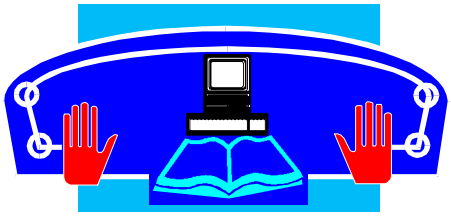

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The members of the Task Force wish to acknowledge the contributions made by Dr. J. G. Hunter. His experience and knowledge contributed to our discussions of the many problems surrounding northern fisheries.

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INTRODUCTION

Section One of this report presented the reconnnendations of the Task Force on Fisheries Development in the Northwest Territories which were arrived at after much sorting and analysis of information, and free and wide-ranging discussion.

During the deliberations of the body, working papers were produced covering many aspects of fisheries development. These documents were used to focus and direct discussion. They are presented here because of the information and analyses which they contain. When they are read, it should be borne in mind that these papers were produced for discussion purposes, and are not necessarily the final recommendations of the group. Section One of the report contains all reconmmndations and should be referred to for this purpose.

AREAS WITH DEVELOPMENTAL POTENTIAL

One of the principal duties of the Task Force was to identify those areas of the Northwest Territories which possess the potential to support some form of fishery. This problem can be approached from a number of different points of view. Basically, any area with sufficient production of fish has potential but economic constraints, chiefly transportation costs, determine whether or not this potential can be realized.

The Task Force decided that, as a first priority, the domestic needs of indigenous peoples for fish must be met. only the harvestable stock over and above this need could be used for commercial purposes. At the same time the Task Force decided that any commercial use of fish had to meet certain criteria: there had to be an adequate supply of fish, the operation had to be economically sound, and the local people affected had to want it. The Task Force then went on to examine the potential of fish resources known and supposed to exist in the Territories within the constraints of these criteria.

Assuming that the domestic needs of the local peoples are met and there is still a harvestable production of fish, the possibility exists for a commercial fishery of some sort. The amount of surplus production will depend on particular characteristics of the water body which determine the productivity of its fish stocks. Commercial and recreational fisheries have been tried or are in operation in a number of areas and these provide some insight into the productivity of

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the fished areas. In addition, there is test fishing data for a number of specific bodies of water which provide information on the relative abundance of different types of fishes. As a first approach, however, some very general statements may be made about the types of lakes and rivers to be found in the Territories, and what they are likely to produce.

It is of major importance to the productivity of lakes and rivers on the mainland of the Territories whether the catchment basin lies on or off the Precambrian Shield. Those lakes receiving most of their water from the Shield are generally low in productivity while those receiving water from the sedimentary rocks and glacial tills of the Mackenzie valley or further south are generally higher in productivity. Most of the lakes in the Territories lie on the Shield, or receive their drainage from the Shield, and are consequently of low productivity. Generally speaking, the lakes lying to the west of the line formed by the Slave, Camsell and Horton rivers should be most productive and should offer the highest per acre sustained yields. Some of these lakes have commercial quotas and others have been fished for domestic consumption. Catches, in general, confirm the productivity of these lakes, but they form only a fraction of the freshwater area of the Territories. The lakes and rivers to the east of this line are likely to be of low productivity. Nevertheless, there are some very large lakes on the shield especially in the Keewatin, which, because of their great size, should produce a moderate harvest of fish. The deep lakes on the Shield

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are also major producers of lake trout and, therefore, play an important role in recreational fisheries.

Around the arctic coast and on some of the more southernly islands arctic char and sea run lake trout provide excellent recreational and some ccnmnercial, potential. The areas of Queen Maud and Coronation Gulfs, Pelly Bay and the rivers south of Rankin Inlet are particularly important. The large lakes of the arctic islands also produce char but these are generally small fish and their productivity is probably too low to support an intensive fishery.

The areas which we know or suspect of producing sufficient fish to make some form of commercial harvest worthwhile may, therefore, be listed fairly simply, according to the area or particular system. Of those lakes lying on the glacial tills and sedimentary uplifts of the Mackenzie valley, the most important is Great Slave Lake, including Kakisa and Tathlina as part of the production unit. These lakes already produce a substantial commercial harvest and the east arm of Great Slave supports an excellent sports fishery. The fisheries of Great Slave were recently the subject of a working party report which analysed the trends in abundance of lake trout and lake whitefish since the fishery began in 1945. The working party made several recommendations which included some modification of quotas (some of these recommendations have been adopted). The overall picture for these species looks favorable, although the trout have declined in abundance drastically in the west basin. The working party decided that it would be best to manage the

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east arm of the lake for the trout fishery, principally for recreation, and to manage the west basin for whitefish. This decision is logical in view of the local topography and limnology of the lake. The east arm receives its drainage mainly from the Shield, and is very clear and relatively unproductive. The habitat is more suited to lake trout than to whitefish. It is also very scenic and offers the best recreational prospects. The west basin receives its drainage from the south and west, is more productive, produces high quality whitefish, and is not very scenic. Recently, the possibility of harvesting the rough fish of Great Slave has been raised and a fish processing plant planned for Hay River will permit commercial sale of these species. There are significant problems with the Great Slave Lake fisheries but they have little to do with the ability of the lake to produce fish. They will be explored later.

A second area of importance is the Camsell drainage. The lakes along this river (Sarah, Faber, Rae, Hardesty, Hottah, Grouard, Clut Lakes) lie in a basin of lacustrine till and are probably reasonably productive. They have been important in the domestic fishing activities of the Dogrib Indians, and Hardesty has been commercially fished. The large lakes in the area bounded by Great Slave Lake, the Camsell River, Great Bear Lake and the Mackenzie River (La Martre, Keller, St. Therese, Backwater, Fish, Willow) should also be productive. All have played an important role in local domestic fisheries. La Martre is presently being fished commercially. St. Therese has a quota for pickerel. Three lakes behind Norman Wells (Kelly, Mahony, Bracket) form another possible production

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unit, as do the group of lakes at the headwaters of the Anderson River (Des Bois, Belot, Coleville, Aubrey, Maunoir). Reports of domestic fishing suggest these lakes are quite productive.

Great Bear Lake and the Mackenzie Delta are two special areas. Great Bear Lake although the largest, is also one of the least productive bodies of water in the Territories. This is a result of its very small drainage area most of which lies on the Precambrian Shield. One major tributary from the south raises the productivity of the McVicar arm somewhat. The Csmsell River, flowing into Conjourer Bay, drains an area of lacustrine sediments, but most of the nutrients carried by this river are probably trapped by the many lakes along its length. For the most part, Great Bear is a larger version of the east ann of Great Slave, and in spite of its great size it will probably never support an intensive fishery. It is presently restricted to sports fishing, and this is probably the wisest fishery use of Great Bear.

The Mackenzie Delta, on the other hand, is one of the most biologically productive areas of the Northwest Territories. The maze of small lakes and channels receives nutrient rich sediments borne by the Mackenzie and Peel rivers. These rivers, because they flow from much further south, also bring relatively warm water to the Delta. The nutrient rich sediments settle out in the slow meandering channels, and in the lakes at flood time, and support prolific plant and animal life. Estimates of the domestic catch of fish for Aklavik alone range up to two million pounds. Of the mainland areas other than Great Slave, the Mackenzie Delta is probably best able to support an intensive fishery.

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The Precambrian Shield area contains most of the lakes in the Territories but these are generally of low productivity and unable to prwide a large yield of fish. The moderate to large sized lakes of this region generally have lake trout in them and may support recreational fisheries. The lakes of the Taltson River drainage and those to the north and east of Great Slave Lake appear to be particularly good for recreational fishing. The very large lakes of the Keewatin (Dubawnt, Yathkeyed, Kaminak, Kaminuriak, Henik and others) may yield a moderate harvest of whitefish and trout, but because of their isolation and low productivity their potential is basically a reserve rather than of immediate interest. Kaminak and Keminuriak are presently being exploited on an experimental basis as a source of supply for the Rankin cannery, but this is.not proving very successful.

Coastal areas, apart from the Mackenzie Delta, are mainly important for arctic char. Of particular value appear to be the runs of the Queen Maud - Coronation Gulf area, and the Pelly Bay area. Of apparently lower productivity are the rivers of the Rankin Inlet area snd the south end of Baffin Island. No comprehensive listing of the char resources of the arctic coast exists, however, so that it is not possible to put close estimates on possible production from most areas. Some streams, such as the Tree River, have been monitored in some detail, but for most all that is known is whether or not char run into them. It is not possible to make even very general predictions about productivity based on the physical conditions of the area for char streams.

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EVen less is known about possible oceanic fisheries, although Mackenzie and Liverpool bays may bear examination from this point of view.

