

A Review of the Status and Harvests Of Fish Stocks in the Sahtu Dene and Metis Settlement Area, Including Great Bear Lake

D.B. Stewart

Central and Arctic Region
Department of Fisheries and Oceans
Winnipeg, Manitoba R3T 2N6

1996

**Canadian Manuscript Report of
Fisheries and Aquatic Sciences 2337**



Fisheries and Oceans
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INCLUDING GREAT BEAR LAKE**

by

D.B. Stewart¹

Central and Arctic Region
Department of Fisheries and Oceans
Winnipeg, Manitoba R3T 2N6

This is the 40th Manuscript Report
from the Central and Arctic Region, Winnipeg

¹ Arctic Biological Consultants, Box 68, St. Norbert Postal Station, 95 Turnbull Drive, Winnipeg, MB, R3V 1L5.

PREFACE

This report was prepared under contract for the Department of Fisheries and Oceans, Central and Arctic Region, 501 University Crescent, Winnipeg, Manitoba, R3T 2N6. The Scientific Authority for this contract was Robert W. Moshenko of the Resource Management Division.

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Cat. no. Fs 97-4/2337E ISSN 0706-6473

Correct citation for this report is:

Stewart, D.B. 1996. A review of the status and harvests of fish stocks in the Sahtu Dene and Metis Settlement Area, including Great Bear Lake. Can. Manusc. Rep. Fish. Aquat. Sci. 2337: iv + 64 p.

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ABSTRACT

Stewart, D.B. 1996. A review of the status and harvests of fish stocks in the Sahtu Dene and Metis Settlement Area, including Great Bear Lake. Can. Manuscr. Rep. Fish. Aquat. Sci. 2337: iv + 64 p.

This document was prepared to assist the Department of Fisheries and Oceans (DFO) and the Sahtu Renewable Resources Board to co-manage fisheries in the Sahtu Dene and Metis Settlement Area. It reviews information on stocks of fishes that are harvested for subsistence, commerce and sport in the Settlement Area, including Great Bear Lake. The information is current to February 1995. It is summarized in tables that are organized hierarchically by community, waterbody, and then species. Fisheries and stocks in the Great Bear Lake drainage basin are treated separately and organized alphabetically by geographical name and then species. Recent recommendations by DFO concerning management of the fisheries or stocks are summarized, with a list of pertinent references. Information is also provided on sport fishing lodges operating on Great Bear Lake, and on Scientific Licences issued by DFO since 1985 for research in the Settlement Area.

Key words: Arctic zone; Mackenzie River; Northwest Territories; fishery management; subsistence fishing; commercial fishing; sport fishing; catch statistics.

RÉSUMÉ

Stewart, D.B. 1996. A review of the status and harvests of fish stocks in the Sahtu Dene and Metis Settlement Area, including Great Bear Lake. Can. Manuscr. Rep. Fish. Aquat. Sci. 2337: iv + 64 p.

Ce document a pour objet d'aider le ministère des Pêches et des Océans (MPO) et le Conseil des ressources renouvelables des Sahtu à gérer conjointement la pêche dans la région visée par l'entente conclue avec les Métis et les Dénés du Sahtu. Il contient des renseignements sur l'état des stocks de poissons capturés à des fins sportives, commerciales et de subsistance, dans cette région, qui comprend le Grand Lac de l'Ours. Ces données sont valides jusqu'en février 1995. Au moyen de tableaux, on en fait la synthèse de manière hiérarchique, selon la localité, le cours d'eau, puis l'espèce visée. On a abordé la question de la pêche

et des stocks de poisson du bassin hydrographique du Grand Lac de l'Ours de manière distincte; les renseignements pertinents ont été présentés en ordre alphabétique selon le nom géographique, puis l'espèce visée. De plus, on présente un résumé des dernières recommandations du MPO concernant la gestion de la pêche et des stocks, accompagné d'une liste de références. Le document comprend également des renseignements sur les camps de pêche sportive et sur les permis délivrés par le MPO à des fins scientifiques pour la région visée par l'entente, et ce, depuis 1985.

Mots clés: Arctique; fleuve Mackenzie; delta du Mackenzie; Territoires du Nord-Ouest; gestion de la pêche; pêche de subsistance; pêche commerciale; pêche sportive; statistiques sur les prises.

INTRODUCTION

One of the provisions of the Sahtu Dene and Metis Comprehensive Land Claim Agreement which was approved by Order in Council on 23 June 1994, was the establishment of a Renewable Resources Board (hereafter Board). This seven member board, with equal representation of the Sahtu Tribal Council and Government, plus a chairperson, was appointed in November 1995. It is charged with making all decisions about wildlife management in the Sahtu Dene and Metis Settlement Area (Settlement Area) (Fig. 1), including those on many matters formerly controlled by the federal Department of Fisheries and Oceans (DFO), the Canadian Wildlife Service, and the territorial Department of Renewable Resources. These decisions remain subject to review by the appropriate Minister of the Government of Canada or Minister of the Government of the Northwest Territories.

The purpose of this work is to provide the Board and DFO with a summary of the present status of fish stocks harvested in the Settlement Area (Fig. 1). These stocks are harvested for subsistence, commerce and sport, mostly by Sahtu Dene and Metis beneficiaries of the land claim agreement and by visiting sport fishermen. In recognition of its unique management requirements and importance as a sport fishery, this report treats the Great Bear Lake drainage basin separately from the rest of the Settlement Area.

The published and unpublished sources of information in this summary were identified by searches of bibliographic databases and published bibliographies, and by discussions with people knowledgeable of fisheries resources in the region. The bibliographic databases searched were the Aquatic Sciences and Fisheries Abstracts (ASFA), Arctic Science and Technology Information System (ASTIS), and the Department of Fisheries and Oceans library database, WAVES. DFO files were also searched for unpublished information.

FORMAT

The summary is presented in tabular form, with the fishery data organized hierarchically first by community and then by waterbody and taxa. The objective of this is to enable the Board and DFO to quickly review the data on a community or species basis. Data from the Great Bear Lake drainage basin are treated separately, with the fishery and

stock data organized alphabetically by geographical name and then taxa.

These tables summarize information from studies directed towards the assessment and management of commercial and sport fisheries. They do not summarize other scientific research directed towards a more general understanding of the aquatic environment. To bridge this gap, brief lists of general aquatic studies are provided, below, for the Settlement Area and Great Bear Lake basin. Resource maps in the Northern Land Use Information Series (NLUIS), which were produced between 1974 and 1976 by the Lands Directorate of the Department of Fisheries and Environment, are also useful general references. They are referred to in text by number (e.g. NLUIS 96M) and are available from the Surveys and Mapping Branch of the Department of Energy, Mines, and Resources in Ottawa.

FISH HARVESTS (TABLES 1 to 3)

Each fishing location is identified by its proper geographical name (Canada 1980; NLUIS), and a latitude and longitude. In some cases, a local name or geographical feature is also included in brackets. The map coordinates were taken from Schedule V of the Northwest Territories Fishery Regulations, from the source of the data, or determined from 1:250,000 scale topographical maps.

The quota and harvest years are the same as the federal government fiscal year (e.g. the 1995 quota extends from 1 April 1995 to 31 March 1996). They are not the normal calendar years.

Unless otherwise indicated, the harvest statistics are for commercial fisheries and in kilograms round weight. A round weight is for a whole fish, while a dressed weight is for a fish with the viscera and gills removed. It was not always possible to separate the harvests by species for mixed species fisheries, or to determine how the data were collected. In some instances the commercial harvest data are from export or local sales records, in others from survey questionnaires. The former tend to be conservative as they do not estimate culls and personal use. The latter are prone to survey biases that can lead to over or under estimates of the harvests, and to double counting of fish harvested for sale or subsistence. In most years these data are incomplete as not all active fishermen reported their harvests (L. Anderson, pers. comm.).

Likewise, species may not always be correctly identified, particularly the whitefishes and ciscos. Care, then, must be taken when interpreting these data.

Sahtu except Great Bear Lake basin

Information on the harvests of freshwater fishes from waterbodies in the Settlement Area, excluding the Great Bear Lake drainage basin, is summarized in Table 1. The communities, in the order they are discussed are: Colville Lake, Déline (formerly Fort Franklin), Fort Good Hope, Fort Norman, and Norman Wells. Waterbodies fished by their residents, or in the vicinity, are listed alphabetically for each community. Where several species are harvested at a waterbody, they are listed alphabetically by common name. The Latin scientific name for each species is given in Appendix 2. Waterbodies in the Coppermine, Hornaday, and Nahanni river drainage basins that could not be assigned to a particular community are discussed following the community summaries.

Where a waterbody is fished by more than one community, cross references have been included to avoid repetition. Cross references to waterbodies within the same community section are indicated by "see above" or "see below"; those to waterbodies within another community section are indicated by the community name and waterbody (e.g. see COLVILLE LAKE--Anderson River).

Included in Table 1 are those waterbodies that have a record of commercial, subsistence or sport harvest, or are listed in Schedule V of the Northwest Territories Fishery Regulations. There have been few commercial fisheries for export sale in the Settlement Area, so few of its waterbodies have a record of harvest or stock assessment. This is in marked contrast to the Nunavut Settlement Area, where many stocks of anadromous Arctic charr have been harvested for commercial export since the 1950's, and for which there are detailed harvest records and ongoing stock assessments (Stewart 1994). However, many of the waterbodies for which no harvest data were found do play a vital role in the regional fisheries. They provide critical spawning and nursery habitats for fishes, and support important subsistence and sport harvests. Studies to predict the potential impacts of pipeline and highway developments have documented the importance of a number of these waterbodies. Where such information exists, the waterbody has

been included together with a brief summary of the study results.

For each waterbody with harvest data, the table identifies the species harvested and provides the harvest quota(s), the most recent harvest data, a summary of stock status if available, and a list of pertinent references. Species are treated separately if they have separate quotas. For each waterbody without harvest data, the table summarizes and references the results of pertinent fisheries research. The number of species reported by these studies precludes listing them individually for each waterbody. Species reported by the studies examined are listed in Appendix 1 for selected waterbodies. This listing is intended to support the comments in Tables 1 to 3. It is not the result of an exhaustive review of the literature on species' occurrences.

All site specific harvest data located during this work for the Settlement Area, except Great Bear Lake basin, are summarized in Table 1. Non-site specific community harvest data have also been included, where available, for comparison. Treble (1996) has summarized the pre-1990 community harvest data in detail for subsistence and commercial fisheries of the lower Mackenzie River.

The harvest quotas are derived by various methods, and some more closely reflect the stock status than others. The quotas of active commercial and sport fisheries are reassessed annually by DFO. If information from the harvesters or from sampling suggests that the fishery is not sustainable then the quota is adjusted downward. If that information suggests under-utilization then it may be adjusted upward, in the case of a commercial fishery, or be kept as is to improve the quality of the fishery, in the case of a trophy sport fishery. The experimental quotas, in square brackets, are interim quotas assigned for the purpose of obtaining samples from a fishery. In the past, experimental fisheries were known as exploratory or test fisheries. Abbreviations are used to indicate years when a harvest may have taken place but that no data are available "(NA)", and when a waterbody was opened for fishing by Variation Order but not fished "(NF)".

The general comments column of the tables provides a brief summary of the information available for each waterbody. It tells whether there is an established or experimental fishery, active or inactive or in conflict with other fisheries; when it was last sampled for or by DFO; what is known of the stock status; whether spawning or nursery habitats

have been identified in the system; and recent recommendations by DFO concerning management of the fishery. Comments on habitat use and subsistence harvests are summaries of site-specific aquatic resource assessment research. Reference material pertinent to each fishery is listed in brackets and cited in full in the bibliography.

General information for communities is discussed under community headings (e.g. Colville Lake general area), whereas site-specific harvest data are discussed under the appropriate waterbody or Mackenzie Delta management area. The community data are of limited use to fishery managers since the location of the harvest is unknown. Nevertheless, representative, recent community harvest data have been included for comparison.

There are few data available on subsistence harvests in the Settlement Area. Indeed, many of those described here were documented in the late 1960's to mid-1970's, and their present status and extent have not been documented. Descriptions of the subsistence fisheries can be found in Wynne-Edwards 1947; Bissett 1972; Villiers 1968; Lutra Associates Ltd. 1989; and Rawson Academy of Aquatic Sciences 1990. DFO recently completed a survey of Sahtu communities for information on subsistence fisheries (Taptuna and Low 1995). It was designed to gather information on usage patterns, the importance of various fish species, fishing locations, and the type of fishing gear used--not to estimate harvests. Within a year of its establishment, the Board will initiate a 5 year harvest study to provide information on harvesting necessary for the effective management of fish in the Settlement Area.

Sport fishing limits are listed in the annual Sports Fishing Guide for the Northwest Territories. These limits are generally lower for Great Bear Lake, which is managed as a trophy fishery, than they are for other parts of the Settlement Area. Special limitations on sport fishing in the Great Bear Lake Special Management Area are described below, in the discussion section.

A more general understanding of the aquatic environment of Settlement Area, outside the Great Bear Lake drainage basin, can be gained from the:

aquatic resource assessments of: Shotton 1971, 1973; Hatfield et al. 1972; Brunskill et al. 1973 a+b; Dryden et al. 1973; Stein et al. 1973; Jessop et al. 1974; McCart et al. 1974; Schultz International Ltd.

1974; Slaney and Co. 1974; Jessop and Lilley 1975; Sutherland and Gohlke 1978; McCart 1982;

species accounts of: McPhail and Lindsey 1970; Reist and Bond 1988; Reist and Chang-Kue 1996; and,

reviews of: Doran 1974; Brunskill 1986; McCart 1986; Rosenberg 1986; and Bodaly et al. 1989.

Great Bear Lake basin

Information on the harvests of freshwater fishes in the Great Bear Lake drainage basin is summarized for Great Bear Lake (Table 2), and for its tributaries (Table 3). Within each of these tables, the information is organized alphabetically by fishery location and then by species. Nearly all of these harvests were by residents of Déline (formerly Fort Franklin), or visiting sport fishermen.

In Table 2, the primary fishery locations are the six management areas that DFO has used to manage the trophy lake trout fishery (Fig. 3) (Roberge and Dunn 1988). Each of these areas has a distinct fishery that relies on local stocks of lake trout--the central area of the lake was not discussed since no fishery data were found. Fisheries included in Table 2, have a record of either subsistence, experimental, or sport harvest--with two exceptions. A number of experimental fisheries are listed in the summary tables without their ever having been fished. They are included to highlight areas where there may be an ongoing interest in the commercial harvest of fishes. Where the location and harvest of experimental scientific fisheries could be identified, that information was also included due to the paucity of data available for Great Bear Lake.

Fisheries included in Table 3, have a record of either subsistence or sport harvest, or are listed in Schedule V of the Northwest Territories Fishery Regulations--with two exceptions. A number of experimental scientific fisheries were included to direct readers to some of the only published fisheries information for the tributaries of Great Bear Lake. Likewise, a number of subsistence fisheries for which harvest data are not available were included since these are areas where there is ongoing interest in the harvest of fishes.

For each fishery, the tables identify the species harvested and provide the harvest quota(s), the most recent harvest data, a summary of stock status, and a list of pertinent references. Species are treated separately if they have separate quotas.

Few fisheries in the Great Bear Lake drainage basin have harvest quotas. Whitefish Lake (Table 3) is the only area that has been assigned a commercial harvest quota, and that fishery is apparently inactive. The experimental quotas, in square brackets, are interim quotas assigned for the purpose of obtaining samples from a fishery. Based on trends in harvest and biological data, DFO has recommended "total allowable harvests" (TAH) for the sport fisheries for lake trout in each arm of Great Bear Lake. The quotas of active commercial fisheries and recommended TAH of active sport fisheries are reassessed annually by DFO. If information from the harvesters or from sampling suggests that the fishery is not sustainable then the quota or recommended TAH is adjusted downward. If that information suggests under-utilization then it may be adjusted upward. Abbreviations were used to indicate years when a harvest may have taken place but that no data are available "(NA)", and when a body of water was opened for fishing by Variation Order but not fished "(NF)".

The general comments column of the tables provides a brief summary of the information available for each fishery. It tells whether a fishery is established or experimental, active or inactive, or in conflict with other fisheries; when it was last sampled for or by DFO; what is known of the stock status; and recent recommendations by DFO concerning management of the fishery. The discussions of stock status, and any management recommendations, are based on assessments of the Arctic Fisheries Science Advisory Committee (Clarke et al. 1989) and discussions with fishery managers. Reference material pertinent to each fishery is listed in brackets and cited in full in the bibliography.

There are few data available on subsistence harvests in the Great Bear Lake drainage basin. Indeed, many of those described here were documented in the 1960's and early 1970's, and their present status and extent have not been documented. Descriptions of these fisheries can be found in Osgood (1932), Villiers (1967), Bissett (1972), Morris (1972), Rushforth (1976), Hall (1978), Great Bear Lake Working Group (1985), Lutra Associates Ltd. (1988), Rawson Academy of Aquatic Sciences (1990), and Taptuna and Low (1995).

The Great Bear Lake Working Group (1985), which consisted of aboriginal and government members, prepared a thoughtful examination of the management issues facing in the Great Bear Lake fishery. They recommended a number of management goals and a strategy and process for consideration in the development of a long-term fishery management program for the lake. Yaremchuk (1986) summarized the results of a nine year study by DFO of the sport fishing exploitation of lake trout on Great Bear Lake. He also described the nature of the resource and management options.

A more general understanding of the aquatic environment of Great Bear Lake and its tributaries, can be gained from the:

aquatic resource surveys of: Wong and Whillans 1973; Stewart and MacDonald 1978; Sutherland and Gohlke 1978; and Chang-Kue and Cameron 1980;

limnological studies of Great Bear Lake by: Miller 1947; Johnson 1975b+c; and Moore 1980, 1981; and

species accounts of: Miller 1946; Miller and Kennedy 1948a+b; Kennedy 1949, 1953; Healey 1975, 1978; Johnson 1973, 1975c, 1976; and Martin and Olver 1980.

SPORT FISHING LODGES (TABLE 4)

Table 4 summarizes information on the sport fishing lodges of Great Bear Lake (Fig. 3). Outfitters operating from communities or with moveable camps are not included in this summary, as this information is not readily available. The lodges are listed alphabetically. In a general comment for each lodge are listed its latitude and longitude, operating season, guest bed capacity, targeted fish species, outpost camp locations, recent operating history, participation in fishery management studies, and pertinent references. Beneath this comment the fish species harvested are listed alphabetically. Harvest data for each species are listed by year. They include an estimate of the number of fish killed by the sport fishery, the average number of fish caught per angler hour, and an estimate of the total number of angler days. The sources of these data are described and referenced in a comments section.

Sport fishing lodges also operate on Colville Lake and Wrigley Lake. Neither of these operations has been monitored for harvest data in the manner of the lodges on Great Bear Lake. Their operations

are described briefly in Table 1 (see COLVILLE LAKE--Colville lake; FORT NORMAN--Wrigley Lake).