Having decided that a potentially harvestable resource exists, it is then necessary to decide if thereis sufficient fish in excess of the domestic catch to make additional harvest worthwhile. No comprehensive estimates of the domestic catch of fish exist for the Territories. Sinclair, Trachtenberg and Beckford[1] summarize most of the data available prior to 1967. According to their figures some areas, notably the Great Slave area and the Mackenzie Delta, took quite large catches ranging up to two million pounds of fish a year. Recently domestic catches (used mainly for dog food) have declined as dogs are replaced by skidoos but it is not possible to say by how much. Nor is it possible to be sure of the accuracy of Sinclair et als figures. Nevertheless, the figures do emphasize the importance of fish in the economy of northern indigenous peoples. Before a commercial venture is begun in an area it is necessary to assess and protect the domestic requirements of the natives. It is especially important that local people, who may be participating in both fisheries, understand the meaning of our quota system and how it relates to their domestic catch. The sale of "surplus" domestic catch by natives, especially when it amounts to active inter-settlement trading should be carefully scrutinized. The Task Force

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[1] Sol Sinclair, S. Trachtenberg and M. L. Beckford 1967. Physical and economic organization of the fisheries of the District of Mackenzie, Northwest Territories. Fisheries Research Board of Canada Bull. #158, pp. 1-70.

felt that encouragement of intersettlement trade was desirable but that, when it involved fish, the catching of the fish should be governed under the Fisheries Act like any other commercial fishery. A second criterion for development of a fishery in the North was that it be economically viable. It was with this criterion in mind that the Task Force placed more emphasis upon sports fisheries. It is a "fact" of geography that territorial supplies of fish are a long way from population centres and markets. The major obstacle to economically viable commercial fisheries in the North is the cost of getting the catch to market. With a recreational fishery, on the other hand, the customer travels to the source of supply. This, coupled with the fact that people are prepared to pay a great deal per pound of fish for its recreational value yet a rather small amount per pound for its nutritional value makes recreational fisheries very desirable for the Territories. There is a major proviso to the above statement, however. That is that the recreational fishery should be territorial owned and operated to provide maximum return to the Territories. Operations funded and run by outside entrepreneurs provide only minimal economic benefit to the Territories.

Nine species of game fishes are recorded from the Territories[2] (goldeye, Hiodon alosoides; inconnu, Stenodus leucichthys; grayling, Thymellus arcticus; lake trout, Salvelinus namycush; arctic char, S. alpinus; dolly varden, S. malma; pike, Esox lucius; American yellow

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[2] J. D. McPhail and C. C. Lindsey 1970. Freshwater fishes of Northwestern Canada and Alaska. Fisheries Research Board of Canada Bull. #173, pp. 1-381.

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perch, Perca fluviatilus; and yellow walleye, Stizostedeon vitreum). Only four of these occur in sufficient numbers to be taken regularly (grayling, lake trout, pike, arctic char) but each provides a different type of fishing. Grayling, which frequent clear streams and lakes range in size up to about five pounds. They are a beautiful fish with bright silver and blue coloration. They will take a fly or other small lure and are an excellent game fish on light tackle. Lake trout and pike frequent lakes but also occur in rivers, and lake trout occasionally go to sea. Both can grow to very large size. Pike generally frequent the weedy shallows of lakes and may be taken by casting from shore or casting or trolling from a boat. They are an excellent game fish, very savage in appearance. Lake trout generally occur in deeper water but may be taken in quite shallow water in northern lakes. The sport fishing lodges of Great Slave and Great Bear Lakes depend mainly upon the lake trout for their fisheries. The arctic char is perhaps the most highly prized of all. It is restricted in its distribution to lakes and streams near the arctic coast and on the arctic islands. Lake dwelling forms are generally smaller than the stream dwelling forms which spend part of their life at sea. Supplies of these species, if carefully managed, are probably sufficient to support extensive recreational fisheries in the North.

In the past, fishing lodges of the north have depended upon the abundance of "trophy" sized fish to attract a certain clientele. Because of their remoteness, visits to these lodges are expensive.

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Specialty lodges will probably play an important role in recreational fishing in the Territories for many years. Parts of the Territories are much more. accessible now than they were several years ago, however, and many of today's tourists are from the middle income groups. New recreational fisheries should take account of improved communications, both by road and scheduled airline, so that the recreational needs of the middle income groups are satisfied. The immediate need is for facilities in the southwest corner of the Territories, where road access iS good: Facilities accessible by road and offering a number of recreational opportunities, of which fishing is only one, are needed, Northern pike would probably be a mainstay of this sort of fishery with opportunities for grayling, trout and walleye in some areas. Next in importance are fly-in fisheries by local charter from communication centres in the North. Pike, trout and some char would probably be the important fish for such operations. In all such developments, however, the emphasis should be on the wilderness experience of which catching fish is a part, rather than the size of the fish. Further construction of specialty lodge facilities along the inaccessible areas of the arctic coast for char and to the north, east and south of Great Slave seems reasonable. It should be recognized, however, that if specialty lodges continue to place major emphasis on the availability of large fish then their operation will probably have a limited life span. Local depletion of trophy sized fish is already affecting specialty lodges on Great Slave and Great Bear.

Prospects for new recreational fisheries may be summarized then as: road access fisheries in the southwest corner of the Territories affecting the communities of Enterprise, Hay River, Fort Providence, Fort Simpson, Rae-Edzo, and Yellowknife; local fly-in fisheries affecting principally Hay River, Yellowknife, Inuvik and possibly Cambridge Bay and Frobisher Bay; and speciality lodges in the lakes of the Taltson River drainage, east and north of Great Slave and along the arctic coast in the Queen Maud - Coronation Gulf areas. When road access is available the lakes of the Camsell drainage will provide good recreational fishing prospects as well.

Because of the importance of transportation costs in the viability of commercial fisheries, new commercial fisheries should be preceeded by the construction of efficient and inexpensive transportation facilities. For the Territories this means basically road access, although some shipment by barge on the Mackenzie may be feasible. Three areas presently being commercially fished are of immediate concern. The Rankin Inlet cannery suffers from high product cost and lack of markets, and also from a poor supply of fish. The chief reasons for poor supply of fish appear to be poor access to possible freshwater supplies of fish in the larger Keewatin Lakes and lack of motivation among local residents who are expected to provide the labour force for the fishery. The Great Slave Lake fishery, although productive of fish, suffers from poor income distribution, generally low individual fisherman income, and declining markets for its fish. The construction of a processing

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plant at Hay River may improve the marketing situation somewhat, but its efficient operation is predicated on a large supply of rough fish or infested fish which are otherwise unsalable. The required extra production of fish from the lake may not be forthcoming and overall the plant is unlikely to significantly improve the incomes of the individual fisherman, 40 per cent of whom earn less than $1,000 from the fishery. The Cambridge Bay char fishery is in a similar position. It is not possible to give immediate and adequate solutions to the problems surrounding these existing fisheries, but they are the sorts of problems that are likely to beset any commercial fishery in the North. If we are unable to solve them for existing fisheries we are unlikely to do any better in new fisheries. It seems logical, therefore, to direct our energies toward making the existing operations viable rather than launch new ventures which are almost certain to slide into the same pattern. For these and other reasons the Task Force felt that any proposals for new coxnercial fisheries should be very critically scrutinized and, if possible, postponed until existing operations can be evaluated and some of their problems solved.

Nevertheless, given adequate transportation and other factors there are a few areas within the Territories which might offer sufficient harvest to justify a commercial fishery. These are chiefly Great Slave Lake, the lakes of the Cemsell River system, Lac la Martre and other larger lakes between the Camsell and Mackenzie rivers. lakes of the Anderson drainage, the Mackenzie Delta and the larger Keewatin lakes.

Char streams in the Queen Maud - Coronation Gulf area and the Pelly Bay area probably can support a limited commercial fishery but these streams are also extremely valuable for potential recreational fisheries and some decision as to how they are to be used must be made.

This general analysis should end with a word of caution. We are extremely ignorant of the capacity of specific bodies of water to produce fish. Although it is possible to make very general statements about large regions it is not possible to be sure that a particular lake or stream in the area will conform to the general pattern. Any move to exploit specific lakes or streams should, therefore, be preceeded by an adequate examination of the fish resources and potential of the waters. In a few instances this information is available but for most of the lakes and streams of. the .Territories it is not.

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GREAT SLAVE LAKE FISHERY RESOURCE

Commercial Fishery

Commercial fishery production on Great Slave Lake has a gross value of about nine hundred thousand dollars and, together with neighboring lakes produces more than one million dollars gross income to the area per year. If properly distributed this represents a significant and continuing source of income for the area.

The status of present commercial fish stocks in the lake was recently reviewed by a working party, and a summary of their recommendations is attached. Some of these recommendations, slightly modified, have been adopted (Canada Gazette Pt II, Vol 105, #12, pp 905-907). The most important modifications of the working party's reccnmnendations are in the administration of winter and summer quotas, and in the quotas set for the revised control areas. The old and new quotas and quota recommendations of the Task Force, together with the average catches in the control areas from 1957-68 are summarized in Table 1.

Table I. Quotas and catches in Great Slave (millions of pounds).

Control Area		Quota				Catch
Old	New	Old	Recommended		New	1957-1968
I East	I East	1.2	0.56	0.84	0.7	0.92
I West	I West		0.28		0.5	
II	II	2.3	1.5		1.5	1.50
111	V	3.0	0.91	1.27	1.055	1.60
	VI		0.36		0.40	
IV	IV	2.5	0.67		0.83	0.67

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There seems to be no need for immediate concern about stocks of trout and whitefish in the western part of the lake, assuming we accept the working party's decision to manage the western part of the lake for whitefish and allow the trout to continue to decline. It is imperative that the working party's recommendations for continued statistical assessment be adopted and implemented. The measures they suggest are a minimum list of the data necessary for scientific management of the fishery.

Presently valueless or low valued fish stocks in the lake (cisco, pike, suckers, ling) are poorly known and underutilized. If, as the Freshwater Fish Marketing Corporation has suggested, these stocks will be more important in the future while currently valuable species will be worth less, we must begin our re-assessment of the potential production from these species. A start has been made on this but resources and staff are limited. Rawsonls catch statistics suggest that the standing crops of coarse fishes, apart from cisco, are much lower than the original whitefish and trout stocks. Unless their productivity is much higher it may not be possible to extract a large volume from these stocks.

In 1970, 184 fishermen participated in the commercial fishery earning an average of $4,901 (gross). The income distribtuion for Great Slave fishermen is strongly bimodal (Table II); 42 per cent of the fishermen earned less than $1,000 while 18 per cent earned more than $10,000 (Environmental Analysis Service data). The numbers over $10,000

income may not be representative, since some may be co-ops. Nevertheless, it is clear that for a large number of fishermen, fishing on Great Slave Lake is not very rewarding. Assuming that the value of the resource remains at about one million dollars over the next five years, and that the minimum acceptable gross average salary for fishermen in this area is $10,000, then there are at least twice too many fishermen. The main problem with the Great Slave fishery appears tok that' the distribution of income from the fishery is wrong. In addition, if the market for fresh and frozen fish declines and is replaced by volume production of fish products, then the total value of the resource may well decline. For example, if the value per pound of fish caught in Great Slave drops to an average of ten cents then the catch will have to be doubled to take up the slack. It is unlikely that, even on an 'all species" basis, the lake would support a catch of nine million pounds.

Table II. E.A.S. value for Great Slave Lake fisherman income. 1970.

Income Range	No. of Fishermen
0-500	67
500-1000	2 1
1000-1500	14
1500-2000	12
2000-2500	9
2500-3000	6
3000-3500	4
3500-4000	3

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Table II continued.

Income Range	No. ,of Fishermen
4000-4500	2
4500-5000	3
5000-5500	1
5500-6000	1
6000-6500	2
6500-7000	1
7000-7500	2
7500-8000	0
8000-8500	0
8500-9000	1
9000-9500	1
9500-10000	1
>10000	33
Total	184

Total value of fishery $901,857

Average fisherman income $4,901

Part of the problem of too many fishermen may stem from the use of the commercial fishery as a form of social welfare. The impracticability of this approach should be clear from the low income and low productivity of people thrust into such a scheme. It seems that there must be forms of welfare employment more socially and culturally productive and rewarding than the rigours of fishing Great Slave Lake in an open boat.

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If it is agreed that increasing the average income of Great Slave Lake fishermen is desirable, and that license limitation is an acceptable method of achieving this, then a number of other conditions must be met. The particular scheme for licensing must:

(a) Ensure that fishing quotas are achieved;

(b) Cause readjustment of the inc,ome distribution to reduce skew and bimodality;

(c) Promote the permanence, integrity and self-sufficiency of northern consaunities;

(d) Encourage competitiveness and pride among the fishermen.

It seems possible that the present catch is limited by gear and equipment. A straightforward limitation of licenses might not effect income distribution, therefore, but merely reduce the overall catch. The achievement of conditions (a) and (b) above requires, simultaneously with license restriction, a modernization of gear and equipment. For example, larger boats able to operate in rougher weather and get from place to place quickly, equipped with mechanical net lifters and able to carry ice for keeping the fish.

The form of granting licenses and the requirements for continuing to hold a license can aid in the achievement of conditions (b), (c), (d) . Licensing requirements should seek to encourage the sort of fisherman who looks upon fishing as a year-round occupation. This means that only those persons willing and able to devote the time and energy necessary to achieve a *certain* standard can be allowed to fish. At

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the outset licensing should favour persons presently resident of the Northwest Territories and engaged in the industry. There should also be provision for favouring Northwest Territories residents in later reassignment of licenses. The techniques of license restriction and gear limitation must be balanced to encourage the professional fisherman and to discourage the part-time or occasional fisherman.

Both the territorial and federal governments have major roles to play in the dual process of license restriction and gear modernization. The modernization of the industry will require large initial capital outlay which must be amortized over a number of years to the fisherman. Selection, retraining and encouragement of license holders is a major task.

A reduction in the number of fishemen and the modernization of gear and equipment will make it considerably easier to enforce regulations, thus reducing the cost of policing, and making management of the fishery much simpler. A substantial portion of the cost of management and protection of the fishery resource should be borne by the fishery. Lodge, commercial and recreational license fees should reflect the cost of protection and management.

Some possible considerations in the process of license restriction and modernization are:

(a) License fees and minimal license quotas based on the capabilities of the gear and equipment to be used (3- or 4-tier system?);

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(b) Fixed number of licenses in each tier based on fishing quotas for the lake;

(e) Fixed minimal profit sharing scheme for crews;

(d) System of low-cost loans to qualified individuals applying to take up lapsed licenses.

Sports Fishery

One of the recommendations of the working party on Great Slave was that the east arm of the lake be ❑ anaged for the sport fishing. The quota set for area VI and its methods of administration reflect this thinking. This area is serviced by about six lodges. The mainstay of the fishery has been large lake trout, although grayling are becoming more important. As the Northwest Territories becomes more popular as a recreational. area, the demand for recreational fishing will continue to increase. The changes in the numbers of licenses sold for recreational and commercial fishing over the last few years emphasize the growing importance of recreational fishing to the Northwest Territories (Table III).

The growth of tourism and recreational fishing in the Northwest Territories suggests two possible sources of conflict in the near future. ,Conflict between the demand for recreational fishing facilities and the ability of existing lodges to satisfy that demand, and conflict between recreational and commercial fisheries. .

Present lodges are, of course, strongly seasonal operations. In addition they are relatively isolated, expensive to visit, and cater

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to a rather select group. They have depended to a rather sizeable extent on large "trophy" lake trout to attract guests. More than 50 per cent of the owners of lodge and outfitter licenses are not residents of the Northwest Territories, and more than 50 per cent of their gross revenue is taken out of the Territories. Nevertheless, such lodges do provide an economic input of more than one million dollars to the Territories. Because the numbers of such specialty lodges is severely limited by the productivity of large sports fish, the only way of increasing revenue to the Territories is to encourage local ownership and discourage absentee ownership.

Table III. Numbers of commercial and recreational fishing licenses sold in the Northwest Territories - 1964-1971.

Year	Commercial		Recreational	
	Resident	Non-resident	Resident	Non-resident
1964	177	147	354	1088
1965	208	167	503	2103
1966	154	135	626	2533
1967	168	78	924	3028
S968	185	90	840	3403
1969	168	62	1045	3644
1970	266	130	1439	4550
1971	185	98	3346	3238

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The increasing numbers of casual fishermen provide an opportunity for a different type of recreational facility. Lodges offering fishing as part of a total wilderness package and catering to the middle income groups might be successful in the more accessible southwestern comer of the Northwest Territories. Great Slave Lake and its tributary lakes could provide excellent opportunities for casual sports fishing with northern pike as a mainstay but also grayling, trout and possibly inconnu. Strictly seasonal operations should be discouraged and the possibilities for winter recreation explored.

There are two possible sources of conflict between sports and coxnercial fishermen. The first is through competition for the same species, e.g. lake trout. The second is through differing attitudes toward the value and preservation of some species, e.g. pike. The first conflict can be partially avoided through the use of regulations limiting the commercial fishing effort in some areas (e.g. the east arm of Great Slave). Where recreational species are caught incidentally to the capture of commercial species modifications of gear or times of fishing may help. In any case such problems would be more easily sorted out if the coxnercial fishery were on a more solid economic footing. The problem of differing attitudes toward predatory fishes is mainly an educational problem since it is generally based on naive conceptions of ecological relationships.