FISHERIES RESEARCH LICENCES (TABLE 5)

Table 5 summarizes information on the Scientific Licences that DFO has issued to its personnel or to non-DFO personnel since 1985, for work in the Settlement Area (J.T. Strong, pers. comm.). These licences permit them to take fish for scientific purposes. This information is organized alphabetically by licence holder. The area where the research was to take place, its purpose, and the year for which the licence was issued are shown for each licence holder. The years refer to the federal government fiscal year (see above). The outcome of the research is not discussed, but documents located are referenced.

In 1994, DFO began to distinguish between studies that take fish for scientific, educational, and public display purposes (J.T. Strong, pers. comm.) Since then, separate licences have been issued for each type of study, and studies that do not take fish (e.g. behavioural observations) no longer require a Scientific Licence. These licences are now issued under Section 52 of the Fishery (General) Regulations.

DISCUSSION

In addition to the management concerns typical of northern, inland freshwater systems, fishery managers in the Settlement Area face two important and fundamentally different management problems: 1) the migratory fish stocks in the Mackenzie River basin, and 2) the trophy lake trout fishery on Great Bear Lake.

MIGRATORY FISH STOCKS

A number of the fish species harvested in the Sahtu Dene and Metis Settlement Area migrate long distances on a seasonal basis each year. These movements have important ramifications for the interpretation of Table 1 and for fishery management in the Settlement Area. Long distance migrants such as Arctic cisco, broad whitefish, and inconnu may be vulnerable to harvest by Inuvialuit, Gwich'in, Sahtu, and Deh Cho fisheries. These fishes are predictably available to harvesters on a

seasonal basis at known locations. Some of them, perhaps all, also have discrete spawning stocks. Consequently, fishermen at a given location and season may be harvesting fish from a number of different stocks.

In terms of Table 1, this means that the harvest data for fisheries in the Mackenzie River and its larger tributaries do not relate to a single local population. Rather, they relate to a number of spawning stocks which may be distant from the harvest site. Fisheries in the lower reaches of the Mackenzie Basin, then, directly affect those in the upper reaches, and vice versa. This is also true, but to a lesser extent, for species that undertake shorter seasonal migrations such as Arctic grayling, longnose sucker, and walleye. This makes it very difficult for fishery managers to determine the level of harvest that can be sustained at a particular location by a particular species, and to estimate the harvest pressure on a given fish stock. It also makes it increasingly important that managers understand stock dynamics and estimate stock size (Tallman 1996).

The complexities of identifying the individual stocks, estimating stock size, and determining the extent to which each is harvested by the various fisheries makes management of this resource in the Mackenzie basin extremely difficult. It emphasizes the need for close cooperation between resource management boards in the Inuvialuit, Gwich'in, and Sahtu settlement areas.

DFO and others have undertaken a number of genetic studies of fishes in the Sahtu Dene and Metis Settlement Area for the purpose of stock identification. Bickham et al. (1989), Lockwood and Bickham (1989), Morales et al. (1989), Troy (1989), and Dillinger et al. (1992) have studied the genetics of migratory Arctic cisco in the Carcajou and Mountain rivers; and Reist (1990, 1996a) broad whitefish from The Upper Ramparts area of the Mackenzie River, and various species at other locations (Reist 1987).

Movements of migratory coregonids, Arctic grayling, burbot, longnose sucker, northern pike, walleye, and other fish species have been studied in the Mackenzie Basin using mark-recapture tagging experiments (e.g. Hatfield et al. 1972; Stein et al. 1973; Jessop et al. 1974; Jessop and Lilley 1975; Babaluk et al. 1996). Radio tags have also been used to follow the seasonal movements of broad and lake whitefish in the Mackenzie delta and basin (Chang-Kue and Jessop 1983, 1992, 1996).

Inconnu tagged near Tsiigehtchic, for example, have been captured a year later 1,104 km upstream in the Liard River (Jessop and Lilley 1975), and broad whitefish tagged at Kukjuktuk Creek on the Tuktoyaktuk Peninsula have been recaptured at The Upper Ramparts upstream from Fort Good Hope (Chang-Kue and Jessop 1992).

Radio telemetry, sonar, and fishing techniques have also been used together to locate spawning areas for broad whitefish in the Mackenzie River, at The Upper Ramparts and various downstream locations (Chang-Kue and Jessop 1996).

At present, broad whitefish present perhaps the most important stock management problems in the Sahtu Dene and Metis Settlement Area, outside the Great Bear Lake basin (Tallman and Reist 1996a; Reist 1996b). They migrate between the Inuvialuit, Gwich'in, and Sahtu settlement areas where they are an important part of the subsistence harvests. Because of their anadromous lifestyle the migrants are relatively free of the parasite Triaenophorus crassus, which infects whitefish and lowers their commercial value (Dick 1996).

Their predictable availability in large numbers and relatively parasite-free flesh, has made broad whitefish a target for many economic development initiatives over the past 30 years. None of these has proven to be economically viable (Stewart et al. 1993; Anderson 1995). The most recent of these, an experimental fishery by the Uummarmiut Development Corporation in the Inuvialuit Settlement Area, began in 1989 and operated through 1993 (Treble and Dahlke 1994; Treble and Tallman 1996; G. Fricke pers. comm.). This fishery and its future development is of particular importance to the management of broad whitefish stocks in the Sahtu Dene and Metis Settlement Area, since it is likely to be targeting many of the same stocks that support the subsistence harvest.

Recent work by DFO under the Inuvialuit Final Agreement (Tallman and Reist 1996b) has significantly improved the understanding of these stocks by fishery managers; however, the scale and complexity of the problem is such that it will require many years of research before the stocks dynamics are clearly understood.

A revisiting of data from the aquatic resource assessments conducted for the Mackenzie Valley pipeline and Dempster Highway, directed toward

fishery management should be considered. A wealth of information was collected by these large-scale studies, much of which has never been analysed or presented in detail. Such a review might provide data useful for the management of broad whitefish and other fishes in the Mackenzie River drainage of the Settlement Area.

GREAT BEAR LAKE SPORT FISHERY

Since Yaremchuck (1986) summarized information on the Great Bear Lake sport fishery, there have been a number of changes in its operation. In the past, relocation, bankruptcy, and changes in ownership have periodically led to temporary closure of a lodge for a year or so. At present, the Arctic Circle, Branson's, and Great Bear Lake lodges are all temporarily closed (C. Plummer, pers. comm.). Only Plummer's Great Bear Lake Lodge and Trophy Lodge have operated on a regular basis since 1990.

In addition to their own lodge, the Plummers now manage the Arctic Circle, Great Bear Lake, and Trophy lodges (C. Plummer, pers. comm.). They own these lodges jointly with the Metis Development Corporation, which is the majority shareholder, under 902848 NWT Ltd.. Negotiations are underway to amalgamate with Branson's Lodge which is now owned by the community of Déline. When that is completed, Plummers will manage all of the lodges on the lake and be part owner of the other four lodges. They plan to extend their policy of catch and release for large lake trout, and to implement a rotational fishery whereby individual lodges will be closed periodically for a few years to enable the trout stocks to recover.

In 1991, to conserve the trophy sport fishery, Great Bear Lake and its tributaries were designated a Special Management Area (Northwest Territories Fishery Regulations). Anglers who wish to fish the area require both a Sport Fishing Licence and a Special Management Area Licence. Within this area the daily catch limit and the possession limit for lake trout (1 and 2) are lower than the general limits for the Northwest Territories. These limits apply to Great Bear Lake, the Camsell River from Great Bear Lake upstream to White Eagle Falls, and all other tributaries of Great Bear Lake from their mouths to 1 km upstream.

Prior to 1974, the daily catch and possession limits for lake trout at Great Bear Lake, were 5 and 10 respectively (Yaremchuk 1986). These limits were reduced in 1974 to 3 and 5, in 1979 to 2 and 3, and in 1991 to 1 and 2. These reductions were implemented to ensure a sustainable fishery for large trophy lake trout (R. Moshenko, pers. comm.) In 1991, the daily catch and possession limits for Arctic grayling and northern pike at Great Bear Lake were reduced from 5 and 10 to 2 and 3.

The areas of Great Bear Lake fished by guests of the sport lodges are shown on Figure 4. These areas were originally delimited by Roberge and Dunn (1988) and recently updated by C. Plummer (pers. comm.). They are now somewhat greater than those given by Roberge and Dunn (1988), who based their maps on creel census data from the 1984-5 fishing season. Yaremchuk (1986) shows fishing as taking place along more of the lake's northern shoreline, and in the middle of Smith and Dease arms. These areas are only fished on occasion.

Declining total sport harvests in the 1970's and 1980's (Table 4) do not necessarily reflect a decline in the fish population. Mostly, they reflect the effects of decreasing catch and possession limits, and changes in lodge policy to encourage anglers to catch and release trophy fish.

ACKNOWLEDGMENTS

Laura Anderson, Ken Chang-Kue, Colette Craig, Chris Day, Mary Layton, Dave Moshenko, Robert Moshenko and Ross Tallman of DFO, Winnipeg; George Low and Fred Taptuna of DFO, Hay River; Margaret Treble of the University of Manitoba; and Cécile Stewart of Arctic Biological Consultants gave freely of their time and expertise. They provided much of the information in this report and undertook careful reviews of the manuscript at various stages. Blair Dunn of DFO, Winnipeg, kindly prepared the base maps. Gary Carder, Bruce Fallis, Lyle Lockhart, Jim Reist, Tom Strong and Dan Topolniski of DFO, Winnipeg; D. Grindlay of GNWT Economic Development, Yellowknife; Walter Bayha of GNWT Renewable Resources, Déline; and many others also provided welcome information and advice. Your participation has greatly strengthened this work and I thank you.

I thank especially, Chummy Plummer of Plummer's Arctic Fishing Lodges in Winnipeg for

kindly provided background information on the Great Bear Lake sport fishery, and for reviewing the penultimate draft of the Great Bear Lake portions of the manuscript.

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PERSONAL COMMUNICATIONS

- ANDERSON, L. Department of Fisheries and Oceans (DFO), 501 University Crescent, Winnipeg, MB, R3T 2N6.
- BAYHA, W. Renewable Resources, Déline, NT, XOE OGO.
- CHANG-KUE, K. DFO, 501 University Crescent, Winnipeg, MB, R3T 2N6.
- DAY, A.C. DFO, 501 University Crescent, Winnipeg, MB, R3T 2N6.
- GRINDLAY, D. Economic Development and Tourism, Government of the Northwest Territories, Yellowknife, NT, X1A 2L9.
- FRICKE, G. Economic Development and Tourism, Government of the Northwest Territories, Inuvik, NT, XOE OTO.
- LOCKHART, L. DFO, 501 University Crescent, Winnipeg, MB, R3T 2N6.
- LOW, G. DFO, Box 1008, Hay River, NT, XOE ORO.
- MOSHENKO, D. DFO, 501 University Crescent, Winnipeg, MB, R3T 2N6.
- MOSHENKO, R. DFO, 501 University Crescent, Winnipeg, MB, R3T 2N6.
- PLUMMER, C. Plummer's Arctic Fishing Lodges, 950 Bradford St., Winnipeg, MB, R3H 0N5.

REIST, J. DFO, 501 University Crescent, Winnipeg,
MB, R3T 2N6.

ROBINSON, N. DFO, Inuvik, NT, XOE OTO.

STRONG, J.T. DFO, 501 University Crescent,
Winnipeg, MB, R3T 2N6.

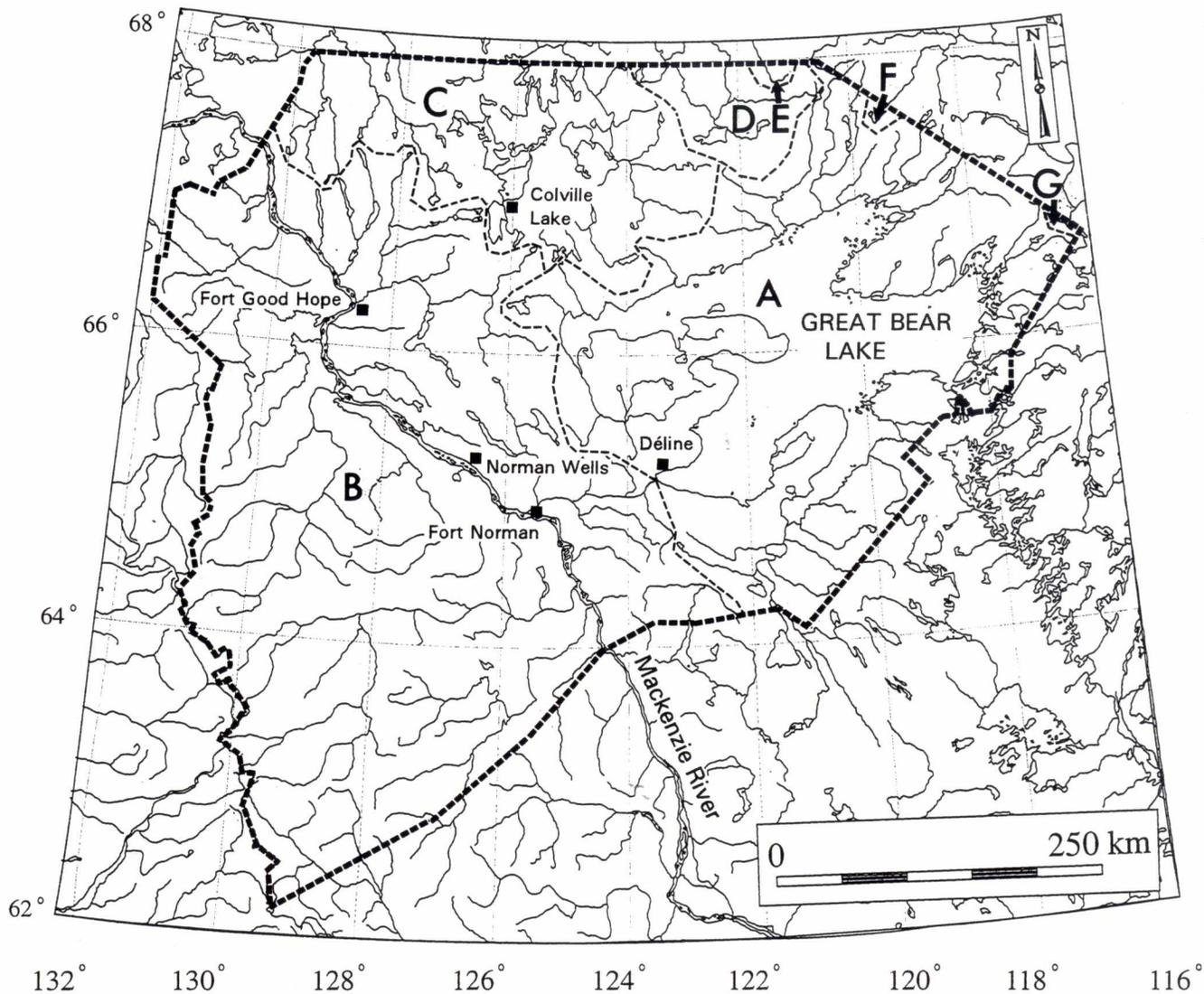


Figure 1. Map of the Sahtu Dene and Metis Settlement Area showing major rivers, drainage basins and communities. The drainage basins are coded by letter as follows: A. Great Bear Lake, B. Mackenzie River, C. Anderson River, D. Horton River, E. Hornaday River, F. Rae River, and G. Coppermine River.

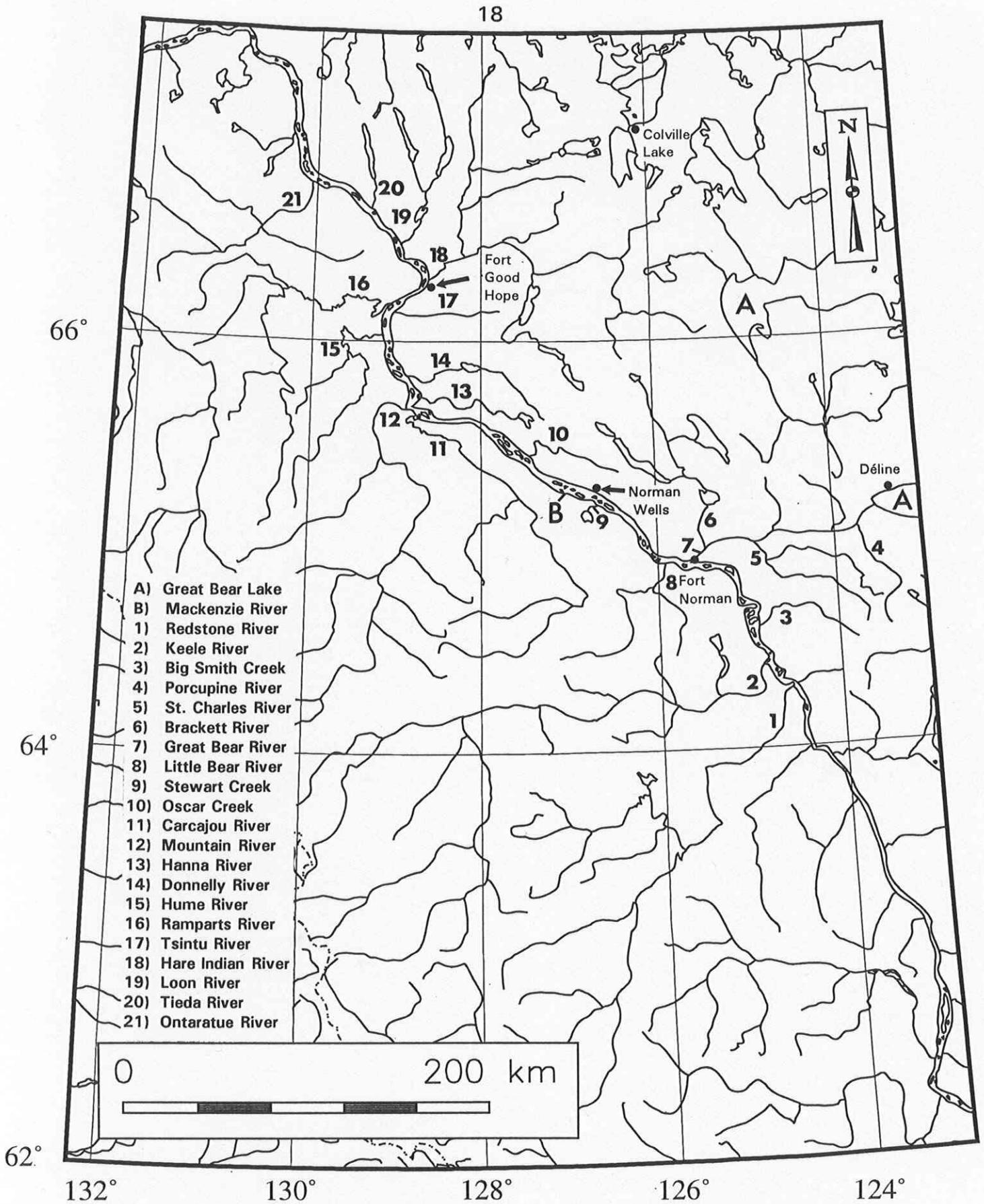


Figure 2. Key to the names of selected Mackenzie River tributaries in the Sahtu Dene and Metis Settlement Area.