Domestic Fishing

In 1944, Rawson estimated the domestic catch of fish from Great Slave Lake to be 500,000 - 1,000,000 pounds. Data in Sinclair

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et al., 1967 suggests that in the 1960's domestic fishing took around 500,000 pounds per year. This is equivalent to about 12 per cent of the commercial catch, and increases the overall estimate of the lake's production to more than five million pounds a year.

At the moment there is no organized method for estimating domestic catch around Great Slave Lake. Although the indigenous peoples are entitled to full use of the local resources there may be some tendency to abuse this right. Since any domestic catch must be taken into account when computing the commercial quota, a shortage of information on domestic take weakens management procedure. In those areas where natives participate both in the domestic and commercial fishery any abuse of the domestic fishing rights cannot be tolerated.

Presumably, the domestic take of fish will gradually decline as the Indian population is slowly assimilated by the European, and as the use of dogs declines. Nevertheless some effort should be made to assess the domestic catch, to improve its efficiency and value to the people, and to convince them of the need for effective conservation practices.

GREAT SLAVE LAKE WORKING PARTY REPORT

Summary of Recmmnendations:

1. Control Areas be adjusted **to divide present Area III into Areas V and VI with the elimination of Area III.**
2. **Control Areas I, II, and IV to be managed for whitefish. Control Area VI to be managed for trout. Control Area V to be managed primarily for whitefish but with close attention to trout production.**
3. **The following quotas be established:**

	Winter	Sumner	Total
Area I (east)	.34	.22	.56
(west)	.28		.28
Area 11	.8	.7	1.5
Area IV	.14	.53	.67
Area V	.23	.68	.91
Area VI		.36	.36
			4.28

4. Consideration be given to some form of effort control.
5. Closure on the fifth of September, for Areas V and VI.
6. No control on net yardage, or twine size.
7. No change in mesh size or hanging ratio.
8. An improved statistical system be inaugurated.
9. A management committee be established for the annual review of regulations.

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GREAT BEAR LAKE - THE MANAGEMENT PROBLEM

Great Bear Lake presents a number of management problems which, to a large extent, result from its unique physiographic characteristics. Chiefly these are its size, great depth, northerly location, and the fact that its drainage basin lies mainly on the hard Precambrian rocks.

Early surveys by Miller and Kennedy indicated that lake trout formed the major fishery resource in the lake but that these were confined to inshore areas shallower than about 60 feet, were not very numerous, grew very slowly and reproduced irregularly. "These facts combined to indicate that, in spite of the size of the lake, any form of commercial fishery was out of the question, but a fairly restricted sports fishery for the trout should be viable.

There are at present six lodges on the lake catering to sports fishermen. The main lodges provide 207 beds in their accommodation while outposts provide an additional 80 beds. Such lodges, because of their remoteness, are extremely expensive to visit. Their main attraction has been that they provide a certain class of fisherman with the opportunity to catch a large lake trout. In addition, some lodges offer side excursions to the Arctic coast to fish for Arctic Char.

I think we must accept the fact that Great Bear will never support an intensive commercial fishery, and that it should be managed as a sports fishing lake. Also, it seems unlikely that communications to the lake will markedly improve over the next five years, in which

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case the fishery should probably continue to be a sports fishery for very large lake trout. The problem then is to decide how much fishing the lake can stand while still producing "trophy" fish. There is little information with which to answer this question and we must move at once to begin collecting the necessary data. But first let us briefly examine two points relating to the status of the fishery.

The general rule used by the Division of Tourism, Government of the Northwest Territories in the policy for separating lodges in the Northwest Territories is 2.5 shore line miles per guest bed per season. This is based on an allowable harvest of two ounces per acre suggested by J. Hunter, an allowable harvest of 200 pounds per guest bed per season based on a one mile off shore strip. Great Bear has a shore line of about 1,250 miles. On the above basis it should support 500 beds. The present 287 beds is well below this mark. Present harvest pressures greatly exceed 200 pounds per bed per season. Two of the lodges have moved their main encampment to one of their outpost encampments, strongly suggesting that there is at least localized overfishing if not general overfishing of the larger fish, and that these guidelines are of little value in managing the Great Bear fishery.

We are, therefore, in a position of knowing that overfishingis occurring but being able to make only limited predictions about the extent of this overfishing or the time it will take the lake to recover.

A minimum list of the information necessary for the biological management of the sports fishery is the length, weight, age, condition

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and area of capture of fish caught by sports fishermen. Since the lodges seem reluctant to provide this information voluntarily presumably they must be compelled to provide it. The following measures would help ensure that these data are checked:

1. Lodge licence fees at present do not reflect the cost of administering the fishery. It is suggested that minimum charges should be $100 per guest bed per season for the main lodge and $50 per bed for outposts. The majority of this revenue should be put back into" management of the fishery.
2. Lodges be required to permit a certain number of fisheries observers to spend the season at their lodges, accompanying fishing expeditions and collecting the necessary information listed above. Compensation could be provided lodges at a reasonable rate for meals and/or lodging of observers. Licence fees could go toward paying summer observer's salaries.
3. A start be made to define the distribution of lake trout seasonally and from year to year in more detail. Such data could be used to give lodges clues as to where to locate outposts and where and when it is best to fish.
4. Lodges be encouraged to vary the fare a bit more and include grayling and walleye from some of the nearby lakes in their packages.

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SOCIOLOGICAL ASPECTS OF FISHERIES DEVELOPMENT

Fishery development inthe Northwest Territories should be designed to achieve maximum utilization of available fishery resources for the primary benefit of territorial residents. This objective can best be achieved by attempting to:

(a) Improve harvesting and processing efficiency.

(b) Improve harvesting and processing quality control.

(c) Promote the sale of surplus production to an outside market.

(d) Create an awareness and understanding of resource limitations and promote conservation techniques> thus providing for future resource requirements.

(e) Promote a more reasonable distribution of income from fishing.

(f) Promote increased recreational use of the fishery resource by residents and non-residents as an additional means of stimulating the local economies of the Northwest Territories.

In each of the above areas of fishery development, certain constraints, reflecting basic difficulties in social transition, can be anticipated.

(a) Improvement of harvesting and processing efficiency.

Efficiency in modem society implies a favorable relationship between factors of input and eventual output. Time is one significant input because:

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(i) Each unit of individual time not required in the production of a unit of output is available for additional economic or recreational activity.

(ii) There is a definite distinction between time expended for economic returns and time expended for non-economic return.

In primitive society, time has much less significance. This has been particularly true of the Indian and Eskimo way of life in northern Canada, and this difference in life-style has led to some of the problems encountered in establishing certain developmental projects.

However, in introducing the concept of efficiency to a primitive or semi-primitive people, it is important that the following not be overlooked:

(i) Time saved in the production of a certain level of output may not be channeled into further economic activity due to the limited employment opportunity available.

(ii) Time saved in the production of a certain level of output may not be channeled into recreational or non-economic activity due to limited recreational facilities available.

(iii) There is little distinction in a primitive society between time expended for economic and non-economic r'eturn.

Example:

Through introduction of modern gear, the time expended to satisfy a domestic family requirement of 100 pounds of lake trout may

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be reduced from ten hours to one hour. Production per unit of effort (time) has increased ten times. What happens to the nine hours of saved time? In the absence of trap lines to attend, other domestic chores to be completed, or a local film to view, the individual involved is not likely to see much advantage in the harvesting efficiency achieved. Unless unusual hardships due to extreme bad weather are involved, a large portion of time originally expended to harvest the fish may be considered as purely recreational.

Because of limited opportunity in a primitive society for specialization, the value of other inputs such as tools and gear has been traditionally related closely to time. This, the value of improved basic gear, is largely a question of time-saving.

The improved efficiency through better gear which is not manufactured by the user presupposes that the unused time saved by acquisition of such improved gear can be channeled into some economic activity, the gains from which could contribute to the cost of modern gear acquired.

Example:

The use of canoes and outboards in coastal char fishing for domestic consumption may not be a real improvement in overall efficiency unless other local opportunities provide multiple use of such equipment. With limited alternative economic opportunity, the time required to construct a kayak or canoe and the time required to paddle to and from the resource site, if considered partially recreational, does not necessarily represent inefficiency.

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The introduction of exchange on-market value in commercial fishing offers some advantages.

(i) During the fishing season, opportunity is provided for continued economic activity. The multiplying effect of greater efficiency on operations progress is more easily acceptable.

(ii) Total productive involvement in an efficient commercial operation will tend to accumulate recreational and other time requirements which can be accounted for at the end of the fishing season.

However, even in commercial fishing, the cultural and traditional lack of emphasis placed on time by indigenous groups will continue to be a constraint in improving the efficiency of harvesting the resource. Even where opportunity exists for a more productive use of time, modern efficiency does not always appeal to the values of local groups.