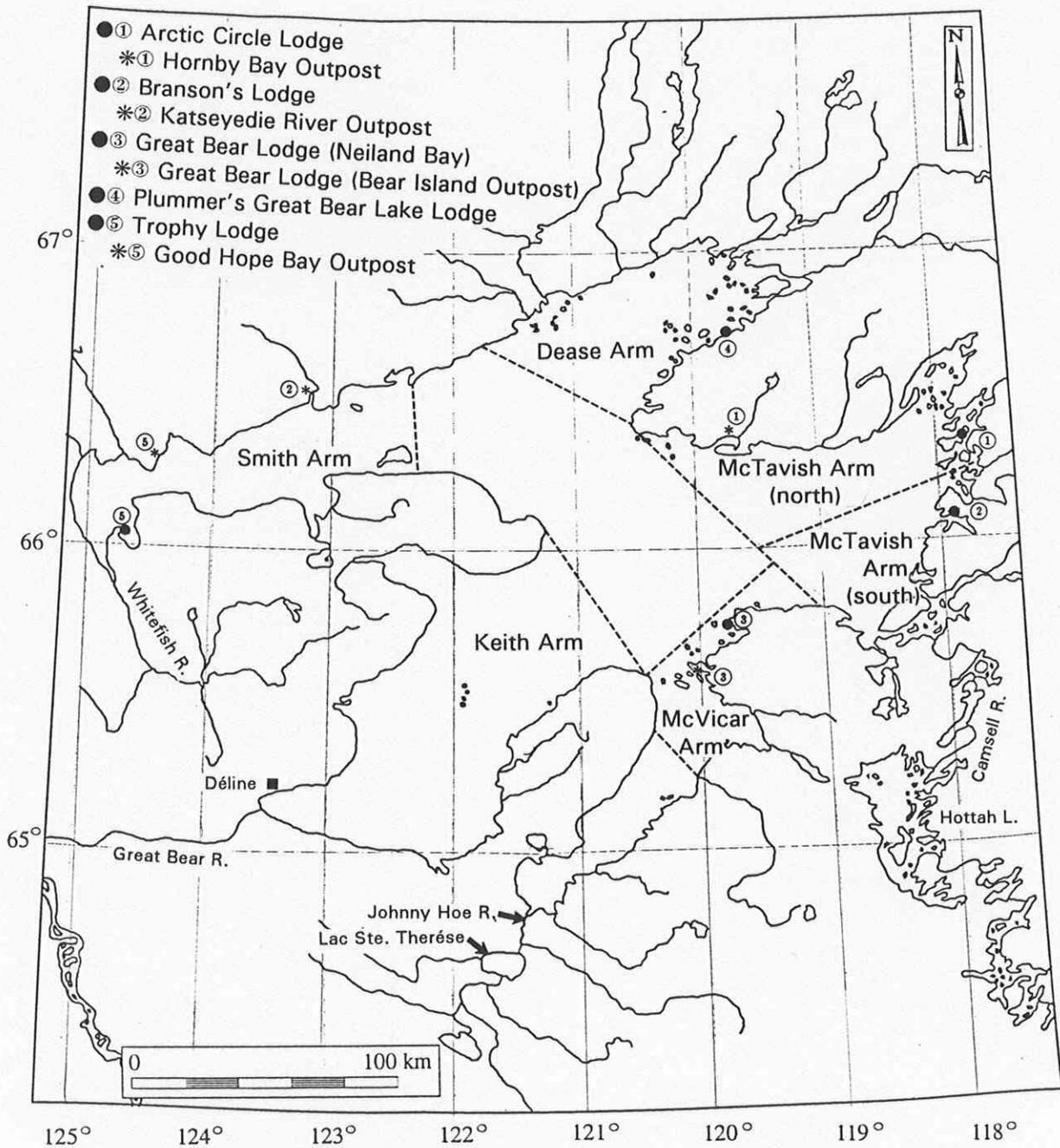


Figure 3. Sport fishing lodges and outposts on Great Bear Lake, and the management areas used by the Department of Fisheries and Oceans for the lake trout sport fishery.

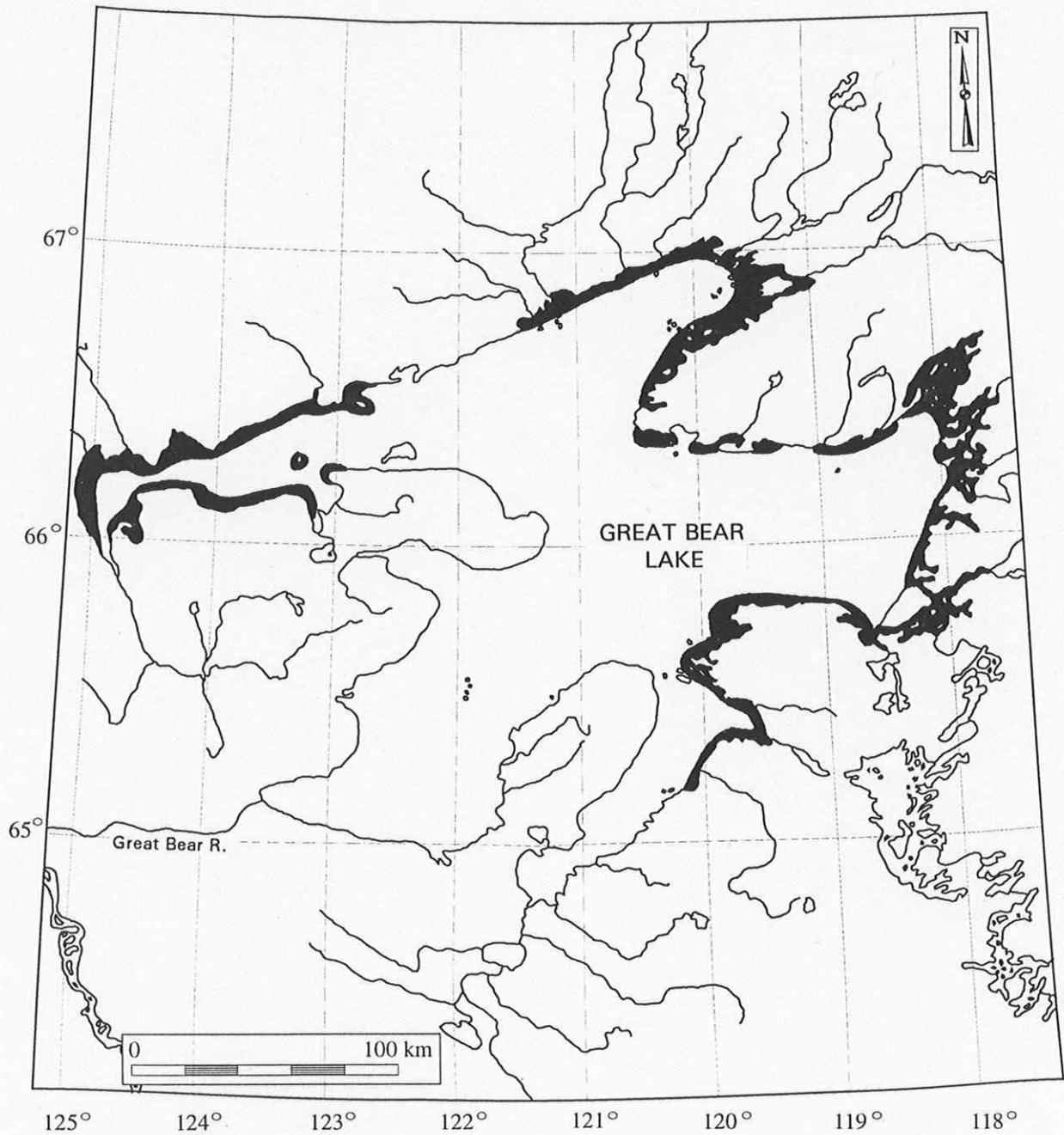


Figure 4. Areas of Great Bear Lake fished by guests of the sport lodges.

Table 1. Harvests of fishes from the Sahtu Dene and Metis Settlement Area, except Great Bear Lake drainage basin, by community area and waterbody.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
COLVILLE LAKE			
Anderson River 67°50'N, 124°45'W			In 1975, an experimental seine fishery caught slimy sculpin and immature Arctic grayling, burbot, sucker and whitefish at this site on the Anderson River. The river is a migration route for Arctic grayling, inconnu, northern pike, sucker, and whitefish. The river and its tributaries provide spawning and nursery habitat for Arctic grayling, burbot, sucker, and whitefish. Residents of Colville Lake, Fort Good Hope, and/or Déline fish for subsistence at many of the unnamed headwater lakes on the Anderson River system (e.g. 66°58'N, 123°27'W; 66°51'N, 123°32'W; 66°54'N, 123°17'W; 66°55'N, 124°35'W; 66°56'N, 124°19'W; 66°57'N, 124°11'W) in conjunction with winter hunting and trapping. (Sutherland and Gohlke 1978; Taptuna and Low 1995; NLUIS 96J+N)
Aubry Lake 67°20'N, 126°25'W	lake trout [2,000]	1988--NF; 1989--2 kg;	This lake on the Anderson River system is fished year-round for subsistence by residents of Colville Lake and Fort Good Hope from October through February, as are many of its tributaries'unnamed headwater lakes (e.g. 67°16'N, 126°46'W). Lake whitefish, lake trout, northern pike, and burbot are the main species harvested. In 1975 an experimental gillnet fishery caught lake trout and lake and round whitefish in Aubry Lake. An experimental fishery was conducted at Aubry Lake 1989. (Villiers 1968; Bissett 1972; Sutherland and Gohlke 1978; DFO 1991, 1992a; McGowan 1993; Taptuna and Low 1995; NLUIS 96M)
	lake whitefish [2,000]	1988--NF; 1989--20 kg;	
Colville Lake 67°10'N, 126°00'W	lake trout + lake whitefish [1,000]	1988--NF;	This lake on the Anderson River system is fished year-round for subsistence by residents of Colville Lake and Fort Good Hope, and for sport by guests of the Colville Lake Lodge (67°02.5'N, 126°05'W). Subsistence harvesters generally fish the north end of the lake in fall and winter and the south end in spring and summer. The main species taken are lake trout, whitefish, and northern pike. The sport lodge has operated since 1966. It has 12 guest beds and is open year-round. Guests angle for Arctic grayling, inconnu, lake trout, northern pike, and whitefish. An outpost camp of the lodge is located at the outlet to Colville Lake (67°19'W, 125°43'W). In 1975, an experimental gillnet fishery sampled the lake and its tributary Bloody Pack Creek. Arctic grayling, northern pike, and whitefish spawn in the lake's tributaries and use them as nursery areas. The lake outlet is an important nursery area, and the lake shores are spawning and nursery habitat for lake trout and whitefish. An experimental licence was issued for Colville Lake, in 1988, but the lake was not fished. DFO sampled lake trout and lake whitefish in Colville Lake for biological data and heavy metal and organic contaminants in 1993--bottom sediments were also sampled for contaminants. (Villiers 1968; Bissett 1972; Sutherland and Gohlke 1978; DFO 1991; Muir et al. 1994; Lockhart et al. 1995; Taptuna and Low 1995; NLUIS 96M+N)
Colville Lake general area			In 1972, the combined subsistence harvest of fish by residents of Fort Good Hope and Colville Lake was estimated at 45,450 kg. In 1988, Lutra Associates Ltd. surveyed residents of Colville Lake for information on their subsistence harvests, as did DFO in 1995. Neither study estimated the annual harvest. (Bissett 1972; Lutra Associates Ltd. 1989; Rawson Academy of Aquatic Science 1990; Taptuna and Low 1995)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Estabrook Lake 66°53'N, 123°47'W			This lake on the Horton River system and the headwater lakes of its tributary streams have been fished for subsistence on occasion in the past by trappers from Colville Lake, Déline, Fort Good Hope and Fort Norman. The lake supports Arctic grayling, burbot, lake trout, and whitefish. (NLUIS 96O)
Gassend Lake 68°00'N, 126°10'W			In 1975, an experimental gillnet fishery sampled this lake in the Anderson River drainage basin. (Sutherland and Gohlke 1978)
Horton Lake (Arakay Lake) 67°30'N, 122°20'W			This lake on the Horton River system is fished for subsistence in early winter by trappers who visit the area from Colville Lake and Déline, and possibly other Sahtu communities. (D. Moshenko, pers. comm.; NLUIS 96O)
Lac Belot 66°52'N, 126°17'W	lake trout + lake whitefish [800]	<u>Sport harvest:</u> 1985--276 lake trout caught, 36 kept; 1988--237 lake trout (7.28 fish caught per angler hr; 47 angler days); 1989--89 lake trout (3.24 fish caught per angler hr); <u>Experimental harvest:</u> 1988--NF; 1991--NF;	This lake on the Anderson River system is fished year-round for subsistence by residents of Colville Lake and Fort Good Hope. In 1975, an experimental gillnet fishery caught lake trout, northern pike and round whitefish in Lac Belot. Guests of Trophy Lodge on Great Bear Lake fly to Lac Belot to angle for lake trout and northern pike. In 1985, lodge guides collected data from this fishery for DFO, and DFO sampled lake trout from the anglers' creels. In 1988 and 1989, data on the sport harvest were collected by DFO using angler diaries. Experimental licences were issued in 1988 and 1991, but the lake was not fished. In 1983, DFO sampled lake trout from Lac Belot for biological data and heavy metal and organic contaminants. They also sampled lake sediments for contaminants and prepared a bathymetric map for the lake. (Bissett 1972; Sutherland and Gohlke 1978; Roberge and Dunn 1988; Dunn and Roberge 1989; DFO 1991, 1993; Muir et al. 1994; Lockhart et al. 1995; Taptuna and Low 1995; L. Anderson and L. Lockhart, pers. comm.)
	northern pike --no quota	<u>Sport harvest:</u> 1985--20 caught, none kept;	
Lac des Bois 66°46'N, 125°11'W	lake trout + lake whitefish [1,000]	<u>Sport harvest:</u> 1985--508 lake trout caught, 62 kept; 2 lake whitefish caught, both kept; <u>Experimental harvest:</u> 1988--NF;	This lake on the Anderson River system is fished for subsistence by residents of Fort Good Hope from October through February, generally at the south end of the lake in conjunction with trapping. The present extent of this fishery is unknown. In 1975, an experimental gillnet fishery sampled this lake in the Anderson River drainage basin. Guests of Trophy Lodge on Great Bear Lake fly to Lac des Bois to angle for lake trout, northern pike, and lake whitefish. In 1985, lodge guides collected data from this fishery for DFO, and DFO sampled lake trout from the angler's creels. An experimental licence was issued in 1988, but the lake was not fished. (Bissett 1972; Dunn and Roberge 1989; Sutherland and Gohlke 1978; DFO 1991; NLUIS 96K)
	northern pike --no quota	<u>Sport harvest:</u> 1985--6 caught, 3 kept;	
Lac Maunoir 67°30'N, 125°00'W			This lake on the Anderson River system has been fished for subsistence by residents of Colville Lake in conjunction with winter trapping activities. An experimental gillnet fishery sampled this lake 1975. Arctic grayling, northern pike, and whitefish spawn in the lake's tributaries and use them as nursery areas. The lake outlet is an important nursery area, and the lake shores are spawning and nursery habitat for lake trout and whitefish. (Sutherland and Gohlke 1978; NLUIS 96N)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Niwelin Lake 67°50'N, 126°00'W			This lake on the Anderson River system is fished for subsistence by residents of Colville Lake in summer and fall. An experimental gillnet fishery sampled this lake 1975. Arctic grayling, northern pike, and whitefish spawn in the lake's tributaries and use them as nursery areas. The lake outlet is an important nursery area, and the lake shores are spawning and nursery habitat for lake trout and whitefish. (Sutherland and Gohlke 1978; Taptuna and Low 1995; NLUIS 96N)
Tadek Lake			See FORT GOOD HOPE--Tadek Lake.
Tedji Lake 67°42'N, 126°38'W			This lake has been fished for subsistence by residents of Colville Lake in conjunction with winter trapping. (NLUIS 96M).
DÉLINE			Only those Déline fisheries that lie outside the Great Bear Lake drainage basin are discussed here. Most Déline fisheries are discussed in Tables 2 and 3 which describe fisheries in Great Bear Lake and its tributaries.
Anderson River			See COLVILLE LAKE--Anderson River.
Estabrook Lake			See COLVILLE LAKE--Estabrook Lake.
Fallstone Lake			See FORT NORMAN--Fallstone Lake.
Great Bear Lake drainage basin			See Tables 2 to 4.
Horton Lake			See COLVILLE LAKE--Horton Lake.
Lac Ste. Therese			See Table 3.
Stewart Lake			See FORT NORMAN--Stewart Lake.
unnamed lake 65°45'N, 125°15'W	lake whitefish [454]		Experimental fishery 1979. No record of harvest. (Yaremchuk et al. 1989)
unnamed lake (Clement Lake) 65°42'N, 125°20'W	lake whitefish [2,268]		No record of commercial harvest. (Yaremchuk et al. 1989)
unnamed lake 65°19'N, 125°24'W	lake whitefish [2,268]		No record of commercial harvest. (Yaremchuk et al. 1989)
Yellow Lake			See FORT NORMAN--Yellow Lake.
FORT GOOD HOPE			
Aubry Lake			See COLVILLE LAKE--Aubry Lake.