The mix of recreational and productive use of time in sophisticated methods of processing is not easily accepted. Specialization of function and the repetitive nature of some processing tasks requiring full concentration for extended periods of time are not easily mastered. Monotony from lack of variety during a daily shift is usually evident after the first few days, and can lead to problems in maintaining a modern production system.

CONCLUS1ON

Members of a "non-sophisticated" society are, generally not motivated toward efficiency because of a traditionally different concept of time, and limited economic opportunity.

RECOMMENDATIONS

The integration of fishery development with the development of other available resources could provide an opportunity for increased motivation toward efficiency. In most local economies of the Northwest Territories, efficiency is relative to the extremely limited total resources.

(b) Improvement of harvesting and processing quality control.

Product quality considerations are mandatory in the development of fishery resources for two major reasons:

(1) In the domestic use of the resource, there are considerable local health hazards associated with unhygienic handling and improper processing of food.

(2) The exchange value of food products varies considerably with the health standards maintained in its harvesting and processing.

Considerable progress has been made among Indian and Eskimo residents of the North in the raising of local health standards, however, much more education is necessary to ensure the practice of routine disease prevention.

Considerable difficulty can be expected in attempting to explain the difference between the natural aging of fish or caribou meat and the controlled aging of delicate cheeses and wines. A large part of the diet of the primitive Eskimo was made up of meats exposed to various elements,, especially during times of extreme scarcity.

Fortunately, the climatic environment of the Canadian Arctic provides many natural hygenic controls.

The high standards of quality control demanded in the harvesting and processing of fish for a modern consumer's market is not an easy concept to grasp in view of the above. Many of the standard requirements of the sophisticated consumer are not related by the Indian and Eskimo to health standards of the importing society. Until better understanding of a few basic biological health factors and the variation in consumer metabolisms are grasped by northerners, market price must be relied upon heavily to ensure good product quality.

This reliance on the market price, however, can be very wasteful and cruel. Some step-up in related educational programs is required to assist commercial fishermen.

CONCLUSION

The modern quality standards demanded in the food industry are very difficult for the Indian and Eskimo fisherman to accept. Extensive education is required to clarify the basis of such standards.

(c) Promotion and sale of surplus preduction to an outside market.

Because so little marketing mechanism is available for study in most northern communities, the total significance of consumer demand in an exchange society is difficult to understand. Exchange between the Canadian North and other areas is largely a one way affair at present. The full cycle of marketing is more easily understood than certain aspects in themselves.

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Much of the Indian and Eskimo population is totally ignorant of the many factors which contribute to the fluctuations in local prices for sealskins. Considerable suspicion has traditionally been aimed at local traders during rapidly changing prices. It would appear to them that the quality of the product has little effect on market price as is suggested at times by the buying agent.

CONCLUSION

In the promotion of fishery products from the North, the full participation and involvement of northern residents is frequently restricted by lack of information affecting market demand and price. More aggressiveness and enthusiasm in the industry can be expected if some of this additional knowledge related to the market were available.

RECOMMENDATIONS

Any promotional program to assist fishery development in the Northwest Territories should include some marketing education for the benefit of fishermen. Of major importance in stimulating participants is further knowledge of mechanical aspects of marketing, which determine the extent of opportunity available.

(d) Create an awareness of resource limitations and promote conservation techniques to provide for future resource requirements.

There are two primary reasons why progress is generally slow in the encouragement of conservation techniques among primitive groups, namely:

(1) Very little emphasis is traditionally placed on long term planning.

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(2) Limited populations, especially in a nomadic life style, and the absence of resource exchange value, placed very little pressure on the resources of the area they frequented.

While considerable seasonal planning was practiced in primitive harvesting for food, the modern concept of planning several years ahead was non-existent. This concept is still relatively new among the northern Indian and Eskimo. There is still much evidence of the old philosophy that each year is expected to take care of itself. While current education has done much to generate long term planning, the basic motivation toward its actual practice is yet rather limited.

Concern for the future supply of fishery resources involves a certain amount of planning over an extensive time period. The significance of sustained yield is not obvious over a short period of one or two years. The sparsity of population across the large landmass of the North, and the traditionally small groups of native people in particular areas, offered very little threat to fishery resources. It was generally accepted that an area was resource bearing, or void of resources, for purely natural reasons over which one had very little control. However, the introduction of resource exchange value in commercial exploitation is accompanied by increased pressure on available resources. At present, the new concept of volume harvesting for exchange purposes is juxtaposed against the old concept of unlimited supply without a clear grasp of the interaction of the two.

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CONCLUSION

The need for conservation techniques has not yet been grasped by northerners because no relationship has been established between changes resulting in increased demands on the fishery resource and certain controllable limitations on all renewable resources.

RECOMMENDATIONS

Some basic knowledge related to fish population growth and depletion rates should be included in any educational program designed to assist fishery development in the Northwest Territories.

(e) Promote a reasonable distribution of income from fishing.

Ideally, the exploitation of the fishery resource in any part of the country should attract people who have some degree of committment to the industry. Unfortunately, even in the southern zones of North America, the fish harvesting season is relatively short and most fishermen rely on additional occupations during the winter months. The season in southern Canada, however, is sufficiently long to afford some degree of specialization. Considerable proficiency is maintained from season to season, with most commercial fishermen returning each season. In contrast, the fish harvesting season in most of the Northwest Territories is a maximum of 2 1/2 to 3 months for freshwater fish such as whitefish and trout and a couple of two or three-week runs in spring and fall for Arctic char.

With the exception of larger resource areas such as Great Slave Lake, and the pending possible development of winter fishing,

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opportunity will continue to be relatively limited even after improved techniques are available.

Such limitations will tend to encourage agreatnumberof part-time fishermen, motivated by the traditional habit of spreading the efforts of each individual over all available resource aspects, as opposed to the concentration of certain individuals according to preference.

In the Northwest Territories, this may be a much more desirable objective or means of income distribution than more modern methods of harvesting would allow.

CONCLUSION

The most logical means of improving income distribution in the Northwest Territories in the near future may be at the expense of increased efficiency in modern terms.

RECOMMENDATIONS

The emphasis on efficiency in development of fisheries should vary to some degree with progress made in the development of other resources in the Northwest Territories.

(f) promote the recreational and sports use of the fishery resource by residents and non-residents as an additional means of stimulating the local economy of the Northwest Territories.

The Northwest Territories is presently experiencing considerable overflow from other provinces and the U.S.A. in sports and recreational activity. The potential opportunity in the Northwest Territories from

extensive travel to suitable areas of sports and recreational fishing will tend to vary with the ability to provide services such as accommodation, transportation, guiding, etc.. Many service demands will be precisely defined by the market, and in spite of difficulties which may be involved in providing such services, will have to be met on those terms if the related opportunity is to materialize.

Example:

Many sportsmen who visit the Northwest Territories have considerable experience in rough water boating and have their own concept of travel restrictions due to lake winds and fast water.

This may differ considerably with that of locally hired Indian and Eskimo guides.

Three distinct possibilities may be involved here:

(1) Eskimos particularly are not keen swimmers. Consequently, considerable margin is allowed psychologically.

(2) An additional margin of safety may be allowed due to the inadequacy of equipment.

(3) An appropriate local margin of safety may not be practiced due to lack of confidence on the part of the guide in dealing with visiting sportsmen.

In this example, further training in particular travel methods may be necessary. Further investment in proper equipment to meet prevailing travel conditions may also be necessary. Further education also may be required to provide potential guides with a better knowledge of what to expect when guiding tourists.

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CONCLUSION

A period of adaption can be anticipated in the initial association of local residents with the habits and expectations of visiting sports fishermen.

RECOMMENDATIONS

As much opportunity as possible should be made available for prospective participants to become more accustomed to standards of service characteristics of the industry.

The above are a few sociological aspects which may merit some consideration in Fishery Development of the Northwest Territories. They are in no way meant to be truly representative of all areas of the Northwest Territories. Emphasis has been placed on possible conflicts in the exchange of ideas between two distinctly different" cultures.

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RESOURCE-USE CONFLICTS

Resource-use conflicts may be divided into those uses competing for the same fish and those uses competing for fish habitat.

(A) Conflicts between domestic, recreational, and commercial fisheries.

The policy to date has been one of giving first priority to domestic requirements. Sports fishery uses are generally considered second due to the theoretically greater economic impact of such endeavors. Any surplus following these uses may be.allocated for commercial use.

Due to improved freezer and backhaul capabilities now being developed, some coastal communities have started to fish Arctic char for outside sale. Such activities by communities could begin to encroach on areas now being used as satellite camps for sports fishing. The final outcome of such a conflict could involve a direct choice between commercial exploitation by the native 'peoples, or sports use by (usually) non-residents. This problem must be recognized and decisions made before it becomes a "fire-fighting" type decision. The guidelines stated in N.W.T. Policy Statement No. 2 are excellent however, they apparently have not been followed to date. These should be put into practise immediately.