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Bluefish River 66°30'N, 128°16'W			In July, this tributary of the Hare River is a migration route for Arctic cisco, Arctic grayling, northern pike, walleye, and whitefish to and from the Mackenzie River. It is also a nursery area for Arctic grayling, longnose sucker, and lake whitefish. A number of unnamed lakes on the Bluefish River system (e.g. 66°58'N, 126°35'W; 66°54'N, 126°38'W; 66°54'N, 127°00'W) have been fished for subsistence in winter by trappers from Fort Good Hope and Colville Lake. (NLUIS 96L+106I)
Burnt Lake 67°26'N, 128°10'W			Residents of Fort Good Hope harvest whitefish and northern pike for subsistence from this headwater lake on the Carnwath River in the fall. (Taptuna and Low 1995)
Carcajou River 64°58'N, 127°11.5'W			A baseline fisheries study of the Carcajou River system was conducted by DFO in 1971-72 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. The river is used by whitefish, longnose sucker, and other fish species as a nursery area and presumably for spawning purposes. Carcajou Falls (64°44'N, 127°12'W) restrict upstream fish movement in the river. Arctic cisco were collected from the river in 1988 for genetic analyses. (Hatfield et al. 1972; Dryden et al. 1973; Stein et al. 1973; Lockwood and Bickham 1989; Morales et al. 1989; Troy 1989; Dillinger et al. 1992; NLUIS 96D)
Carcajou Lake 67°16'N, 128°40'W			Residents of Fort Good Hope harvest whitefish and lake trout from this lake on the Loon River system for subsistence in summer, fall, and winter. DFO sampled the lake in October-November 1986. Lake trout and lake whitefish were taken for biological and genetic analysis, Arctic grayling, burbot and northern pike are also present. A lake on the Little Keele River system is also named Carcajou (see FORT NORMAN--Carcajou Lake) (Reist 1987; Taptuna and Low 1995; NLUIS 96D)
Chick Lake 65°52'N, 128°11'W			The outlet stream of this lake on the Donnelly River system is an important spawning and nursery area for Arctic grayling. Burbot and northern pike spawn and overwinter in the lake. Arctic grayling and longnose sucker migrate through the lake to spawn in the outlet. (NLUIS 106H)
Colville Lake			See COLVILLE LAKE--Colville Lake.
Donnelly River 65°50'N, 128°46'W			Baseline fisheries studies of the Donnelly River system were conducted in 1971-73 for the Mackenzie Valley pipeline. Sixteen species of fish were caught in the Donnelly (Appendix 1), but only four species (Arctic grayling, longnose sucker, northern pike, and slimy sculpin) were distributed throughout the drainage. Grayling and longnose suckers, the most abundant species, were studied in detail and their life histories and general patterns of movement described. Grayling in the Donnelly River grow quickly and some mature by age 2 years. They migrate into the Donnelly during spring break-up in early and mid-May and spawn in late May. Adults remain in the outlet of Chick Lake (see above), a major spawning area, about a month after spawning and then many disperse downstream or return to the Mackenzie River. Some tagged grayling return to the Donnelly in subsequent years. Arctic grayling tagged in June and July 1972, were recaptured as far upstream as the mouth of Wolverine Creek on the Great Bear River, and as far downstream as Fort Good Hope. During the open water period, small tributary streams are important rearing areas for young grayling. Longnose suckers in the

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Donnelly River --continued.			Donnelly are slow growing. The youngest mature males were aged 9 years, and the females aged 12 years. Adults move into Donnelly in mid to late May and spawn in early June. By early July both adults and fry have moved downstream from a major spawning area in the upper Donnelly, with the adults dispersing through the lower reaches of the river and some exiting to the Mackenzie River. Many other adults leave the drainage in late September. Longnose suckers tagged in 1972 were recaptured the same year in Oscar Creek (see NORMAN WELLS--Oscar Creek), upstream, and at Fort Good Hope, downstream. (McCart et al. 1974; Tripp and McCart 1974; Chang-Kue and Cameron 1980)
Estabrook Lake			See COLVILLE LAKE--Estabrook Lake
Fort Good Hope general area	broad whitefish --no quota	1978--18 fish (41 kg); <u>Subsistence harvest:</u> 1989--632 fish (1,454 kg);	Residents of Fort Good Hope harvested an estimated 157,500 kg of fish for subsistence in 1961. In 1972, the combined subsistence harvest of fish by residents of Fort Good Hope and Colville Lake was estimated at 45,450 kg. DFO surveyed commercial and domestic licence holders for information on their fish harvests in 1978 and 1989. While domestic licences are purchased by non-native harvesters who wish to fish for subsistence, these data were combined with the commercial data. A subsistence harvest study was conducted in 1982 for the Fort Good Hope Band Council (unpubl.). In 1988, Lutra Associates Ltd., and in 1995 DFO, surveyed community residents for information on their subsistence harvests of fish. Neither study estimated the annual harvest. DFO found low levels of chlorinated hydrocarbons in the livers of burbot sampled from the area, in 1985, relative to more southerly populations. (Sinclair et al. 1967; Bissett 1972; Lutra Associates Ltd. 1989; Berkes 1990; Muir et al. 1990; Rawson Academy of Aquatic Science 1990; Taptuna and Low 1995; Treble 1996; NLUIS 1061)
	cisco spp. --no quota	1978--275 fish (110 kg); <u>Subsistence harvest:</u> 1982--17,580 fish (7,032 kg); 1989--4,929 fish (1,972 kg);	
	inconnu --no quota	1978--80 fish (360 kg); <u>Subsistence harvest:</u> 1982--11,192 fish (50,364 kg); 1989--1,451 fish (6,530 kg);	
	lake whitefish --no quota	<u>Subsistence harvest:</u> 1989--3,676 fish (4,779 kg);	
	whitefish spp. --no quota	<u>Subsistence harvest:</u> 1982--26,453 fish (47,615 kg);	
	other --no quota	1978--3 fish (7 kg); <u>Subsistence harvest:</u> 1982--4,572 fish (10,427 kg); 1989--3,261 fish (5,526 kg);	

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Hare Indian River 66°18'N, 128°34'W			Residents of Fort Good Hope fish for subsistence in summer, and to a lesser extent in spring and fall, at the mouth of the Hare Indian River, a tributary of the Mackenzie River. Arctic cisco, Arctic grayling, inconnu, sucker, whitefish and northern pike are harvested. Subsistence harvesters report a movement of Arctic grayling from Lac á Jacques into the Hare Indian River in the spring to spawn. Experimental fishery surveys of the river system in 1971-74 for the Mackenzie Valley pipeline, in 1973 for the Mackenzie Highway, and in 1975 for the Arctic Land Use Research program found the river to be an important spawning and nursery area for Arctic grayling and longnose sucker. The lower reaches also provide spawning and nursery habitat for northern pike, and nursery habitat for lake and round whitefish and longnose and white sucker. Fish may overwinter in the river. Species reported from this system are listed in Appendix 1. (Villiers 1968; Bissett 1972; Hatfield et al. 1972; Dryden et al. 1973; Lombard North Group Inc. 1973; Shotton 1973; Stein et al. 1973; Jessop et al. 1974; McCart et al. 1974; Schultz International Ltd. 1974; Jessop and Lilley 1975; Lilley 1975; Sutherland and Gohlke 1978; Taptuna and Low 1995; NLUIS 106I)
Hume River 66°01'N, 129°15'W			Baseline fisheries studies of the Hume River system were conducted in 1971-73 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. The headwater lakes provide nursery habitat for Arctic grayling and lake chub. Many small lakes between the Ramparts and Hume rivers have been fished for subsistence, and residents of Fort Good Hope also fish year-round for subsistence in the Hume River. Whitefish, inconnu, and burbot are the main species harvested. (Shotton 1971, 1973; Hatfield et al. 1972; Dryden et al. 1973; Jessop et al. 1974; Taptuna and Low 1995; NLUIS 106H+I)
Kilkale Lake 66°39'N, 124°00'W			Hunters and trappers from Fort Good Hope have occasionally fished for subsistence at Kilkale Lake on the Anderson River system. In 1975, an experimental gillnet fishery at the east end of the lake caught northern pike and lake and broad whitefish. (Sutherland and Gohlke 1978; NLUIS Map 96J)
Lac á Jacques (Loche Lake) 66°08'N, 127°25'W			This headwater lake of the Hare Indian River is fished for subsistence by residents of Fort Good Hope in October through February, and Fort Norman in summer and winter. DFO sampled fish in the lake in the fall of 1994, for biological data and heavy metal and organic contaminants. Lac á Jacques supports Arctic grayling, burbot, whitefish, northern pike, and walleye. In the spring, Arctic grayling move from the lake into the Hare Indian River to spawn. Tissue mercury concentrations in the northern pike and walleye were found to exceed levels recommended for human consumption. (Bissett 1972; Lilley 1975; Taptuna and Low 1995; NLUIS 96L; L. Lockhart, pers. comm.)
Lac Belot			See COLVILLE LAKE--Lac Belot.
Loon River and Lake 66°28'N, 128°58'W			Baseline fisheries studies of the Loon River system were conducted in 1971-72 for the Mackenzie Valley pipeline, and in 1973 for the Mackenzie Highway. Species reported from this system are listed in Appendix 1. The river is a nursery area for longnose sucker, whitefish, and cisco. Arctic grayling, broad whitefish, least cisco, and northern pike use the river to move between Loon, Manuel, and Rorey lakes. The river mouth and Loon Lake (66°36'N,

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Loon River and Lake --continued.			128°42'W) are fished year-round for subsistence by residents of Fort Good Hope. (Bissett 1972; Hatfield et al. 1972; Dryden et al. 1973; Shotton 1973; Stein et al. 1973; Schultz International Ltd. 1974; Taptuna and Low 1995; NLUIS 106I)
Mackenzie Delta (Area 5)	broad whitefish 1,000	1991-2--NA; 1993--2,300 kg;	This management area was established in 1976. Prior to 1991, it extended from Point Separation to just upstream of Tsiigehtchic on the Mackenzie and Arctic Red Rivers. Since 1991, this quota area has extended upstream from Point Separation to the confluence of the Mountain and Mackenzie rivers in the Sahtu Dene and Metis Settlement Area. Prior to 1991 the area was fished almost exclusively by residents of Tsiigehtchic, its subsequent extension upstream means that the area now encompasses waters fished commercially by residents of Tsiigehtchic (Gwich'in) and Fort Good Hope (Sahtu Dene and Metis). The harvest data presented here were reported during DFO surveys of the licenced commercial fishermen--these data were not extrapolated to provide an estimate of the total harvest. Response rates to those questionnaires in the western Arctic were 27% in 1991, nil in 1992, and 55% in 1993, so the quality of the harvest estimate is not known. The main species harvested and sold are broad whitefish and inconnu, with lesser amounts of lake whitefish, cisco sp., and other fishes having occasionally been sold. Comparison of the harvest and sales figures suggests that sales figures were incomplete, or that a significant portion of the catch is either used for subsistence or unmarketable. It is not known what proportion of the 1991-3 commercial harvests was taken by Gwich'in fishermen. DFO licenced 10 commercial fishermen from Tsiigehtchic in 1991, and 2 in each of 1992 and 1993. A single commercial fisherman was licenced from Fort Good Hope in 1993. (DFO 1993, 1994, 1995; Treble 1996) Subsistence harvest data are not available for this area specifically, but have been collected for the community of Fort Good Hope (see above Fort Good Hope general area). The Mackenzie River near The Ramparts is fished for subsistence by residents of Fort Good Hope throughout the summer and fall. The peak fishing period is between mid-August and late September. Major fish species encountered are Arctic cisco, burbot, inconnu, and whitefish spp. (Wynne-Edwards 1947; Dryden et al. 1973). DFO has used radio tagging studies to identify a number of spawning sites for broad whitefish in this area--perhaps the most important of which is located upstream from the community at the Upper Ramparts. They have also collected broad whitefish at The Upper Ramparts for genetic analyses. (Reist 1990, 1996a; Chang-Kue and Jessop 1996)
	burbot --no quota	1991-2--NA; 1993--90 kg;	
	cisco spp. 500		
	herring 600	1991-2--NA; 1993--0 kg;	
	inconnu --no quota	1991-2--NA; 1993--720 kg;	
	lake whitefish 4,600	1991-2--NA; 1993--871 kg;	
	northern pike --no quota	1991-2--NA; 1993--230 kg;	
	other species --no quota	1991-2--NA; 1993--60 kg;	
Manuel Lake 67°00'N, 128°56'W	lake trout + lake whitefish 800	1974--907 kg; 1990--lake trout 100 kg, lake whitefish 136 kg; 1991--NF; 1993--NA;	This lake on the Loon River system is fished for subsistence by residents of Fort Good Hope in the summer, fall and winter in support of hunting and trapping activities. Northern pike, burbot, lake trout and whitefish are the main species harvested. Commercial harvests were reported from the lake in 1974 and 1990. DFO sampled fish in Manuel Lake in the fall of 1994, for biological data and heavy metal and organic contaminants. (Yaremchuk et al. 1989; DFO 1992b, 1993, 1995; Taptuna and Low 1995; NLUIS 106I; L. Lockhart, pers. comm.)
Marion Lake 66°48'N, 130°35'W			Residents of Fort Good Hope harvest whitefish, lake trout, northern pike, and burbot for subsistence in the fall and winter from this lake. (Taptuna and Low 1995)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Moon Lake			See NORMAN WELLS--Moon Lake.
Mountain River 65°41'N, 128°55'W			A baseline fisheries study of the Mountain River system was conducted in 1971-72 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. Arctic cisco, Arctic grayling, lake chub, and longnose sucker were caught in the greatest numbers and may spawn in the river system. The river was also sampled in 1981 for the Norman Wells Oilfield Expansion Project. Arctic cisco were collected from the Mountain River system in 1988 for genetic analyses. (Hatfield et al. 1972; Dryden et al. 1973; Jessop et al. 1974; Envirocon 1981; Bickham et al. 1989; Lockwood and Bickham 1989; Morales et al. 1989; Troy 1989; Dillinger et al. 1992)
Ontadek Lake 68°18'N, 128°24'W			This lake has been fished for subsistence by residents of Fort Good Hope. (NLUIS 1061)
Ontaratue River 67°43'N, 130°01'W			A baseline fisheries study of the Ontaratue River system was conducted in 1971-72 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. Northern pike spawn in the Ontaratue River which also serves as a nursery area for immature pike. (Hatfield et al. 1972; Dryden et al. 1973)
Ramparts River 66°10'N, 129°15'W			Baseline fisheries studies of the Ramparts River system were conducted in 1971-72 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. (Shotton 1971; Hatfield et al. 1972; Dryden et al. 1973)
Rorey Lake 66°55'N, 128°25'W	late trout + lake whitefish 800	1991--NF; 1993--NA;	Residents of Fort Good Hope fish for subsistence at this lake on the Loon River year-round. Lake trout, whitefish, and northern pike are the main species harvested. The lake has been opened for commercial harvest but it has no record of commercial harvest. (Bissett 1972; Yaremchuk et al. 1989; DFO 1993, 1995; Taptuna and Low 1995; NLUIS 1061)
Sam McRae Lake 65°57'N, 127°10'W	lake trout + lake whitefish [800]	1991--NF;	Residents of Fort Good Hope and Norman Wells fish for subsistence year-round at this headwater lake on the Hare Indian River system. Lake trout, Arctic grayling, northern pike, and whitefish are harvested. The lake was opened in 1991 for an experimental fishery, but not fished. (DFO 1993; Taptuna and Low 1995)
Snafu Creek 66°01'N, 128°29'W			Baseline fisheries studies of the Snafu Creek system were conducted in 1972 for the Mackenzie Valley pipeline, and in 1973 for the Mackenzie Highway. The creek is a spawning and nursery area for Arctic grayling and longnose sucker, and northern pike spawn in its headwater lakes. (Lombard North Group Inc. 1973; Shotton 1973; McCart et al. 1974)
Tadek Lake 67°00'N, 127°25'W			This lake on the Anderson River system is fished year-round for subsistence by residents of Fort Good Hope, and possibly Colville Lake. In 1975, an experimental gillnet and seine fishery sampled Tadek Lake and its outlet, the Carnwath River. The lake supports lake trout and northern pike, and the river is a spawning and nursery area for Arctic grayling and sucker. (Sutherland and Gohlke 1978; Taptuna and Low 1995; NLUIS 96M)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Tieda River 66°43'N, 129°17'W			Baseline fisheries studies of the Tieda River system were conducted in 1971-73 for the Mackenzie Valley pipeline, and in 1973 for the Mackenzie Highway. Species reported from this system are listed in Appendix 1. The river is a spawning and nursery area for Arctic grayling and longnose suckers. It is frozen solid in winter. (Hatfield et al. 1972; Dryden et al. 1973; Shotton 1973; McCart et al. 1974; Schultz International Ltd. 1974)
Tsintu River 66°07'N, 128°29'W			Baseline fisheries studies of the Tsintu River system were conducted in 1971-73 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. Longnose sucker and walleye spawn in the lower reaches of the Tsintu River and use them for a nursery area. The upper reaches are spawning and nursery areas for Arctic grayling and slimy sculpin. (Dryden et al. 1973; Shotton 1973; McCart et al. 1974)
Tunago Lake			See Table 3--Tunago Lake.
Tweed Lake 66°48'N, 125°52'W			This lake on the Anderson River system has been fished for subsistence by residents of Fort Good Hope in conjunction with winter trapping activities. An experimental gillnet fishery sampled this lake 1975. (Sutherland and Gohlke 1978; NLUIS 96K)
Yeltea Lake 66°54'N, 129°24'W			This lake on the Tieda River system is fished for subsistence by residents of Fort Good Hope, mostly in September through December. Lake trout, northern pike, and whitefish are the main species harvested. Yeltea Lake was sampled in 1971-73 for the Mackenzie Valley Pipeline studies, and in 1973 for the Mackenzie Highway. DFO collected lake whitefish from the lake in October and November 1986 for biological and genetic analysis. (Bissett 1972; Dryden et al. 1973; Shotton 1973; McCart et al. 1974; Schultz International Ltd. 1974; Reist 1987; Taptuna and Low 1995; NLUIS 106L)
FORT NORMAN			
Alfred Lake			See NORMAN WELLS--Lennie Lake.
Bear Rock Lake (Fish Lake) 64°59'N, 125°40'W			A baseline fisheries study of this lake was conducted in 1973 for the Mackenzie Highway. (Lombard North Group Ltd. 1973)
Big Smith Creek 64°36'N, 124°45'W			Baseline fisheries studies of Big Smith Creek were conducted in 1971-73 for the Mackenzie Valley pipeline and Mackenzie Highway studies. Waterfalls situated about 6 km upstream from the creek mouth and 3 m in height appear to prevent movement of fish from the Mackenzie River to the headwater lakes. The area below the falls is a spawning and nursery area for lake chub and slimy sculpin. There is a major Arctic grayling spawning and feeding area above the falls. Species reported from this system are listed in Appendix 1. (Hatfield et al. 1972; Dryden et al. 1973; Shotton 1973; McCart et al. 1974; Slaney and Co. Ltd. 1974; NLUIS 96C)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Bluefish Creek 64°57'N, 125°52'W			This small tributary of the Mackenzie River was sampled in 1971 and 1973 for the Mackenzie Valley pipeline studies. The creek is a spawning, nursery, and overwintering area for Arctic grayling, longnose sucker, and slimy sculpin. There is a downstream movement of Arctic grayling, cisco and lake whitefish fry, and adult lake chub and slimy sculpin, from Bluefish Creek into the Mackenzie River during July and August. Arctic grayling tagged at Three Day Lake (see NORMAN WELLS) were recaptured at the creek mouth by subsistence harvesters who fish the downstream post-spawning migration. Residents of Fort Norman and Norman Wells fish for subsistence, mainly in spring and summer, at Bluefish Creek. Arctic grayling and whitefish, lake trout, inconnu, and burbot are the main species harvested. (Dryden et al. 1973; Jessop et al. 1974; Taptuna and Low 1995; NLUIS 96C).
Brackett Lake (Willow Lake) 65°13'N, 125°20'W	lake trout + lake whitefish 2,800	1981--lake whitefish 1,200 kg; 1993--NA;	Residents of Fort Norman fish for subsistence in this lake on the Brackett River system in the fall and early winter, primarily for whitefish spp.. Small commercial harvests were reported in 1975 and 1981. (Villiers 1968; Bissett 1972; Dryden et al. 1973; Yaremchuk et al. 1989; DFO 1995; NLUIS 96F)
Brackett River 65°00'N, 125°27'W			Baseline fisheries studies of this tributary of the Great Bear River were conducted in 1971-74 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. The river provides spawning and nursery habitat for a variety of species. Residents of Fort Norman fish for subsistence at its mouth in late summer and fall. (Hatfield et al. 1972; Dryden et al. 1973; Shotton 1973; Stein et al. 1973; Chang-Kue and Cameron 1980)
Carcajou Lake 64°40'N, 127°52'W			This headwater lake on the Little Keele River system, a tributary of the Carcajou River, supports populations of Arctic grayling, lake trout, and whitefish. Rapids on the lower reaches of the Little Keele River restrict upstream fish movement into the lake. A lake on the Loon River system is also named Carcajou (see FORT GOOD HOPE--Carcajou Lake). (NLUIS 96D)
Dahadinni River 63°59'N, 124°25'W			A baseline fisheries study of the Dahadinni River system was conducted in 1971-72 for the Mackenzie Valley pipeline. Arctic grayling spawn in the river and use it as a nursery area. (Hatfield et al. 1972; Dryden et al. 1973; NLUIS 95N)
Dal Lake 63°07'N, 126°30'W			A baseline fisheries study of this lake on the Redstone River was conducted in 1971-73 for the Mackenzie Valley pipeline. The lake supports Arctic grayling, Dolly Varden, lake trout, longnose sucker, and whitefish. Its outlet is shallow and intermittent, limiting or perhaps preventing fish passage. See also FORT NORMAN--Redstone River. (Hatfield et al. 1972; Dryden et al. 1973; Jessop et al. 1973; NLUIS 95M)
Doris Lake 65°10'N, 128°15'W	lake trout + lake whitefish 300		This lake on Virgin Creek, a tributary of the Mountain River, supports lake trout, lake whitefish, and northern pike. It has no record of commercial harvest. (NLUIS 106H)
Ekwi River 63°55'N, 128°23'W			Arctic grayling are thought to spawn in this area of the Ekwi River, a tributary of the Keele River. The Ekwi also serves as a nursery area for young grayling. (NLUIS 105P)
Fall Stone Lake 64°38.5'N, 125°38'W			This headwater lake of the East Little Bear River has been fished for subsistence in winter by hunters and trappers from Fort Norman, and possibly Déline. (NLUIS 96C)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Fort Norman general area			Residents of Fort Norman fish for subsistence year-round in the Mackenzie River near the community, in the Great Bear River, and in many other lakes and rivers. They harvested an estimated 28,275 kg of fish in 1961, and 1,320 kg in 1972. Inconnu and large, near-ripe Arctic cisco appear annually in the catches of subsistence harvesters at Fort Norman in late August. McLaren Plansearch Corp. monitored the subsistence harvest from 27 September to 15 October 1985, for the Endicott Environmental Monitoring Program. In 1995, DFO surveyed community residents for information on fishing activities. Neither study estimated the total annual harvest. (Sinclair et al. 1967; Bissett 1972; Chang-Kue and Cameron 1980; Nelson et al. 1987; Taptuna and Low 1995)
Gayna River 65°19'N, 129°30'W			This tributary of the Mountain River is a nursery area for Arctic grayling. Adult grayling may be year-round residents as turbulence in the lower reaches of the river may limit upstream fish access. (NLUIS 106H)
Godlin Lake 63°49'N, 128°47'W			In spring, Arctic grayling migrate into the Godlin Lakes via the Godlin River, a tributary of the Ekwi River, to feed during the summer. The lakes are thought to be too shallow to overwinter the fish, and a fall downstream migration to overwintering areas on the Keele River is likely. (NLUIS 105P)
Great Bear Lake			See Table 2. Residents of Fort Norman occasionally fish for subsistence at Great Bear Lake. Lake trout, burbot, and Arctic grayling are the main species harvested. (Taptuna and Low 1995)
Great Bear River 64°55'N, 125°35'W			Baseline fisheries studies were conducted on the Great Bear River in 1971-74 for the Mackenzie Valley Pipeline, 1973 for the Mackenzie Highway, and in 1981 for the Interprovincial Pipeline. Species reported from this system are listed in Appendix 1. Species diversity is greatest at the confluence of the Great Bear and Mackenzie Rivers, >25 species, and least at its headwaters, 12-14 species. Arctic grayling, northern pike, longnose sucker, and round whitefish are the major fish species throughout the river. Arctic grayling were abundant in most sections of the river, and used the lower 25 km of the river and tributaries upstream of the Brackett River as spawning and nursery areas. The Great Bear Lake outflow and first 10 km reach of the Great Bear River provide important summer feeding habitat for Arctic grayling. Post-spawning migrants from Stewart and Wolverine creeks (see below) have been recaptured in this area. Inconnu and Arctic cisco were only found in the fall as far upstream as St. Charles Rapids. Some Arctic cisco migrate from the Mackenzie Delta annually to spawn in the Great Bear River or its tributaries. The Great Bear River is fished for subsistence year-round, but mainly in summer, near Fort Norman and periodically at the mouth of the Brackett River during the late summer and fall. Whitefish, Arctic grayling, cisco, and inconnu are the most sought after species. (Bissett 1972; Hatfield et al. 1972; Dryden et al. 1973; Lombard Group North Inc. 1973; Shotton 1973; McCart et al. 1974; Jessop et al. 1974; Chang-Kue and Cameron 1980; McCart 1982; Taptuna and Low 1995)
Jackfish Lake 64°48'N, 125°17'W			Residents of Fort Norman fish for subsistence year-round at Jackfish Lake. Whitefish and northern pike are the main species harvested. (Taptuna and Low 1995)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Keele River 63°45'N, 127°54'W			A baseline fisheries study of the Keele River system was conducted in 1971-73 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. The Keele River is a nursery area for Arctic grayling. Other species may also overwinter in its deep pools. (Hatfield et al. 1972; Dryden et al. 1973; Jessop et al. 1974)
Kelly Lake 65°21'N, 126°00'W			This lake on the Loche River (65°19'N, 125°43'W), a tributary of the Brackett River, is fished year-round for subsistence by people from Fort Norman and Norman Wells, mainly for whitefish, lake trout, and northern pike. Anglers also fly-in to Kelly Lake from Norman Wells to fish for lake trout. DFO sampled lake whitefish from this fishery in 1971, and from the lake in February 1974. Fish migrations have been reported between Kelly Lake and the numerous lakes along the Loche River. Residents of Norman Wells recently expressed concern that the lake is being overfished. (Villiers 1968; Bissett 1972; Hatfield et al. 1972; Dryden et al. 1973; Stein et al. 1973; Jessop and Lilley 1975; Taptuna and Low 1995; NLUIS 96F; D. Grindlay and G. Low, pers. comm.)
Lac á Jacques			See FORT GOOD HOPE--Lac á Jacques.
Lennie Lake			See NORMAN WELLS--Lennie lake.
Little Bear River 64°54'N, 125°54'W			A baseline fisheries study of the Little Bear River system was conducted in 1971-72 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. The river is an important nursery area and probable spawning ground for Arctic grayling, burbot, longnose sucker, walleye and whitefish. The river is swift flowing and shallow near its mouth and consequently is seldom fished. (Hatfield et al. 1972; Dryden et al. 1973; Stein et al. 1973)
Little Smith Creek 64°29'N, 124°41'W			Baseline fisheries studies of Little Smith Creek were conducted in 1972-73 for the Mackenzie Valley pipeline. The creek is a spawning and nursery area for Arctic grayling, burbot, lake chub, and longnose sucker. (Shotton 1973; McCart et al. 1974; Slaney and Co. Ltd. 1974)
Mahony Lake 65°30'N, 125°20'W	lake trout + lake whitefish 4,600	1993--NA;	This lake on the Brackett River system is fished year-round for subsistence by residents of Fort Norman. Species harvested include whitefish, lake trout, northern pike, burbot, inconnu, walleye, and sucker. No record of commercial harvest. (Villiers 1968; Yaremchuk et al. 1989; DFO 1995; Taptuna and Low 1995)
Porcupine River 65°00'N, 123°40'W			A baseline fisheries study of this tributary of the Great Bear River was conducted in 1971-74 for the Mackenzie Valley pipeline. Arctic grayling spawn in the river and use it as a nursery area, as may northern pike and ninespine stickleback. Species reported from this system are listed in Appendix 1. (Hatfield et al. 1972; Dryden et al. 1973; Stein et al. 1973; Chang-Kue and Cameron 1980)
Redstone River 63°58'N, 125°00'W			A baseline fisheries study of the Redstone River system, including Dal Lake (see above), was conducted in 1971-73 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. In the fall, the North Redstone River (63°38'N, 126°35'W) is a migration route for mountain whitefish. Arctic grayling and longnose sucker overwinter in the river. (Hatfield et al. 1972; Dryden et al. 1973; Jessop et al. 1974; NLUIS 95M+N)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
St. Charles Creek 64°52'N, 124°58'W			A baseline fisheries study of Charles Creek was conducted in 1971-74 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. Arctic grayling use the creek as a spawning and nursery area. (Hatfield et al. 1972; Dryden et al. 1973; Jessop and Lilley 1975)
Saline River 64°18'N, 124°30'W			Baseline fisheries studies of the Saline River system were conducted in 1971-73 for the Mackenzie Valley pipeline. The river is a spawning and nursery area for Arctic grayling, lake chub, longnose sucker, slimy sculpin, and whitefish. Overwintering habitat was found about 8 km upstream from the mouth. (Shotton 1973; McCart et al. 1974; Slaney and Co. Ltd. 1974)
Slater River 64°58'N, 126°10'W			This river provides nursery habitat for burbot, walleye and whitefish and may be a spawning area for longnose sucker and burbot. A headwater lake (64°52'N, 126°32'W) has been fished for subsistence by residents of Fort Norman. (NLUIS 96D)
Stewart Creek			See NORMAN WELLS--Stewart Creek.
Stewart Lake 64°22'N, 125°18'W	broad whitefish --no quota	1990--2 kg	This lake on the Keele River system is fished for subsistence year-round by residents of Fort Norman, in summer and fall by residents of Norman Wells, and possibly also by residents of Déline. Lake trout and lake whitefish are the main species caught. The lake was fished by experimental fisheries in 1987 and 1990. DFO obtained samples from the October 1987 harvest. (McGowan 1989; Yaremchuk et al. 1989; Taptuna and Low 1995; NLUIS 96C)
	lake trout [200]	1987--255 kg; 1990--64 kg	
	lake whitefish [200]	1987--48 kg	
	northern pike --no quota	1987--18 kg; 1990--13 kg	
Stick Creek 65°02'N, 124°03'W			A baseline fisheries study of this tributary of the Great Bear River was conducted in 1972 and 1974 for the Mackenzie Valley pipeline. The creek is a nursery area for Arctic grayling and northern pike. (Dryden et al. 1973; Jessop and Lilley 1975; Chang-Kue and Cameron 1980; NLUIS 96F)
Tagatui Lake 64°57'N, 125°12'W	lake whitefish 900		No reported commercial harvest. (Yaremchuk et al. 1989)
Tate Lake 64°30'N, 125°20'W			Residents of Norman Wells and Fort Norman fish for subsistence at Tate Lake in summer. Whitefish, lake trout, northern pike, and burbot are harvested. (Taptuna and Low 1995)
Three Day Lake			See NORMAN WELLS--Three Day Lake.
unnamed creek ("C") 64°52'N, 125°06'W			A baseline fisheries study of this creek was conducted in 1973 for the Mackenzie Highway. (Lombard North Group Ltd. 1973)
unnamed creek ("D") 64°53'N, 125°17'W			A baseline fisheries study of this creek was conducted in 1973 for the Mackenzie Highway. (Lombard North Group Ltd. 1973)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
unnamed creek (Mountain Creek) 65°04'N, 124°40'W			A baseline fisheries study of this tributary of the Great Bear River was conducted in 1974 for the Mackenzie Valley pipeline. (Chang-Kue and Cameron 1980)
unnamed creek (Steep Creek or Birch Island Creek) 64°12'N, 124°21'W			A baseline fisheries study of Steep Creek was conducted in 1973 for the Mackenzie Valley pipeline. The creek provides spawning and nursery habitat for Arctic grayling, and overwintering habitat for Arctic grayling and slimy sculpin. (McCart et al. 1974; Slaney and Co. Ltd. 1974)
unnamed lake 63°30.5'N, 126°45'W			In the past this lake was a well-used subsistence fishery by people now living in Fort Norman. (NLUIS 95M)
unnamed lake 63°40'N, 126°45'W			In the past this lake was a well-used subsistence fishery by people now living in Fort Norman. (NLUIS 95M)
Willow Lake			See FORT NORMAN--Brackett Lake.
Wolverine Creek 65°03'N, 124°17'W			This tributary of the Great Bear River is fished for subsistence by residents of Fort Norman in summer, fall, and early winter. In 1974, DFO erected a fence and trap to count the post-spawning downstream migration of fish in the creek. Between 12 June and 8 July, 8,973 Arctic grayling, 591 longnose sucker, and 68 northern pike passed downstream. DFO tagged 1,733 grayling and 186 longnose suckers. Based on field observations and tag recoveries by sport anglers (22 in 1974) the Great Bear Lake outflow and the upper 10 km of the Great Bear River appear to be major summering habitat for Arctic grayling from this system. (Miller 1946; Bissett 1972; Chang-Kue and Cameron 1980)
Wrigley Lake (Drum Lake) 63°51'N, 126°10'W	lake trout + lake whitefish 1,700	<u>Subsistence:</u> 1970--1,136 kg;	In the past, residents of Fort Norman lived year round in this area and fished for subsistence in this lake on the Redstone River in August and September. Drum Lake Lodge (63°52'N, 126°16'W), has operated a sport fishery on the lake since the 1970's. The lodge has 33 guest beds and operates from mid-June to the end of September. Arctic grayling, Dolly Varden, and lake trout are the main species sought. DFO sampled the lake in 1968, during the Barren Grounds Survey. In spring, Arctic grayling and longnose sucker migrate into the tributary streams of Wrigley Lake (63°56'N, 126°16'W; 63°48.5'N, 126°25'W) to spawn. The lake outlet is a nursery area for lake chub and longnose sucker. (Bissett 1972; Moshenko 1980; NLUIS 95M; D. Grindlay, pers. comm.)
Yellow Lake 64°42'N, 125°43'W			This headwater lake of the East Little Bear River is fished for subsistence in summer and winter residents of Fort Norman, and possibly Déline. (Taptuna and Low 1995; NLUIS 96C)
NORMAN WELLS			
Alfred Lake			See below Lennie Lake.
Billy Creek			Billy Creek was sampled in 1981 for the Norman Wells Oilfield Expansion Project. (Envirocon Ltd. 1981)
Bluefish Creek			See FORT NORMAN--Bluefish Creek.