Quotas for commercial fisheries are established on a whole-lake basis. To date, domestic catches have not been subtracted from the quota for the lake, and consequently a real danger exists of over-fishing. Although it is not an easy thing to determine the domestic

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catch, an attempt must be made to do so in those areas where such a problem exists. Subsequently, the total allowable quota must have subtracted from it the domestic catch, thus obtaining a commercial quota. Ifno figures are available concerning the domestic catch, then estimates must be made until such data are available.

(B) Conflicts for fish habitat.

(i) Hydro-electric.

At present there is inadequate consultation between renewable resource managers and the Northexn Canada Power Commission. Proposals exist for water impoundments in many areas of the Northwest Territories but these are not circulated to other resource-oriented agencies unless specifically requested. Studies to obtain baseline and impact data frun aquatic systems may require substantial expenditures of manpower and funds and consequently must be initiated early in the planning stages for hydro development. Assessment is often necessary prior *to* structural modifications being recommended (e.g. fish ladders), further necessitating long-range planning, as most areas of the Northwest Territories are little known in terms of aquatic biology.

The following facts are available:

1. N.C.P.C. holds bi-annual meetings with the Water Resources Branch of the D.I.A.N.D. ; however, this is primarily due to the fact that the commission is financially responsible to D.I.A.N.D. and the meetings are mainly for economics and policy.

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2. No other meetings are held on a regular basis.
3. The Department of the Environment is not contacted routinely during any stages of N.C.P.C. planning.
4. N.C.P.C. has sent out "feelers" to other departments concerning liaison but nothing positive has come of this.
5. N.C.P.C. has' recently placed Regional Managers in Yellow-"knife and Whitehorse who could perhaps serve some liaison purpose.
6. N.C.P.C. are not aware of"who should receive the relevant material concerning resource-usec onflicts. This could be solved by their employing a 'liaison biologist" (under loose consideration) or by seine other method.

Recommendations"

1. Copies of all feasibility studies contracted by N.C.P.C. should be sent to Regional Director, Fisheries Service, Central Region, and to the Department of Industry and Development, Government of' the Northwest Territories.
2. As soon as tentative development schedules are proposed, the above persons should be notified and a meeting between representatives of N.C.P.C. and these agencies convened.
3. Copies of all ecological assessment proposals contracted from consultants to N.C.P.C. should be forwarded to the Regional Director, Fisheries Service, and to the Director"of Industrial Development, Government of the

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Northwest Territories. In this manner, coordinated surveys are possible, and unnecessary duplication can be avoided.

(ii) Mining.

The present boom in oil and gas exploration will spur the construction of new transportation facilities and make new areas attractive for mineral exploration. A service road along the Mackenzie River will give easy access to lakes near the river, and small airstrips built by oil companies will reduce costs of mineral exploration. The "Manhattan" has demonstrated, further, that properly designed ore carriers can negotiate Lancaster Sound for up to ten months of the year.

The three major areas most likely to be developed in the next five years are the Mary River iron deposits south of Pond Inlet on Baffin Island, the lead-zinc deposits on Little Cornwallis. Island, and the lead-zinc deposits on Strathcona Sound.

Other areas that hold promise are the Indin Lake (S.E. of Great Bear Lake) and Beulieu River areas (E. of Yellowknife). There are promising uranium possibilities in the Kazan River area, while Hope Lake (west of Coppermine), High Lake (west of Bathurst Inlet) Contwayto Lake and the Perry River region also are likely areas for future developments.

It is quite likely that development will be fairly rapid when it does occur, allowing inadequate time for pre-developmental assessment of renewable resources to take place. It is, therefore, important that these areas be assessed biologically so that when development occurs the necessary safeguards can be used to protect the other resources present.

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The current impact of mining developments is localized, and the effect on aquatic systems is primarily one of effluent disposal having varying effects on local populations, depending upon the relative toxicity of the discharge.

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LEGISLATION AND FISHERIES DEVELOPMENT

The primary objective of the Task Force ,regarding legislation is to identify those statutes having direct or indirect effect on fisheries development in the Northwest Territories, and' to recommend broad areas of change or further investigation as required.

There *are* three major types of legislation in effect which influence fisheries development:

A. Resource use legislation, e.g. Fisheries Act and the regulation set thereby;

B. Marketing legislation;

c. Taxation legislation, e.g. Income tax.

Resource Use Legislation

A. Administered by Fisheries Service.

1. The Fisheries Act and Regulations made under authority. of this act, e.g. N.W.T. Fisheries Regulations; Walrus, Beluga, Seal, and Narwhal Protection Regulations; Applications of Fines and Forfeitures.

2. The Fisheries Development Act.

(a) Fishing Vessel Assistance Regulations.

(b) Fishery Products Storage Regulations.

3. Fishing Vessel Insurance Regulations.

B. Administered by the Government of the Northwest Territories.

1. Travel and Outdoor Recreation Ordinance.

2. Public Health Ordinance.

Marketing Legislation

1. The Fisheries Inspection Act.

2. Freshwater Fish Marketing Act.

3. General Legislation concerning tarrifs and trade.

The Northwest Territories Fisheries Regulations have the most direct bearing on fisheries development. These regulations have undergone numerous minor amendments, and are presently being completely revised. Certain broad areas of required change are:

1. Resource-use conflicts.

In many areas there is conflict between sports, commercial and domestic fisheries which compete for the same fish. Domestic fisheries are by far the most difficult to manage as no licensing or catch reporting are required. Any fisheries management program must consider all fish which are removed from a system, for whatever purpose, prior to allowing further commercial of sports harvest. This is a sizable problem on many char producing rivers of the Northwest Territories and must be solved if fish stocks are to be managed on a sustained yield basis.

2. Angling regulations.

Changes are required to reduce the amount of fish being harvested at sports fishing lodges, such as fillets being included as fish in determining possession limits.

3. Enforcement.

As more biological data are acquired, allowing for the implementation of realistic fish quotas, the necessity for adequate enforcement

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becomes very great. Consideration should be given to alternatives to the quota system, such as licensing restrictions for certain areas, limiting the numbers of guests at lodges, etc. The quota system, for example, requires a heavy commitment of field staff to adequately enforce it during peak periods, making it difficult to justify staff requirements on a year-round basis. Licensing restriction could be a useful tool, as it would allow the holders of a commercial license to be reasonably assured of an economically successful ventrue should sufficient effort be extended.

4. The present 'Control Area", as described in Schedule A of the Northwest Territories Fisheries Regulations should be discarded, and lakes managed on an individual basis. The area involved is sufficiently diverse biologically to require a more specific program of inventory and monitoring to ensure that the fish stocks of the area are properly used. The other regulations arising from the Fisheries Act are comparatively straightforward, and no major changes are apparently required although these regulations should certainly be reviewed in conjunction with any rewrite of the Northwest Territories Regulations to maintain continuity in enforcement policies.

Marketing Legislation

1. Fish Inspection Act.

The most important area of concern under this statute is the requirement for registration of all fish handling and processing establishments. Possible requirements for remote establishments in the

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North involved in dressing and packing fish are presently being studied by the Northwest Territories Department of Industry and Development and by the Fisheries Service.

Inspection regulations in general are a safeguard against poor quality products reaching the market, and should be viewed as a necessary requirement in maintaining high standards.

2. Freshwater Fish Marketing Act.

Changes that would facilitate the marketing of high quality, low priced fish in major population areas such as Great Slave Lake, Mackenzie Valley and Delta, and Frobisher Bay are desirable.

3. Other legislation.

At a recent meeting, Mr. Ray Brooker, Sales Manager for the Freshwater Fish Marketing Corporation indicated that the floating of the Canadian dollar and the ten per cent surcharge imposed on imports to the U.S.A. have both had adverse effects on the sale of freshwater fish. The economic measures presently beind discussed by the U.S. and Canada could have further effects and must be taken into consideration as they become known. Such problems could, in many cases, be alleviated by a reduced dependence on foreign markets through increased fish sales within Canada.

Taxation legislation.

The effect of U.S. income tax regulations on the sport fishing lodges in the Northwest Territories, for example, could be substantial. Before new developments particularly sports fisheries, are designed,

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the origin of the customer and the fragility of any taxation system contributing to their presence in the Northwest Territories should be assessed.

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HAZARDOUS SUBSTANCES

When fish from the Saskatchewan River system were found to contain high levels of mercury in November, 1969, a survey of inland waters was undertaken to guage the full extent of the problem. This survey has included a number of lakes in the Northwest Territories and, although levels in excess of the 0.5 p.p.m. mercury set by the Food and Drug Directorate are relatively infrequent, a number of lake trout from the high mineral bearing areas of the Precambrian Shield have been found to contain levels in excess of the standard. This has led to the destruction of 6,000 pounds of trout and a curtailment in the operation of the Rankin Inlet cannery by restricting their operation to whitefish and Arctic Char. This cannery also utilized beluga whales which have likewise been found to contain high levels of mercury.