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Bosworth Creek 65°19'N, 126°53'W			Baseline fisheries studies of Bosworth Creek were conducted in 1972-73 for the Mackenzie Valley pipeline, and 1973 for the Mackenzie Highway. There is a minor spawning and nursery area for Arctic grayling and suckers near the creek mouth. Spring fed areas of the creek remain open in winter and may provide overwintering habitat for fish. Fish Lake (65°18'N, 126°39'W) on Bosworth Creek is a popular recreation area for residents of Norman Wells. Subsistence harvesters from the community harvest burbot from the creek in fall and winter. (Lombard North Group Ltd. 1973; Shotton 1973; McCart et al. 1974; Taptuna and Low 1995; NLUIS 96E)
Canyon Creek 65°14'N, 126°31'W			Baseline fisheries studies of Canyon Creek were conducted in 1972-73 for the Mackenzie Valley pipeline and 1973 for the Mackenzie Highway. The creek is a spawning and nursery area for Arctic grayling and lake chub. (Lombard North Group Ltd. 1973; Shotton 1973; McCart et al. 1974)
Elliot Creek 65°32'N, 127°37'W			Baseline fisheries studies of Elliot Creek were conducted in 1972-73 for the Mackenzie Valley pipeline, in 1973 for the Mackenzie Highway, and in 1981 for the Norman Wells Oilfield Expansion Project. The creek is a spawning and nursery area for Arctic grayling, lake chub, and slimy sculpin. It has areas of open water in winter that may provide overwintering habitat for fish. (Lombard North Group Ltd. 1973; Shotton 1973; McCart et al. 1974; Envirocon Ltd. 1981)
Florence Lake 65°09'N, 128°08'W			Residents of Norman Wells harvest lake trout and northern pike for subsistence from this lake on Virgin Creek, a tributary of the Mountain River, in winter. (Taptuna and Low 1995; NLUIS 106H)
Francis Creek 65°13'N, 126°27'W			Baseline fisheries studies of Francis Creek were conducted in 1972-73 for the Mackenzie Valley pipeline, and in 1973 for the Mackenzie Highway. (Lombard North Group Ltd. 1973; Shotton 1973; McCart et al. 1974)
Great Bear Lake			See Table 2. Residents of Norman Wells harvest lake trout, Arctic grayling, and whitefish for subsistence year-round, but mainly in summer, at Great Bear lake. (Taptuna and Low 1995)
Great Bear River			See FORT NORMAN--Great Bear River. Residents of Norman Wells harvest Arctic grayling and lake trout at Bennett Field (65°02'N, 124°40'W) in summer and fall. (Taptuna and Low 1995)
Hanna River 65°40'N, 128°07'W			Baseline fisheries studies of the Hanna River system were conducted in 1971-73 for the Mackenzie Valley pipeline. Species reported from this system are listed in Appendix 1. The river is a spawning and nursery area for Arctic grayling and slimy sculpins. Areas of the river that remain open during the winter may provide overwintering habitat for fishes. (Hatfield et al. 1972; Shotton 1973; McCart et al. 1974)
Helava Creek 65°12'N, 126°24'W			Baseline fisheries studies of Helava Creek were conducted in 1972-73 for the Mackenzie Valley pipeline, and in 1973 for the Mackenzie Highway. The creek is a spawning and nursery area for lake chub and slimy sculpin. (Lombard North Group Ltd. 1973; Shotton 1973; McCart et al. 1974)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Jungle Ridge Creek 65°02'N, 126°00'W			Baseline fisheries studies of Jungle Ridge Creek were conducted in 1972-73 for the Mackenzie Valley pipeline, and in 1973 for the Mackenzie Highway. The creek is a spawning and nursery area for Arctic grayling, slimy sculpin, and sucker. (Lombard North Group Ltd. 1973; McCart et al. 1974)
Kelly Lake			See FORT NORMAN--Kelly Lake.
Lennie Lake (Alfred Lake) 65°34'N, 126°33'W	lake trout + lake whitefish 2,800	1983--200 kg; 1991--NF; 1993--NA;	This lake on the Brackett River system is fished for subsistence year-round, but mostly in summer and fall, by residents of Norman Wells. Whitefish, lake trout, and northern pike are the main species harvested. The only reported commercial harvest from this lake was in 1983. It was opened for commercial fishing in 1991 and 1993, but no harvest was reported. Confusion exists in the literature with respect to the name of this lake, which has been referred to interchangeably as Lennie Lake or Alfred Lake. Residents of Norman Wells recently expressed concern that the lake is being overfished. (Yaremchuk et al. 1989; DFO 1993, 1995; Taptuna and Low 1995; N. Robinson, pers. comm.)
Loon Creek 65°10'N, 126°55'W			This creek is a nursery area for broad and lake whitefish. (NLUIS 96E)
Mirror Lake 64°51'N, 126°55'W			Residents of Norman Wells harvest lake trout and northern pike from this lake in winter for subsistence. (Taptuna and Low 1995)
Moon Lake 65°38'N, 127°29'W	lake trout + lake whitefish [500]	1982--NF;	Moon Lake on the Hanna River system has been fished for subsistence by residents of Fort Good Hope and Norman Wells in support of winter trapping activities. Whitefish are the main fish sought. Moon Lake was sampled in 1972 for the Mackenzie Valley pipeline. There is a grayling spawning and rearing area and possible round whitefish spawning site at the lake outlet. An experimental fishery licenced for the lake in 1982, did not take place. (McCart et al. 1974; Yaremchuk et al. 1989; NLUIS 96E)
Norman Wells general area			Residents of Norman Wells fish the Mackenzie River near the community year-round, but mainly in summer. In 1971, liver and muscle tissue from a variety of fish species were analyzed for heavy metal and chlorinated hydrocarbon contamination. Residents of the community have expressed concern that pollution may be affecting their fishing. In response, DFO and others have undertaken a number of pollution-related studies downstream from Norman Wells to address these concerns (See Table 4). In 1972-74, DFO tagged 4,687 fish of a variety of species in the Norman Wells area to follow their movements. In 1995, DFO surveyed community residents for information on their subsistence harvesting activities. They did not estimate the total annual harvest. (Hatfield et al. 1972; Stein et al. 1973; Jessop et al. 1974; Jessop and Lilley 1975; Taptuna and Low 1995)
Nota Creek and Lake 65°05'N, 125°59'W			Baseline fisheries studies of the Nota Creek system were conducted in 1972-73 for the Mackenzie Valley pipeline. The creek is a major spawning and nursery area for Arctic grayling and slimy sculpin. It is also an important migration route for juvenile and adult grayling and adult lake chub. Nota Lake (65°04'N, 125°56'W) was also sampled during these studies. (Shotton 1973; McCart et al. 1974)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Oscar Creek 65°27'N, 127°22'W			Residents of Norman Wells harvest Arctic grayling, northern pike, walleye, and burbot from Oscar Creek in spring and summer for subsistence. Baseline fisheries studies of the Oscar Creek system were conducted in 1971-74 for the Mackenzie Valley pipeline, in 1973 for the Mackenzie Highway, and in 1981 for the Norman Wells Oilfield Expansion Project. The intensive 1973-4 survey included a fish fence and tagging program. The creek is a migration route for a variety of species. Its lower reaches provide spawning habitat for Arctic grayling, longnose sucker, northern pike, walleye, and possibly other species. The creek mouth is an important nursery area for whitefish. There is open water in winter and it is an overwintering area for burbot, ninespine stickleback, northern pike, and perhaps other species. Species reported from this system are listed in Appendix 1. (Hatfield et al. 1973; Dryden et al. 1973; Lombard North Group Ltd. 1973; Shotton 1973; Jessop et al. 1974; McCart et al. 1974; Jessop and Lilley 1975; Envirocon Ltd. 1981; Taptuna and Low 1995; K. Chang-Kue, pers. comm.)
Prohibition Creek 65°10'N, 126°18'W			Baseline fisheries studies of the Prohibition Creek system were conducted in 1972-73 for the Mackenzie Valley pipeline, and in 1973 for the Mackenzie Highway. This small stream supports spawning populations of Arctic grayling and slimy sculpin, and is an important nursery area for whitefish spp.. Parts of the stream are spring-fed and flow throughout the winter. A detailed study of the stream sediments, water chemistry and zoobenthos was conducted in 1972. (Lombard North Group Ltd. 1973; Shotton 1973; Stein et al. 1973; McCart and deGraff 1974; McCart et al. 1974)
Sam McRae Lake			See FORT GOOD HOPE--Sam McRae Lake.
Stewart Creek 65°11'N, 126°40'W			Stewart Creek, which drains Three Day Lake (see below), was sampled in 1972-74 for the Mackenzie Valley pipeline. It is a whitefish nursery area and a migration route for a variety of species, particularly Arctic grayling. Residents of Norman Wells fish for subsistence at the creek mouth. The creek mouth has also been fished for subsistence by harvesters from Fort Norman. Species reported from this system are listed in Appendix 1. (Stein et al. 1973; Jessop et al. 1974; Jessop and Lilley 1975; K. Chang-Kue, pers. comm.; NLUIS 96E)
Stewart Lake			See FORT NORMAN--Stewart Lake.
Tate Lake			See FORT NORMAN--Tate Lake.
Three Day Lake 65°09'N, 126°45'W			In May and June of 1972-74, DFO tagged 2,821 post-spawning Arctic grayling as they ran downstream in Stewart Creek (see above) out of Three Day Lake. Tagged fish were recaptured in late June and July by subsistence fisheries at the mouths of Stewart and Bluefish creeks (see above) and at Norman Wells, and by sport and subsistence fisheries in the Great Bear River in late summer and fall. These returns demonstrate an annual progressive movement of post-spawners from Three Day Lake towards the Great Bear River (see FORT NORMAN) and upstream to the outlet of Great Bear Lake. DFO did not find suitable overwintering habitat in Three Day Lake, and suggested that these fish may overwinter in the Great Bear River. While grayling return annually to Three Day Lake after ice break-up in May, the degree of their site fidelity is unknown. Arctic grayling spawn in Gus Creek, a tributary of the lake. Grayling tagged at Three Day Lake have been recaptured in spring spawning runs at the Donnelly River

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
Three Day Lake --continued.			(see FORT GOOD HOPE), a downstream tributary of the Mackenzie River, and in Wolverine Creek, a tributary of the Great Bear River. Post-spawning longnose sucker tagged in the lake have been recaptured at Bluefish Creek. Residents of Norman Wells harvest Arctic grayling from Three Day Lake in summer for subsistence. The lake has also been fished for subsistence by harvesters from Fort Norman. (Stein et al. 1973; Jessop et al. 1974; Jessop and Lilley 1975; Chang-Kue and Cameron 1980; Taptuna and Low 1995; NLUIS 96E).
Trapper Creek 65°32'N, 127°55'W			A baseline fisheries study of this creek was conducted in 1981 for the Norman Wells Oilfield Expansion Project. (Envirocon Ltd. 1981; NLUIS 96E)
Turton Lake 65°48'N, 126°55'W			Residents of Norman Wells harvest lake trout, northern pike, and whitefish for subsistence year-round from this headwater lake on the Hare Indian River system. (Taptuna and Low 1995)
Twentyfive Mile Lake 65°00'N, 126°58'W			This headwater lake of Twentyfive Mile Creek, a tributary of the Carcajou River is fished for subsistence by residents of Norman Wells. (Taptuna and Low 1995; NLUIS 96E)
unnamed creek (Gordon Creek) 65°54'N, 127°48'W			Baseline fisheries studies of this unnamed creek were conducted in 1973 for the Mackenzie Valley pipeline. The creek provides spawning and nursery habitat for Arctic grayling, longnose sucker, and northern pike. (McCart et al. 1974)
unnamed lakes (Necklace Lakes) 65°22'N, 127°09'W			A baseline fisheries study of the Necklace Lakes was conducted in 1973 for the Mackenzie Highway. (Lombard North Group Ltd. 1973)
Vermilion Creek 65°07'N, 126°00'W			Baseline fisheries studies of Vermilion Creek were conducted in 1972-73 for the Mackenzie Valley pipeline, and in 1973 for the Mackenzie Highway. The river mouth is a spawning and rearing area for Arctic grayling, lake chub, longnose sucker, slimy sculpin, and whitefish spp. Spring fed areas of the river provide overwintering habitat for juvenile grayling. (Hatfield et al. 1972; Dryden et al. 1973; Lombard North Group Ltd. 1973; Stein et al. 1973; McCart et al. 1974)
COPPERMINE RIVER DRAINAGE BASIN			
Kamut Lake 66°43'N, 116°22'W			A survey gillnet fishery of this lake in the Coppermine River drainage basin, in 1977, caught Arctic grayling, lake trout, and lake whitefish. Several of the lake whitefish were in spawning condition on 18 August 1977. (Stewart and MacDonald 1978)
HORNADAY RIVER DRAINAGE BASIN			
Hornaday River 67°44'N, 120°57'W			In 1975, a survey seine fishery caught ninespine stickleback and immature Arctic grayling in the headwaters of the Hornaday River. (Sutherland and Gohlke 1978)
NAHANNI RIVER DRAINAGE BASIN			
South Nahanni River 62°30'N, 128°41'W			The South Nahanni River supports populations of Arctic grayling, Dolly Varden, longnose sucker, and mountain whitefish. Spawning may occur in the river and in many of its tributaries. (NLUIS 105I)

Table 1. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	HARVEST (kg rd wt) ³	STOCK STATUS (references)
O'Grady Lake 63°00'N, 129°01'W			This headwater lake of the South Nahanni River supports Arctic grayling and lake trout. (NLUIS 105I)

¹ Old or alternate names for the fisheries are shown in brackets.

² A round weight (kg rd wt) is that for a whole fish, while a dressed weight is that of a fish with the viscera and gills removed. Square brackets indicate provisional test quotas. The quota years are the same as the federal government fiscal year (e.g. the 1995 quota extends from 1 April 1995 to 31 March 1996). "NA" indicates that a harvest may have taken place but that no data are available; "NF" indicates that a waterbody was opened for fishing by Variation Order but was not fished.

³ Unless otherwise noted the harvests were taken by commercial fisheries. The "subsistence harvests" were taken by residents for their own use, "experimental harvests" (formerly known as exploratory or test fisheries) were taken for scientific purposes, and the "sport harvests" were taken by anglers.

Table 2. Harvests of fishes from Great Bear Lake, NWT.

LOCATION ¹	QUOTA (# of fish or kg rd wt) ²	ESTIMATED HARVEST (# of fish or kg rd wt) ^{2,3}	STOCK STATUS (references)
DEASE ARM	Arctic grayling --no quota	<u>Sport harvest:</u> 1988--1,028 fish; 1989--561 fish; 1990--261 fish <u>Experimental harvest:</u> 1984--3 fish;	Residents of Déline have fished for subsistence in Clearwater Bay and other sheltered bays near Cape MacDonnel, the mouth of the Bloody River, and at the head of Dease Arm. In some years, large quantities of fish were sent back to Déline from fall fish camps along the Great Bear Lake shoreline. No estimates of past or current subsistence harvests were located. Guests of Plummer's Great Bear Lake Lodge angle Arctic grayling, lake trout, lake whitefish, and northern pike from Dease Arm (Fig. 3+4). Estimates of the sport harvest of lake trout were generated by DFO from their creel censuses of lodge guests in 1972, 1973, 1977 and 1984, and from their angler diary program in 1988-90. Data from the 1987 angler diary program are not included here due to the low response rate (9%). Creel census data from the sport lodge are summarized in Table 4. DFO conducted experimental gillnet fisheries in Dease Arm in 1973 and 1984. The latter fishery sampled Arctic grayling, lake cisco, lake trout, lake whitefish, and round whitefish for data on growth, reproduction, diet, and catch-effort. Between 1973 and 1984, the harvest and biological data show a decline in the mean length and age of lake trout caught by the fishery, a decline in the availability of trout >30 yr of age, and an increase in the instantaneous total mortality rate. These are indications of a fishing down of the standing stock of lake trout in Dease Arm, and also that the trout population had not yet stabilized and was continuing to decline--despite the lower harvest in 1984. In 1988, DFO recommended that sport fishermen take no more than 2,000 lake trout annually (TAH ²) from Dease Arm, in to order stabilize the population and to sustain the trophy fishery. (Falk and Dahlke 1974; Falk et al. 1974c, 1975; Moshenko and Gillman 1983; Yaremchuk 1986; Roberge and Dunn 1988; Clarke et al. 1989; Dunn and Roberge 1989; Anderson and Thompson 1991; NLUIS Maps 86L and 96I; L. Anderson, pers. comm.)
	lake cisco --no quota	<u>Experimental harvest:</u> 1973--1 fish; 1984--20 fish;	
	lake trout --no commercial quota, recommended TAH of 2,000 fish per year by trophy fisheries	<u>Sport harvest:</u> 1972--6,828 fish (24,581 kg); 1973--5,494 fish (18,781 kg); 1977--3,413 fish (13,072 kg); 1984--3,932 fish; 1988--1,903 fish; 1989--1,311 fish; 1990--861 fish; <u>Experimental harvest:</u> 1984--276 fish (635 kg);	
	lake whitefish --no quota	<u>Experimental harvest:</u> 1984--49 fish;	
	northern pike --no quota	<u>Sport harvest:</u> 1988--11 fish; 1989--8 fish; 1990--44 fish;	
	round whitefish --no quota	<u>Experimental harvest:</u> 1973--4 fish (1.8 kg); 1984--3 fish;	

Table 2. Continued.

LOCATION ¹	QUOTA (# of fish or kg rd wt) ²	ESTIMATED HARVEST (# of fish or kg rd wt) ^{2,3}	STOCK STATUS (references)
KEITH ARM --experimental licence includes waters west of Fox Point (62°21'N, 122°45'W) and Manitou Island (65°02'N, 122°17'W) but excluding the special harvesting area, effective 1994 season.	Arctic grayling --no quota	<u>Subsistence harvest:</u> 1993--70 fish;	In 1944, the annual subsistence harvest of fish by residents of Déline (Fort Franklin) from Keith Arm was estimated at 220,000 kg; in 1961 at 117,360 kg; and, in 1973 at 22,650 kg. In 1977, the total subsistence harvest of fish from Great Bear Lake as a whole was estimated at between 60,000 and 84,300 kg. Lake trout made up about 37% of this harvest, lake cisco 31%, whitefish 26%, and Arctic grayling 6%. In 1944-5, the fishery was mainly conducted in summer and most fish were used to feed the approximately 600 dogs. Historically, the summer subsistence fishery for cisco sp. has been unreliable, with large fluctuations in the annual harvest. In 1979, DFO sampled lake trout taken by subsistence fishermen in the vicinity of Déline for data on their growth and sexual maturity. No estimate of the subsistence harvest was given. Experimental fisheries have been conducted in Keith Arm annually since 1990. The low harvests between 1990 and 1993 reflect the local market for fish, not their catchability. In 1988, Lutra Associates Ltd. surveyed residents of Déline for information on their subsistence fishing activities. DFO also collected data on the subsistence harvest from 1-31 August 1993. Neither study estimated the total annual subsistence harvest of fish by the community. Specific areas of Keith Arm are discussed below. (Miller 1947; Sinclair et al. 1967; Bissett 1972; Rushforth 1976; Guttman 1973 cited in Hall 1978; Falk et al. 1982; Lutra Associates Ltd. 1988; Rawson Academy of Aquatic Science 1990; DFO 1992a+b, 1993, 1994, 1995; McGowan 1993; G. Low, pers. comm.)
	cisco spp. [500]	1989--NF; 1990--0 kg; 1991--300 kg; 1992--0 kg; 1993--0 kg; <u>Subsistence harvest:</u> 1974--37,500 to 60,400 fish; 1993--710 fish;	
	lake trout [600]	1989--NF; 1990--344 kg; 1991--600 kg; 1992--363 kg; 1993--300 kg; <u>Subsistence harvest:</u> 1974--4,400 to 6,600 fish; 1979--177 fish (640 kg) were sampled; 1993--731 fish;	
	lake whitefish [500]	1990--0 kg; 1991--200 kg; 1992--0 kg; 1993--0 kg; <u>Subsistence harvest:</u> 1993--5 fish;	
Alcyone Bay 65°12'N, 121°38'W			Residents of Déline have gillnetted lake trout and whitefish for subsistence from Alcyone Bay in late spring and early summer. A spawning ground has been reported in Great Bear Lake at the mouth of a stream (65°10'N, 121°37'W) immediately south of Alcyone Bay. (NLUIS Map 96H)
Cloud Bay 65°04'N, 121°40'W	lake trout [685] lake whitefish [455]	1982--0 kg; 1986--NF;	Experimental fisheries licenced in 1982 and 1986. No record of harvest. (McGowan 1985; Yaremchuk et al. 1989; W. Bayha, pers. comm.)

Table 2. Continued.

LOCATION ¹	QUOTA (# of fish or kg rd wt) ²	ESTIMATED HARVEST (# of fish or kg rd wt) ^{2,3}	STOCK STATUS (references)
Deerpass Bay 66°56'N, 122°25'W	Arctic grayling --no quota	<u>Subsistence harvest:</u> 1977--90 kg;	Lake trout and whitefish are reported to spawn at the head of Deerpass Bay. Residents of Déline fish for subsistence at Deerpass Bay. They harvested an estimated 907 kg of fish from the area in the fall of 1973, and 1,270 kg in the spring of 1977. Experimental fisheries were licenced in 1982, 1983 and 1986 but there is no record of harvest. Guests from Trophy Lodge on Smith Arm fly-in to Deerpass Bay to angle for lake trout. (Hall 1978; McGowan 1985; Yaremchuk et al. 1989; NLUIS Maps 96 G+J; L. Anderson and W. Bayha, pers. comm.)
	lake trout [685]	1982--0 kg; 1983--NF; 1986--NF; <u>Subsistence harvest:</u> 1977--227 kg; <u>Sport harvest:</u> 1988--4 lake trout 1989--117 lake trout 1990--112 lake trout	
	lake whitefish [455]	<u>Subsistence harvest:</u> 1977--909 kg;	
	northern pike --no quota	<u>Subsistence harvest:</u> 1977--45 kg;	
Dehselia 65°05'N, 123°15'W	lake trout [685] lake whitefish [455]	1986--NF;	Experimental fishery licenced in 1986, but not fished. (Yaremchuk et al. 1989; W. Bayha, pers. comm.)
Fort Franklin (Great Bear Lake) 65°11'N, 123°25'W			See KEITH ARM. Fort Franklin and Keith Arm refer to the same area or Great Bear Lake. (G. Low, pers. comm.)
Fox Point 65°21'N, 122°45'W	lake trout [685] lake whitefish [455]	1986--NF;	Experimental fishery licenced in 1986, but not fished. (Yaremchuk et al. 1989; W. Bayha, pers. comm.)
Jupiter Bay 65°19'N, 121°33'W	lake trout + lake whitefish [2,300]	1982--0 kg; 1983--NF;	Experimental fisheries licenced in 1982 and 1983. No record of harvest. (McGowan 1985; Yaremchuk et al. 1989; W. Bayha, pers. comm.)
Manitou Bay 65°00'N, 122°09'W	lake trout [685] lake whitefish [455]	1982--0 kg; 1983--NF; 1986--NF;	Experimental fisheries licenced in 1982, 1983 and 1986. No record of harvest. (McGowan 1985; Yaremchuk et al. 1989)
Preble Bay 65°30'N, 121°10'W			Lake trout spawn in Preble Bay in late August and early September. (Johnson 1975c).

Table 2. Continued.