In addition to the beluga whales just mentioned, excessive levels of mercury have been discovered in other marine mammals, in particular the fur seal where levels in the liver have exceeded 100 p.p.m. This survey is still in its early stages but a problem obviously exists that could affect many isolated settlements which depend on marine mammals for part of their diet.

Surveys for pesticides and other heavy metals have been, or are currently being, conducted in the Northwest Territories. Results to date are encouraging and a repeat of the mercury problem is unlikely.

Surveys to date have been aimed at analyzing fish from the major commercially fished areas as these fish potentially affect most

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people. The current practice is to attempt to sample lakes in the Northwest Territories prior to their opening for commercial fishing; failing this, the first production from the lakes is sampled and analyzed. This procedure will continue in the future although due to the high costs involved in sampling a lake for the sole purpose of obtaining samples for heavy metal analyses it is necessary to combine sampling with our biological assessment program, or to obtain samples through local government personnel in the area.

Surveys to assess the problem as it affects domestic and sports fisheries will require even more extensive sampling than do commercial fisheries as they are so widespread. In cases where extreme levels, such as those in seal livers, become evident it is necessary to warn all domestic users prior to a complete survey. In the case of fish, however, such extreme levels are not evident in the Territories and the proposed approach is to await a more detailed analyses of the problem through the sampling of commercially fished lakes. Where thirty or more samples from a lake or area indicate a recurring occurrence of a hazardous substance in levels considered unsafe, some method of notifying sports and domestic users must be adopted either by posting lakes or attaching a list of lakes and affected species to each angling licence.

A 1969-70 survey conducted by Environment Canada - Fisheries Service showed that pesticide residues in the Northwest Territories are well below the established tolerance levels, and that Pesticides will likely not affect the marketing of fish from the Northwest Territories.

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Reccnmuendations regarding hazardous substances.

The fisheries of the Northwest Territories have not been as adversely affected by mercury as have other regions in Canada. However, because of the geography of the area, any disruption in production or marketing can tilt the economic balance and result in a non-viable operation. To reduce the possibility of this happening, the following measures are suggested:

(a) Conduct a survey program.

This involves withdrawing a random sample of various sized fish of the same species from different areas and analysing them for contamination. This could lead to a program which harvests fish of a certain size, these fish having lower levels of hazardous substances due to'a size-contamination relationship. Prior to establishing any fishery development operation, conduct an investigation of the fish to be used to ensure that no further problems arise.

(b) Investigate different processing methods.

In some cases, different methods of product preparation can result in a final fish product which meets health requirements.

COMMUNICATION BETWEEN THE FEDERAL GOVERNMENT AND THE GOVERNMENT OF THE NORTHWEST TERRITORIES AND LATERALLY WITHIN EACH

One of the reasons for the establishment of the Task Force was to encourage a closer link between the agencies concerned with the fishery resources in the Federal Government and the Northwest Territories Government. There was evidence of conflicting or divergent policies, which were affecting the management and utilization of the resource. The Task Force was to serve as the first step toward a coordinated and cohesive approach to resource use planning for the Northwest Territories.

Similarly there was evidence of lack of coordination between agencies within each of the respective governments. Several senior planning groups are currently reviewing the question of coordination on a broader scale, particularly within the Federal Government. However, the Task Force felt it could play a valuable role by focussin"g upon those problems specific to the fishery resource in the Northwest Territories.

One of the major problems affecting communication and joint planning is that of distance. Geographical separation of the various agencies is a frequent cause of planning and decision-making being carried out in isolation. For this reason the problem presents a particular challenge. The working relationships of staff from the different organizations and the use of modern cOmmunication links must be given more attention. It must always be remembered, however, that effective

coordination and cOmmunication ultimately depends upon the efforts of individual people. All the Task Force can do is to pinpoint weak areas and recommend systems which may foster the development of a cooperative approach.

Specific Problem Areas

I. Between the Federal Government and the Northwest Territories Government.

It has previously been determined that the Northwest Territories Government should communicate with the Federal Government on all fisheries matters through the aegis of the Regional Director, Fisheries Service, Winnipeg. The two agencies within the Northwest Territories Government with direct interest in fisheries are the Industrial Development Branch and the Tourism Branch, both within the Department of Industry and Development. Thus it is critical that these federal-territorial links be strengthened and developed.

Suggested courses of action

1. Installation of Telex communications between Yellowknife, Hay River, and Winnipeg will facilitate communications.
2. Closer communication at the senior government level when program planning decisions are being made would facilitate an integrated approach to management and resource use.
3. Closer liaison between people at comparable working levels e.g. (1) Supervisor, Northwest Territories Fishery

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Development - Head, Fishery Management, Fisheries Service - District Administrator, Yellowknife, Fisheries Service; (ii) Northwest Territories Industrial Development Officers - Fisheries Service Conservation and Protection Officers and Inspection Officers would facilitate implementation of management and development programs-at the *operations* level.

4. Distributing of organizational charts showing the names of people holding given positions and their areas of responsibility between the two agencies (Fisheries Service, Central Region and Northwest Territories Industry and Development Branch), would permit immediate identification of responsible individuals of the operations and management level who should be contacted when new proposals are being considered.

5. Circulation of all progress and final reports on projects conducted by either *agency* to the other would permit each agency to keep up to date on the officers' activities.

II. Within the Federal Government.

A. Interdepartmental

1. Department of Indian Affairs and Northern Development : Environment Canada, Fisheries Service.

The Department of Indian Affairs and Northern Development has responsibilities in environmental protection and land use which are of concern to fisheries interests. In addition, this department provides

substantial financial support for the activities of the Government of the Northwest Territories. COmmunications between D.I.A.N.D. and Fisheries Service at the planning stage of new programs could ensure that these programs yield optimal benefits to northern residents and reduce conflicts to a minimum. In some cases, a clear definition of responsibilities could help to eliminate duplication.

2. Northern Canada Power Commission : Environment Canada, Fisheries Service.

The Northern Canada Power Commission is a Crown agency responsible for the generation of the power requirements of the Northwest Territories. It carries out or commissions investigations into the hydroelectric potential of northern river systems. Communication and coordination at the planning stage of N.C.P.C. studies could ensure that the potential ecological effects of proposed power developments would form an integral part of such investigations. Ecological studies are of a long-term nature and cannot be carried out effectively in a 12-month period prior to construction.

B. Within the Fisheries Service

1. Resource Management Branch : Freshwater Institute.

There is a need for a closer liaison between these two agencies, involving discussion of all research and management activities in the Northwest Territories. There should be joint definition of (i) the needs for research and (ii) management priorities, which should be closely allied to the findings of the Task Force. Programs should be designed to meet these needs. Regular review of programs is essential.

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Closer coordination of activities will be more feasible when both agencies are located in the same building.

2. *Resource* Management Branch : Industrial Development Branch, Ottawa.

All of the activities of the Industrial Development Branch in the Northwest Territories must form an integrated part of the management and research thrust. Their programs should form an integral part of any development plan.

The Industrial Development Branch is currently administered from Ottawa. Joint planning and cOmmunications would be facilitated if their operations were decentralized.

3. Resource Management Branch : Economics Branch.

There is a need for closer liaison between these two branches to develop programs to *assess* the economic effects of changes in management and legislation.

4. Resource Management Branch (internal).

There is a need for district staff stationed in the Northwest Territories to be better informed of departmental activities and programs. The responsibility to see that this is done lies with Regional Office and with District Administrator. The installation of Telex communications will help to alleviate this problem.

III. Within the Territorial Government - Department of Industry and Development.

The continuous transmission of ideas, policy, status of programs, planning, etc. between headquarters, regional and particularly

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field personnel, is vital for two reasons: Firstly, because of the tremendous distances and consequent communication difficulties that arise, personnel at the field level are frequently looked upon by local people as "the government". How well informed they are has a telling result on how effectively problems are dealt with. In this role they are often the first contact which members of the public, the Settlement Council, Trappers' Association or local Co-op may have with the government when a fisheries question arises. Good information and sound advice given at this point can settle a question at an early stage and avoid misunderstandings of government policy, with subsequent repercussions at a later.time and frequently at a different level. These enquiries , it should be pointed out , may apply to both Territorial and Federal (i.e. D.O.E.) responsibilities. Secondly, because the field men are resident in an area, they are in a unique position to provide valuable insight into fisheries and sea mammal activities, i.e. information on harvests, trade, angling activity, etc. Provision of this information to regional and headquarters levels is important for identifying and assessing fisheries development possibilities as well as providing the management agency (Department of the Environment) with informationwhich will allow northerners to pursue their traditional way of life without jeopardizing the stocks of fish on which they depend.