LOCATION ¹	QUOTA (# of fish or kg rd wt) ²	ESTIMATED HARVEST (# of fish or kg rd wt) ^{2,3}	STOCK STATUS (references)
Russel Bay 65°28'N, 122°52'W	lake trout [685] lake whitefish [455]	1982--0 kg; 1983--NF; 1986--NF;	Lake trout spawn in Russel Bay in late August and early September. Whitefish are also reported to spawn in the bay. In the fall of 1973, an estimated 2,268 kg of fish were harvested for subsistence from Russel Bay. In June of 1974, about 1,000 lake trout and whitefish were harvested at Russel Bay and returned to Déline. Experimental fisheries licenced in 1982, 1983 and 1986. No record of harvest. Two nets were set in 1982 but no fish were caught. (Johnson 1975c; Rushforth 1976; Guttman 1973 cited in Hall 1978; McGowan 1985; Yaremchuk et al. 1989; NLUIS Map 96G; W. Bayha and A.C. Day, pers. comm.)
Whiskey Jack Point 65°13'N, 123°00'W	lake trout [685] lake whitefish [455]	1986--200 lake trout;	Experimental fishery licenced in 1986. (Yaremchuk et al. 1989; W. Bayha, pers. comm.)
McTAVISH ARM (north)	Arctic grayling --no quota	<u>Sport harvest:</u> 1988--84 fish; 1989--51 fish; 1990--39 fish;	Residents of Déline fish for subsistence in Hornby Bay and an unnamed bay (66°21'N, 119°47'W). In some years, large quantities of fish were sent back to Déline from fall fish camps along the Great Bear Lake shoreline. No estimates of these or current subsistence harvests were located. Sport fishermen from Arctic Circle Lodge and its outpost camp angle Arctic grayling, lake trout, lake whitefish, and northern pike from northern McTavish Arm (Fig. 3+4). While they take the most fish, some guests from Plummer's Great Bear Lake Lodge and Branson's Lodge also visit this area of the lake to fish. DFO estimated the sport harvest of lake trout from northern McTavish Arm from data supplied by Arctic Circle Lodge in 1972, from creel censuses of lodge guests in 1975 and 1984, and from their angler diary program in 1987-90. Creel census data from the sport lodge are summarized in Table 4. Data from the 1987 angler diary program is not included here due to the low response rate (33%). Pre-1988 harvest estimates only include fish harvested by guests of Arctic Circle Lodge. In 1984, DFO also conducted an experimental gillnet fishery in northern McTavish Arm. Arctic grayling, lake cisco, lake trout, lake whitefish, northern pike, and round whitefish were sampled for data on growth, reproduction, diet, and catch-effort. Based on the harvest and biological data, the stock of lake trout in northern McTavish Arm appear to have declined between 1975 and 1984. Indicators of this change included a decrease of over 40% in the catch per unit of fishing effort, a shift towards smaller and younger fish in the catch, the disappearance of "trophy quality" trout older than 25 yr, and an increase in the instantaneous total mortality rate. These are indications of a fishing down of the standing stock of lake trout in northern McTavish Arm, and of its continued decline. In 1988, DFO recommended that sport fishermen take no more than 1,500 lake trout (TAH) from northern McTavish Arm annually to enable the population to stabilize and to sustain the trophy fishery. Arctic Circle Lodge was closed in 1991, and will remain closed through the 1995 season. (Falk and Dahlke 1974; Moshenko and Gillman 1978a; Yaremchuk 1986; Roberge and Dunn 1988; Clarke et al. 1989; Dunn and Roberge 1989; Anderson and Thompson 1991; NLUIS Map 86L; L. Anderson and C. Plummer, pers. comm.)
	lake cisco --no quota	<u>Experimental harvest:</u> 1984--1 fish;	
	lake trout --no commercial quota, recommended TAH of 1,500 fish per year by trophy fisheries	<u>Sport harvest:</u> 1972--1,484 fish (3,912 kg); 1975--2,325 fish (6,517 kg); 1984--2,345 fish; 1988--1,701 fish; 1989--1,351 fish; 1990--1,018 fish; <u>Experimental harvest:</u> 1984--379 fish (507 kg);	
	lake whitefish --no quota	<u>Experimental harvest:</u> 1984--5 fish;	
	northern pike --no quota	<u>Sport harvest:</u> 1988--64 fish; 1989--50 fish; 1990--13 fish;	
round whitefish --no quota	<u>Experimental harvest:</u> 1984--1 fish;		

Table 2. Continued.

LOCATION ¹	QUOTA (# of fish or kg rd wt) ²	ESTIMATED HARVEST (# of fish or kg rd wt) ^{2,3}	STOCK STATUS (references)
McTAVISH ARM (south)	Arctic grayling --no quota	<u>Sport harvest:</u> 1987--267 fish; 1988--323 fish; 1989--196 fish; 1990--128 fish; <u>Experimental harvest:</u> 1973--7 fish;	In the past, hunters and trappers from Rae Lakes and Déline fished for subsistence in the fall at sheltered bays in the Conjuror Bay area. Arctic grayling were the main species taken. They were eaten or used for dog food. No estimates of these or current subsistence harvests were located. In 1945, the sport harvest of lake trout by residents of Port Radium was estimated at 1,330 kg. More recent harvests by residents of the area are unknown. In summer, sport fishermen visit Branson's Lodge to angle Arctic grayling, lake trout, lake whitefish, and northern pike from southern McTavish Arm (Fig. 3+4). Estimates of the sport harvest of lake trout were generated by DFO from creel censuses of lodge guests in 1972, 1974, 1978 and 1984, and from their angler diary program in 1987-90. The weights of fish harvested in 1984 and 1987-90 were not estimated. Partial creel censuses were conducted in 1971 and 1973. Creel census data from the sport lodge are summarized in Table 4. DFO conducted experimental gillnet fisheries at Cameron Bay, in 1973, and in the vicinity of Branson's Lodge in 1978. Four of the 203 trout tagged during the 1978 sampling program were recovered within 10 km of the lodge in 1979. In 1984, DFO conducted an experimental gillnet fishery of southern McTavish Arm. Arctic grayling, lake trout, lake whitefish, northern pike, and round whitefish were sampled for data on growth, reproduction, diet, and catch-effort. The stock of "trophy" sized fish in southern McTavish Arm was exhausted by 1972. Between 1973 and 1984, the harvest and biological data show a decline in the catch per unit of fishing effort, a decline in the mean length and age of lake trout caught by the fishery, a marked absence of "trophy" fish older than 24 yr, and an increase in the instantaneous total mortality rate. These are indications of a fishing down of the standing stock of lake trout in southern McTavish Arm, and also that the trout population had not yet stabilized and was continuing to decline. In 1988, DFO recommended that sport fishermen take no more than 1,500 lake trout (TAH) from southern McTavish Arm annually in order stabilize the population and to sustain the trophy fishery. Branson's Lodge was closed in 1991, and remained closed at the time of writing. The Eldorado Mine at Port Radium (66°06'N, 118°05'W), produced silver and radium from 1932 to 1960, and was later re-opened to mine silver from 1976-81. The Echo Bay Mine, nearby, operated from 1964 to 1976, mining silver, copper, lead, and other associated minerals. Prior to 1975, both mines discharged tailings directly into Great Bear Lake. In 1972, DFO sampling in the vicinity found elevated heavy metal concentrations in the bottom sediment, and in lake cisco and lake trout collected near the tailings discharge. The levels of radionuclides and heavy metals in the sediment were still elevated in 1978, when they were again sampled. Flesh of lake trout in the vicinity was tested for mercury and found to have low concentrations (0.01-0.05 mg kg ⁻¹), well within the limits for human consumption. Toxicity tests conducted in 1974 by Environment Canada showed the mine tailings discharge to be moderately acutely toxic to rainbow trout. After 1975, the mine tailings were deposited into McDonough Lake, where additional retention time and treatment could act to decrease the concentrations of toxicants. (Miller 1947; Falk et al. 1973a+b, 1974a+c, 1975, 1982; Falk and Dahlke 1974; Wallace et al. 1975; Moore and Sutherland 1981; Moshenko and Gillman 1983; Yaremchuk 1986; Nassichuk 1987; Roberge and Dunn 1988; Clarke et al. 1989; Dunn and Roberge 1989; Anderson and Thompson 1991; NLUIS Map 86E; L. Anderson and C. Plummer, pers. comm.)
	lake cisco --no quota	<u>Experimental harvest:</u> 1973--16 fish (1.5 kg);	
	lake trout --no commercial quota, recommended TAH of 1,500 fish per year by trophy fisheries	<u>Sport harvest:</u> 1971--partial creel; 1972--3,635 fish (10,217 kg); 1973--partial creel; 1974--3,963 fish (12,890 kg); 1978--1,935 fish (7,212 kg); 1984--2,564 fish; 1987--1,136 fish; 1988--1,202 fish; 1989----906 fish; 1990----831 fish; <u>Experimental harvest:</u> 1978--62 fish (85.5 kg); 1984--126 fish (226 kg);	
	whitefish --no quota	<u>Experimental harvest:</u> 1973--4 fish (15.6 kg); 1984--2 fish;	
	northern pike --no quota	<u>Sport harvest:</u> 1987--31 fish; 1988--66 fish; 1989--55 fish; 1990--42 fish;	
	round whitefish --no quota	<u>Experimental harvest:</u> 1973--17 fish (11 kg); 1984--2 fish;	

Table 2. Continued.

LOCATION ¹	QUOTA (# of fish or kg rd wt) ²	ESTIMATED HARVEST (# of fish or kg rd wt) ^{2,3}	STOCK STATUS (references)
McVICAR ARM	Arctic grayling --no quota	<u>Sport harvest:</u> 1987--145 fish; 1988--146 fish; 1989--152 fish; <u>Experimental harvest:</u> 1984--1 fish;	In the fall of 1973, subsistence fishermen harvested an estimated 4,536 kg of fish from McVicar Arm. Sport fishermen from the Neiland Bay and Bear Island outposts of Great Bear Lodge angle Arctic grayling, lake trout, and northern pike from northern McVicar Arm (Fig. 3+4). Estimates of the sport harvest of lake trout were generated by DFO from creel censuses of lodge guests in 1972, 1973, 1979 and 1984, and from their angler diary program in 1987-89. Great Bear Lodge has been closed since 1990. A limited creel census was conducted in 1971, and some data were supplied by the lodge in 1974. Creel census data from the lodge are summarized in Table 4. DFO conducted experimental gillnet fisheries in 1973 and 1979, in the Neiland Bay and Bear Island areas respectively. In 1979, they tagged 256 lake trout. In 1984, DFO conducted an experimental gillnet fishery of northern McVicar Arm. Arctic grayling, lake cisco, lake trout, lake whitefish, northern pike, and round whitefish were sampled for data on growth, reproduction, diet, and catch-effort. Large harvests of trout in the 1970's caused the mean length and age of lake trout in the McVicar Arm stock to decline in the late 1970's. This led to a change in lodge policy such that each angler only retained one trophy fish. In 1984, based on the relatively large mean length and age of trout caught by the experimental fishery and on the size of fish in the intensive creel census, DFO believed that the stock had stabilized and that trophy quality lake trout were still available. In 1988, DFO recommended that sport fishermen take no more than 1,500 lake trout (TAH) from northern McVicar Arm annually in order to sustain the trophy fishery. (Falk et al. 1974 a+c, 1975, 1982; Guttman 1973 cited in Hall 1978; Yaremchuk 1986; Roberge and Dunn 1988; Clarke et al. 1989; Dunn and Roberge 1989; Anderson and Thompson 1991; L. Anderson and C. Plummer, pers. comm.)
	lake cisco --no quota	<u>Experimental harvest:</u> 1973--117 fish (11 kg); 1984--62 fish;	
	lake trout --no commercial quota, recommended TAH of 1,500 fish per year by trophy fisheries	<u>Sport harvest:</u> 1971--partial creel; 1972--2,496 fish (11,717 kg); 1973--2,292 fish (11,230 kg); 1974--partial creel; 1979-->1,026 fish (4,976 kg) Bear Isl. only; 1984--1,626 fish; 1987--1,355 fish; 1988--771 fish; 1989--892 fish; 1990--19 fish; <u>Experimental harvest:</u> 1979--42 fish (60 kg); 1984--148 fish (610 kg);	
	lake whitefish --no quota	<u>Experimental harvest:</u> 1973--3 fish (14 kg); 1984--36 fish;	
	northern pike --no quota	<u>Sport harvest:</u> 1987--52 fish; 1988--64 fish; 1989--55 fish; <u>Experimental harvest:</u> 1984--2 fish;	
	round whitefish --no quota	<u>Experimental harvest:</u> 1973--21 fish (12.5 kg);	
	round whitefish --no quota	<u>Experimental harvest:</u> 1984--12 fish;	

Table 2. Continued.

LOCATION ¹	QUOTA (# of fish or kg rd wt) ²	ESTIMATED HARVEST (# of fish or kg rd wt) ^{2,3}	STOCK STATUS (references)
SMITH ARM	Arctic grayling --no quota	<u>Sport harvest:</u> 1987--1,137 fish; 1988--577 fish; 1989--396 fish; 1990--313 fish; <u>Experimental harvest:</u> 1973--79 fish; 1985--35 fish;	Residents of Déline fish for subsistence at sheltered bays along the coasts of Smith Arm. In the fall and early winter of 1977, they harvested an estimated 13,608 kg of fish from Bydand Bay (66°00'N, 124°55'W), and 3,636 kg of whitefish from McGill Bay (66°35'N, 122°23'W) (see also Table 3, Whitefish River). Sport fishermen from Trophy Lodge angle Arctic grayling, lake trout, and northern pike from Smith Arm (Fig. 3+4). Smaller numbers of fish are also harvested from the area by guests at Branson's Lodge's outpost camp. DFO has estimated the sport harvest of lake trout from data provided by Trophy Lodge in 1972; from creel censuses of lodge guests in 1972, 1973, 1976, 1980, and 1985; and from their angler diary program in 1987-90. The harvest estimates before 1987 were based only on data from Trophy Lodge. Creel census data from the sport lodge are summarized in Table 4. DFO conducted an experimental gillnet and beach seine fishery of Smith Arm in 1973, and experimental gillnet fisheries in 1980 and 1985. They tagged 405 trout in 1980. In the more extensive 1985 fishery, Arctic grayling, lake cisco, lake trout, lake whitefish, northern pike, and round whitefish were sampled for data on growth, reproduction, diet, and catch-effort. While harvest and biological data suggested that the lake trout stock in Smith Arm had stabilized in 1980, this was no longer clear by 1985 when the modal age of fish in the creel census sample declined and the instantaneous total mortality rate remained high. However, gillnet sampling indicated that trophy quality trout were still available in 1985. In 1988, DFO recommended that sport fishermen take no more than 2,500 lake trout (TAH) from southern McTavish Arm annually in order to stabilize the population and to sustain the trophy fishery. (Falk et al. 1974a+c, 1975; Hall 1978; Moshenko and Gillman 1978a; Gillman and Roberge 1982; Yaremchuk 1986; Roberge and Dunn 1988; Clarke et al. 1989; Dunn and Roberge 1989; Anderson and Thompson 1991; NLUIS Maps 96J+K; L. Anderson, pers. comm.)
	lake cisco --no quota	<u>Experimental harvest:</u> 1973--12 fish (4 kg); 1985--33 fish;	
	lake trout --no commercial quota, recommended TAH of 2,500 fish per year by trophy fisheries	<u>Sport harvest:</u> 1972--3,709 fish (12,277 kg); 1973--3,850 fish (13,046 kg); 1976--2,758 fish (9,132 kg); 1980--2,497 fish (6,092 kg); 1985--2,965 fish; 1987--2,262 fish; 1988--1,477 fish; 1989--1,535 fish; 1990--1,111 fish; <u>Experimental harvest:</u> 1980--43 fish (35 kg); 1985--202 fish (668 kg);	
	lake whitefish --no quota	<u>Experimental harvest:</u> 1973--83 fish (153 kg); 1985--256 fish;	
	northern pike --no quota	<u>Sport harvest:</u> 1987--233 fish; 1988--150 fish; 1989--173 fish; 1990--174 fish; <u>Experimental harvest:</u> 1973--7 fish (22 kg); 1985--4 fish;	
	round whitefish --no quota	<u>Experimental harvest:</u> 1973--5 fish (1.5 kg); 1985--35 fish;	

Table 2. Continued.

¹ Fisheries are discussed under six main area headings, corresponding to the management areas DFO has used for the lake trout sport fishery (Fig. 3). Under the heading of "Keith Arm" a number of smaller areas with histories of interest in commercial or subsistence harvest are also discussed.

² A round weight (kg rd wt) is that for a whole fish, while a dressed weight is that of a fish with the viscera and gills removed. The quotas are from Schedule V of the Northwest Territories Fishery Regulations except where they have been changed recently by Variation Order. In this case, the most recent quota is given. Square brackets indicate provisional test quotas. The quota years are the same as the federal government fiscal year (e.g. the 1995 quota extends from 1 April 1995 to 31 March 1996). "NA" indicates that a harvest may have taken place but that no data are available; "NF" indicates that a waterbody was opened for fishing by Variation Order but was not fished. "TAH" is the total allowable harvest that DFO has recommended for sport fisheries in each arm of Great Bear Lake.

³ Unless otherwise noted the harvests were taken by commercial or experimental fisheries. The "subsistence harvests" are taken by residents for their own use, "experimental harvests" were taken for scientific purposes, and the "sport harvests" by anglers. Sport harvest data are the "total estimated sport harvest" which includes fish kept as trophies, eaten for shore lunch, and which were released and subsequently died (estimated at 7% by Falk et al. 1974b). The 1971-73 harvest estimates for lake trout were taken from Falk et al. (1975) who recalculated the original data to reflect improved methodology. These estimates differ somewhat from those originally published by Falk et al. (1973a, 1974a), and are thought to be more accurate. They are also better comparable to the more recent harvest estimates which were calculated using similar methodology. Estimates of the total weight of fish killed by sport fisheries in 1984, and 1987-90 are not available. Sport harvest estimates for lake trout from 1987-90 include all of the lodges fishing in a particular arm of the lake--other harvest estimates are only for the lodge situated on that arm of the lake.

⁴ Rushforth (1976) reported total edible weights, which were assumed to be 80% of the total weight of the fish. These total edible weights have been converted to round weight in kilograms (i.e. total edible weight in kg / 0.8 = round weight in kg).

Table 3. Harvests of fishes from tributaries of Great Bear Lake, NWT.