To this might be added the fact that these personnel are among the first to know of, evaluate, and report on other activities that may be important in preserving the ecology of the area (e.g. seismic and drilling activity).

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Of the approximately 40 game and industrial development officers located at different points across the Northwest Territories, many have technical or practical understanding of the North, the way of life of its inhabitants and its. problems. Most are keenly interested in their jobs but many, through no fault of their own, are unaware of the biological principles which affect fish stocks and the vital role that planning, training, transportation and supply, labour and market research play in any fisheries development proposal. There is an urgent need to incorporate into industrial development and game *training* courses, meetings, etc. time for discussion of the above by knowledgeable Territorial and Federal Fisheries, management, inspection, enforcement, economics and marketing personnel. It is also important that new employees destined for a remote posting be allowed sufficient time at headquarters and regional offices to become properly rehearsed on program policies and objectives (and pitfalls). Provision of pertinent written material in the form of magazines and books will also be helpful.

The present practice of monthly report writing by Game and Industrial Development field men should be re-examined. This exercise could be used to encourage remotely located field men to participate in programs by being listened to and reacted to. The effects on morale would be beneficial and would serve to reaffirm and to help modify policies, as well as providing basic statistics on seal hunting, domestic fishing, intersettlement trading activity, "etc.

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Isolation in distance and thinking are very real problems which must be contended with by staff at all levels in the Department on an on-going basis.

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DATA COLLECTION AND PROCESSING

The commercial fisheries of the Northwest Territories are managed by a fishing quota which limits the catch to a set poundage. The objective of the quota is to provide the fishermen with a reasonable catch while preventing overfishing. At the initiation of a commercial fishery, the quota is usually guessed at on the basis of yields from other areas. After several years of fishery operation, provided the necessary management data are available, the quota is revised upwards or downwards, depending on how the fish are responding to fishing.

The success of this system depends on three things: (1) the collection of enough of the right sort of information to permit the managing personnel to monitor changes in the fish stock from year to year; (2) the processing and analysis of these data within a reasonable time; and (3) the cooperation of industry in helping protect the resource. It has been a problem in the past that, although data of value to fisheries managers were collected from some fisheries, the data were processed and made available too slowly to permit close year-to-year assessment of the fishery. Now, although the data could probably be processed more rapidly by computer, considerably less are being collected. Waybills from sales to the Freshwater Fish Marketing Corporation (F.F.M.C.), which record poundage of fish delivered to market by each license holder, the lake from which the fish were taken, and the area fished within the lake, are processed through the Environmental Analysis Service (E.A.S.)

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of the Fisheries Service. Monthly records of amount of fish caught, where, *and by* whom are available from E.A.S. Provided fishermen are honest in reporting their catch, lake fisheries can be regulated by the E.A;S. *records.* The major shortcoming of the records is that they do not include fish culled before the catch reaches the market. The estimate of total catch from these records, therefore, is always an underestimate of the true catch. For areas" like Lac la Martre, where many small fish are culled before the catch is shipped to the F.F.M.C. this problem is critical. Nevertheless, E.A.S. does provide a medium through which significantly more information could be collected and dealth with in a relatively short time. The simple addition to the waybill of information on nets fished and days fished would provide important catch-per-unit-of-effort data from Great Slave at least. This information, together with random sampling of the catch for age structure, would provide the basic data necessary to manage lake fisheries.

A similar approach to collection of management data could be adopted for anadromous species presently being monitored.

Even if we achieve standardization of data collection and better utilization of present data processing systems, considerably more management effort is required if Northwest Territories fisheries are to be managed in more than a cursory manner. The information presently being collected is insufficient to provide advance warning of overfishing. The situation on Great Slave Lake is especially critical, since exploitation of rough fish in the lake appears likely within

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the next few years. To be economic, a large volume of rough fish must be exploited in a short time. Although some species may be able to withstand heavy exploitation, others certainly will not. Unless very selective fisheries are developed for rough fish, less resilient species will suffer in the absence of an effective management scheme.

For most sport fisheries data of the sort on which management decisions can be based are rare. Here, lack of cooperation by industry appears to be a significant factor, although shortage of manpower to collect the relevant information is also important. Where attempts have been made to carefully regulate a fishery (e.g. Tree River, Albert Edward Bay) the result has been a healthy fishery and a successful industry. Although it may be impractical to monitor all fisheries as closely"as these have been, the success of such operations underscores the advantages of careful monitoring.

Domestic fisheries present a special problem in monitoring. Where domestic catch is small and does not conflict with commercial operations, the lack of information on domestic consumption is of little importance, but where domestic consumption and commercial consumption compete the need for good estimates of domestic consumption is imperative. The promotion of intersettlement trade and the expansion of sport and commercial fishing operations in the north is creating situations where conflict between commercial and domestic use of fish among the indigenous peoples is common. Quotas are set on fish stocks and the sum of domestic and commercial consumption is expected to be within the

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quota. This point may not have been appreciated by the residents of the North for whom European conservation practices are a new concept. Because of this it is all the more important that steps be taken to monitor domestic consumption more thoroughly than was done in the past.

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PUBLIC AWARENESS AND EDUCATION

Most residents of the Northwest Territories have an extremely limited concept of the productivity of northern waters. Generally they are aware that there are extensive areas of water, and that fish can be caught quite readily. Further, most people in the north also have little idea of the roles of the Federal Fisheries Service and of the Northwest Territories Government in fisheries management and development programs. Also, funds devoted to fisheries management and development programs are very limited at the present time.

Programs currently in effect in public information are:

(a) The magazine "Fisheries of Canada't. This probably reaches relatively few Northwest Territories residents and generally provides little of interest to them.

(b) News releases in newspapers and magazines. These are relatively uninformative and often contain only statements of general policy.

(c) Angling regulations pamphlet.

(d) Displays, etc. at occasional exhibitions and functions.

(e) A certain amount of officer contact takes place in the field.

In summary, the above may be described as a low-key effort.

Fisheries management and development programs will not be effective unless public information and education form an integral part of them. If fisheries management and development are to receive adequate

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political and financial support then it will be necessary to provide some public information and education *not* only to these people who will be directly affected but to a broader spectrum of the Canadian public.

Specific areas which can be improved are:

(a) Fisheries Service - Conservation and Protection. The Conservation and Protection Officer staff forms the front line of any public relations program. These men have considerable public contact and they can be very effective in selling field programs and building public confidence in the department. It is essential that their job be oriented increasingly in this direction and to do this they must be given in-service training so that they fully understand their role.

More time must be spent in public information work in the communities. A closer liaison must be developed with the fishing lodge operators and their staff so that these people can gain a better understanding of the resource potential and proper conservation practices. An essential part of the public education program is firm but fair enforcement of the acts and regulations.

(b) Fisheries - Information Branch. The Information Officer should spend a fair amount of his time traveling, talking to communities, business groups and service organizations

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both in the North and in the prairie cities, explaining the role of the Fisheries Service and its programs.

The Information Officer should stimulate the production of a series of information bulletins which would be both informative and appealing. Reprints of articles written by professional staff should be made available. The Angling Regulations pamphlet should be revamped to be more informative and educational.

(c) Fisheries - Inspection Branch. A more intensive program of education is necessary both in areas of new fishery developments and in established coxmnunities to emphasize practices necessary for human health and fish quality. This program should consist of a continuing series of presentations using films, film strips and slides. This should be reviewed and regularly updated. Explanation of the causes and effects of mercury contamination should be an integral part of this.

(d) Magazines and Journals. A review of the magazines and journals read by residents of the Northwest Territories should be carried out. Professional staff and the Information Officer should be encouraged to submit articles farily regularly which would outline and explain different phases of the Fisheries Service programs. These articles should be illustrated, informative and readable.

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(e) Films. A government team should work along with field crews and take film coverage of various activities. Short films should be made which would form an integral part of the public information and education program.

(f) Television. Short film sequences could be shown on the CBC Northern Service. The Information Officer, District Administrator and project biologists should take part in interview programs which could be shown by the CBC. In addition, information shorts, similar to those currently being made for the Canadian Wildlife Service, should be made and shown on national televisions networks.

(g) Northwest Territories Government.

(i) Industrial Development Branch. This agency should develop an educational or training program for the development of managerial and organization skills. People with these skills are essential in the development of any viable fishery so that efficient use is made of manpower, equipment and funds and that fish of the highest quality can be brought to market at the least cost.

(ii) Tourism Branch. Promotion of tourism in the Northwest Territories is closely associated with natural resource use. The promotional programs of this agency should be developed in close association with public information programs of the other agencies.

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Sources of further information

(a) Fisheries Service - Information Branch, Ottawa. Determine what services could be mobilized.

(b) CBc . Determine the degree to which they might be prepared to get involved.

(c) Northwest Territories Government. Determine the potential for a training program in management skills.