LOCATION ¹	QUOTA (kg rd wt) ²	ESTIMATED TOTAL HARVEST (# of fish or kg rd wt) ³	STOCK STATUS (references)
Big Spruce River 66°47'N, 121°21'W			This stream drains into north-central Great Bear Lake. In 1975, an experimental seine fishery caught immature Arctic grayling at the river mouth and 15 km upstream. (Sutherland and Gohlke 1978)
Bloody River 66°56'N, 120°34'W			The Bloody River drains southward into Dease Arm of Great Bear Lake. In 1975, an experimental seine fishery at the river mouth caught immature Arctic grayling and round whitefish, and mature ninespine stickleback. Immature grayling were also taken at a site 50 km upstream from the river mouth. (Sutherland and Gohlke 1978)
Camsell River 65°40'N, 118°07'W	cisco spp. --no quota	1959--125 kg;	A small commercial fishery was conducted at the mouth of the Camsell River (65°40'N, 118°07'W) in 1959. Hunters and trappers from Rae Lakes and/or Déline have occasionally fished below White Eagle Falls (65°37'N, 117°49'W) to provide winter food for themselves and their dogs. At 16 m in height, these falls form a natural barrier to upstream fish migration in the Camsell River. Guests of Branson's Lodge on southern McTavish Arm visit the Camsell River to angle for Arctic grayling, lake trout, and northern pike--much of the fishing takes place below White Eagle Falls. This report has not been confirmed. Anglers from the lodge also visit Hottah Lake, which is on the Camsell River system upstream from the settlement area. DFO conducted a limnological and biological survey of Hottah Lake in 1972. In the past, Terra Mine (65°36'N, 118°08'W), near the mouth of the Camsell River discharged tailings from its silver and copper mining and milling operation into a small lake known locally as "Ho-Hum Lake", which in turn discharges through a muskeg area into the Camsell River. DFO sampled sediments and biota in the lake and in Camsell River, above and below the lake outfall, in 1972. Elevated levels of heavy metals were found in sediment and fish from the tailings pond, but not in sediment or benthos in the Camsell River below its outfall. In 1974, Environment Canada tested the toxicity of samples from Ho-Hum Lake on rainbow trout and did not find them to be acutely toxic. (Falk et al. 1973b; Wong and Whillans 1973; Wallace et al. 1975; Yaremchuk et al. 1989; NLUIS Maps 86E+F; L. Anderson and C. Plummer, pers. comm.)
	Arctic grayling --no quota	<u>Sport harvest:</u> 1988--41 fish (1.49 fish caught per angler hr); 1989--6 fish (1.12 fish caught per angler hr);	
	lake trout --no quota	1959--2,336 kg; <u>Sport harvest:</u> 1988--16 fish (0.47 fish caught per angler hr); 1989--4 fish (0.18 fish caught per angler hr);	
	lake whitefish --no quota	1959--14 kg;	
	northern pike --no quota	<u>Sport harvest:</u> 1988--3 fish (0.03 fish caught per angler hr); 1989--NA (0.08 fish caught per angler hr);	
Contact Lake 65°59'N, 117°50'W	lake trout --no quota	<u>Sport harvest:</u> 1988--5 fish (0.54 fish caught per angler hr); 1989--5 fish (1.2 fish caught per angler hr);	Guests of Bransons's Lodge sometimes fly-in to Contact Lake to angle for lake trout and northern pike. (L. Anderson, pers. comm.)

Table 3. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	ESTIMATED TOTAL HARVEST (# of fish or kg rd wt) ³	STOCK STATUS (references)
Dease River 66°53'N, 119°02'W			An experimental gillnet and seine fishery in 1976 caught Arctic grayling, cisco sp., lake trout, lake whitefish, longnose sucker, ninespine stickleback, northern pike, and slimy sculpin in the Dease River system. Several sites were sampled, including the Dease River near Sandy Creek, Lac la Roux, and upstream from the settlement area at Lac Rouviere. Arctic grayling apparently move upstream from Great Bear Lake in May to spawn in the Dease River system. (Sutherland and Gohlke 1978)
Greenhorn River (Sulky River) 67°00'N, 119°34'W	Arctic Grayling --no quota	<u>Sport harvest:</u> 1988--21 fish (3.7 fish caught per angler hr); 1989--13 fish (2.8 fish caught per angler hr);	Guest of Plummer's Great Bear Lake Lodge visit the "Sulky River" to angle for Arctic grayling and lake trout. (L. Anderson, pers. comm.)
	lake trout --no quota	<u>Sport harvest:</u> 1988--2 fish (0.45 fish caught per angler hr);	
Haldane River 66°51'N, 121°15'W			The Haldane River drains southward into Dease Arm of Great Bear Lake. In 1975, an experimental seine fishery at the river mouth caught immature burbot, lake whitefish, round whitefish and sucker, and mature ninespine stickleback and slimy sculpin. Immature grayling and round whitefish were also taken at a site 55 km upstream from the river mouth. The Haldane River and its tributaries are migration routes, and spawning and nursery areas, for Arctic grayling and round whitefish. (Sutherland and Gohlke 1978)
Johnny Hoe River 64°48'N, 121°25'W	lake whitefish --no quota	<u>Subsistence harvest:</u> 1945--710,000 kg; 1973--13,600 kg;	Lake whitefish move from Great Bear Lake into the Johnny Hoe River from about mid-August through mid-September. Historically these fish have been the focus of a very important fall fishery by residents of Déline. The whitefish are gillnetted in the river and frozen for human consumption and dog food. The extent of this fishery has apparently decreased as the number of dogs in Déline have diminished. In the past, weirs were also erected in the river to catch the migrating whitefish. Guests of Great Bear Lodge sometimes visit the Johnny Hoe River to angle for northern pike. (Miller 1947; Villiers 1967; Guttman 1973 cited in Hall 1978; NLUIS 96A; L. Anderson, pers. comm.)
Junius Lake 66°27'N, 116°38'W			An experimental gillnet fishery in 1977 caught lake trout and longnose sucker in this lake on the Sloan River system. (Stewart and MacDonald 1978)
Katseyedie River 66°32'N, 123°12'W	lake trout --no quota	<u>Sport harvest:</u> 1989--1 fish (1.5 fish caught per angler hr);	The Katseyedie River drains southward into Smith Arm of Great Bear Lake. In 1975, an experimental gillnet fishery caught Arctic grayling, lake cisco, lake trout, lake whitefish, and round whitefish at the river mouth. An outpost camp of Branson's Lodge is situated on the bay near the river mouth. Lake trout comprise most of the angler's catches, and are known to ascend the deep-channeled river mouth. Arctic grayling, round whitefish, and cisco ascend the river to spawn in its middle and upper reaches. Immature grayling were caught by seine net about 15 km upstream from the river mouth. (Sutherland and Gohlke 1978; L. Anderson, pers. comm.)

Table 3. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	ESTIMATED TOTAL HARVEST (# of fish or kg rd wt) ³	STOCK STATUS (references)
Kekwinatui Lake 65°38'N, 123°08'W			Hunters and trappers have fished this lake for subsistence. (NLUIS Map 96G)
Lac Ste. Therese 64°38'N, 121°30'W	Arctic grayling --no quota	<u>Sport harvest:</u> 1984--546 caught, 66 kept;	Lac Ste. Therese on the Johnny Hoe River system is an important winter subsistence fishery for residents of Déline. Guests of Branson's Lodge on Great Bear Lake also fly to Lac Ste. Therese to angle for Arctic grayling, northern pike, and walleye. In 1985, lodge guides collected data from this fishery for DFO, and DFO sampled Arctic grayling and walleye from the fishermen's creels. Experimental harvests were taken from the lake in 1961, 1962, 1973, 1979, and 1980. DFO sampled fish in the lake for biological data and mercury in 1975, 1980, and 1992-94--organic contaminants were also measured in 1994. High concentrations (>0.5 ppm) of mercury are found in the flesh of lake trout, lake whitefish, northern pike, and walleye of Lac Ste. Therese. The mercury occurs naturally in the lake basin and these high levels have persisted for the past 18 years. Mercury levels in the fish exceed recommended levels for human consumption. Residents of Déline have been made aware of the high mercury content of the fish in Lac Ste. Therese. In 1980, DFO prohibited the sale for human consumption of a harvest of lake trout, northern pike, and walleye from Lac Ste Therese. There is no record of commercial fishing at the lake since 1980. (Sinclair et al. 1967; Bissett 1972; Dunn and Roberge 1989; Yaremchuk et al. 1989; Stephens 1995; NLUIS 96A; L. Lockhart and G. Low, pers. comm.; DFO, unpubl. data)
	lake trout --no quota	<u>Experimental harvest:</u> 1961--297 kg; 1962--2,546 kg; 1980--61 kg	
	lake whitefish --no quota	<u>Experimental harvest:</u> 1962--2,351 kg; 1979--550 kg; 1980--363 kg	
	northern pike --no quota	<u>Sport harvest:</u> 1984--162 caught, 24 kept;	
	walleye [6 yr 2,800]	<u>Sport harvest:</u> 1984--318 caught, 100 kept; <u>Experimental harvest:</u> 1961--500 kg; 1962--16,754 kg; 1973--189 kg; 1980--190 kg	
Lost Hill Lake 65°40'N, 123°23'W			Hunters and trappers have fished for themselves and their dogs at this lake. (Rushforth 1976; NLUIS 96G)
Man Drowned Himself Lake 65°42'N, 123°12'W			Hunters and trappers have fished for themselves and their dogs at this lake. (NLUIS 96G)
Tatui Lake 65°58'N, 123°02'W			Hunters and trappers have fished for themselves and their dogs at this lake. (Rushforth 1976)
Tilchuse River (Cruikshank River) 65°52.5'N, 117°35'W	Arctic grayling --no quota	<u>Sport harvest:</u> 1988--1 fish (3.3 fish caught per angler hr);	Guests of Branson's Lodge sometimes visit the rapids below Cruikshanks Lake to angle for Arctic grayling. (L. Anderson and C. Plummer, pers. comm.)
Tuitatui Lake 64°46'N, 123°15'W			Hunters and trappers have fished for themselves and their dogs at this lake. (NLUIS 96G)

Table 3. Continued.

LOCATION ¹	QUOTA (kg rd wt) ²	ESTIMATED TOTAL HARVEST (# of fish or kg rd wt) ³	STOCK STATUS (references)
Tunago Lake 66°20'N, 126°00'W			Hunters and trappers from Fort Good Hope who visit Tunago Lake in fall and winter fish there to provide food for themselves and their dogs. Whitefish, lake trout, Arctic grayling, northern pike and burbot are harvested. (Bissett 1972; Taptuna and Low 1995; NLUIS Map 96K)
unnamed lake 65°02'N, 121°20'W			Lake trout and whitefish are reported to migrate upstream from McVicar Arm into this lake in early June. (NLUIS 96H)
unnamed lake 65°10'N, 123°25'W			Broad whitefish and burbot were collected from this lake near Déline for genetic and toxicological studies in October 1985. (Reist 1987; Lockhart et al. 1989)
unnamed lake 65°31'N, 118°54'W			Hunters and trappers from Déline and Rae Lakes who visited this area in winter occasionally fished in this lake for subsistence. (NLUIS Map 86E)
unnamed lake 66°33'N, 119°18'W			Hunters and trappers from Déline who visited "Caribou Point" in winter have occasionally fished in this unnamed lake for subsistence. (Rushforth 1976; NLUIS Map 86L)
unnamed lake (Johnny Hoe River) 64°22'N, 122°00'W			Trappers have fished this unnamed lake in the winter. (Bissett 1967; NLUIS 96A)
unnamed lake (Johnny Hoe River) 64°47'N, 121°31'W			Residents of Déline have conducted a subsistence fishery at this lake on the Johnny Hoe River system. (Bissett 1967; NLUIS 96A)
unnamed lake (Sloan River) 66°36'N, 116°25'W			An experimental gillnet fishery in 1977 caught lake trout, longnose sucker, and round whitefish at this unnamed lake on the Sloan River system. Several sites upstream from the settlement area were also sampled. (Stewart and MacDonald 1978)
White Water Lily Lake 65°46', 124°08'W			Hunters and trappers have fished for themselves and their dogs at this lake. (NLUIS 96F)
Whitefish Lake 65°43'N, 125°00'W	lake trout + lake whitefish 500	1982--0 kg;	Whitefish lake was opened by Variation Order for commercial fishing annually from 1982-87. No record of commercial harvest. (Yaremchuk et al. 1989)
Whitefish River 65°52'N, 124°45'W	lake whitefish --no quota	<u>Subsistence harvest:</u> 1945--40,000 kg (est.)	The Whitefish River supports an important fall subsistence fishery by residents of Déline. Lake whitefish are taken by gillnet as they enter the river from Great Bear Lake from about mid-August through mid-September. The fish are frozen and stored for winter consumption and dogfood (see also Table 1, SMITH ARM). Northern pike migrate upstream in the Whitefish River in early June and move downstream into Bydand Bay in late October. Sport fishermen from Trophy Lodge visit the river to angle for northern pike. (Miller 1947; Villiers 1967; NLUIS 96F; Trophy Lodge Brochure)
Yeta Lake 65°36'N, 118°46'W			Hunters and trappers from Déline and Rae Lakes who visited this area in winter occasionally fished in Yeta Lake for subsistence. (NLUIS Map 86E)

Table 3. Continued.

¹ Old or alternate names for the fisheries are shown in brackets.

² A round weight (kg rd wt) is that for a whole fish, while a dressed weight is that of a fish with the viscera and gills removed. Square brackets indicate provisional test quotas. The quota years are the same as the federal government fiscal year (e.g. the 1995 quota extends from 1 April 1995 to 31 March 1996). "NA" indicates that a harvest may have taken place but that no data are available; "NF" indicates that a waterbody was opened for fishing by Variation Order but was not fished.

³ Unless otherwise noted the harvests were taken by commercial or experimental fisheries. The "subsistence harvests" were taken by residents for their own use, "experimental harvests" were taken for scientific purposes, and the "sport harvests" were taken by anglers. Sport harvest data are the "total estimated sport harvest" which includes fish kept as trophies, eaten for shore lunch, and which were released and subsequently died (estimated at 7% by Falk et al. 1974b). These data were from the DFO angler diary program, 1987-90 (L. Anderson, pers. comm.).

Table 4. A summary of harvest and creel census data for sport fishing lodges on Great Bear Lake, NWT.

SPECIES	ESTIMATED TOTAL HARVEST (# of fish killed) ¹	AVERAGE NUMBER OF FISH CAUGHT PER ANGLER HOUR ²	ESTIMATED TOTAL NUMBER OF ANGLER DAYS ³	COMMENTS (references) ⁴
ARCTIC CIRCLE LODGE (66°20'N, 117°47'W)				Established in 1965, this lodge is situated at the southeastern end of Great Bear Lake (Fig. 3). It operates during July and August with a guest bed capacity of 34. Arctic grayling, lake trout, and northern pike are the main species sought. Lodge guests fish mainly in northern McTavish Arm (Fig. 4). Some guests are also flown to the Coppermine River, on the coast in the Nunavut Settlement Area, to fish for Arctic charr, and to an outpost camp about 100 km to the west on Hornby Bay (66°30'N, 118°08'W), to fish for lake trout. The lodge participated in a number of DFO creel censuses between 1972 and 1984, and in DFO's angler diary program in 1987-90. These programs were designed to gather the data needed to manage the sport fishery. Data from the 1987 angler diary program is omitted due to low angler participation. Arctic Circle Lodge was closed in 1991 and will remain closed through the 1995 season. (Falk et al. 1973a, 1975; Yaremchuk 1986; Roberge and Dunn 1988; Anderson and Thompson 1991; EDT 1995; L. Anderson and C. Plummer, pers. comm.)
Arctic grayling	1975--15 kept (R); 1984--121 kept (R); 1988--84; 1989--51; 1990--39; 1991--NA ⁵ ; 1992-94--0;	-. ⁵ 0.59 1.70 1.70 0.90 - -	- 79 (R) 147 95 79 - 0	DFO recorded Arctic grayling from angler's creels in 1975 and 1984. They estimated the sport harvests of grayling in 1988-90 using data from the angler diary program. (Moshenko and Gillman 1978a; Dunn and Roberge 1989; L. Anderson, pers. comm.)
lake trout	1972--1,484; 1975--2,325; 1984--2,345; 1988--1,150; 1989--1,005; 1990--839; 1991--NA; 1992-94--0;	- 1.75 1.01 1.15 2.21 1.23 - -	784 860 1,381 1,181 689 730 - 0	Sport harvests of lake trout were estimated from creel censuses of lodge guests. The 1972 estimate is based on a catch summary provided to DFO by the lodge. In 1975 and 1984, DFO conducted the creel censuses and sampled lake trout from angler's catches. Lodge guides also recorded field data on lake trout as part of an intensive creel census conducted by DFO in 1984. Estimates of the sport harvest of trout in 1988-90 were generated by DFO from data gathered by the angler diary program. (Falk et al. 1973a; Moshenko and Gillman 1978a; Yaremchuk 1986; Roberge and Dunn 1988; L. Anderson, pers. comm.)
lake whitefish	1984--6 kept (R);	0.19	6 (R)	DFO recorded lake whitefish from angler's creels in 1984. (Dunn and Roberge 1989)
northern pike	1975--0 kept (R); 1984--2 kept (R); 1988--64; 1989--50; 1990--13; 1991--NA; 1992-94--0;	- 0.27 1.94 2.73 1.18 - -	- 6(R) 163 74 62 - 0	DFO recorded northern pike from angler's creels in 1975 and 1984. They estimated the sport harvests of pike in 1988-90 using data from the angler diary program. (Moshenko and Gillman 1978a; Dunn and Roberge 1989; L. Anderson, pers. comm.)

Table 4. Continued.

SPECIES	ESTIMATED TOTAL HARVEST (# of fish killed) ¹	AVERAGE NUMBER OF FISH CAUGHT PER ANGLER HOUR ²	ESTIMATED TOTAL NUMBER OF ANGLER DAYS ³	COMMENTS (references) ⁴
BRANSON'S LODGE (66°03'N, 117°48'W)				Established in the early 1960's, this lodge is situated on the northeastern shore of Great Bear Lake at the old town of Cameron Bay (Fig. 3). It operates during July and August with a guest bed capacity of 40, and has outpost camp at Katseyedie River (66°31.5'N, 123°10'W) on the north shore of Smith Arm. Arctic grayling, lake trout, and northern pike are the main species sought. Lodge guests fish mostly in southern McTavish Arm (Fig. 4). They can also fly-in to northern McTavish Arm and Smith Arm to fish for trout; to Lac Ste. Therese (64°38'N, 121°32'W) and Blackwater Lake (64°00'N, 123°05'W) for grayling, trout, pike and walleye; and to the Coppermine (67°49'N, 115°04'W) and Kugaryuak (67°42'N, 113°19'W) rivers for Arctic charr. The lodge participated in a number of creel censuses between 1971 and 1984, and in the angler diary program in 1987-90. These programs were designed by DFO to gather the data needed to manage the sport fishery. The lodge was closed in 1991 and was still closed at the time of writing. (Falk et al. 1973a, 1974a, 1975; Moshenko and Gillman 1983; Yaremchuk 1986; Roberge and Dunn 1988; Dunn and Roberge 1989; Anderson and Thompson 1991; EDT 1995; L. Anderson and C. Plummer, pers. comm.)
Arctic grayling	1973--0 kept (R); 1974--36 kept (R); 1978--792 kept (R); 1984--90 kept (R); 1987--267; 1988--323; 1989--196; 1990--128; 1991--NA ⁵ ; 1992-94--0;	- - - 0.48 2.43 2.08 2.19 2.42 - - -	- - - 102 (R) 240 362 235 113 - - 0	DFO recorded Arctic grayling in angler's creels in 1973, 1974, and 1978. A few grayling were sampled from the angler's creels in 1971-73. Estimates of the sport harvests of grayling in 1987-90 were generated by DFO using data from the angler diary program. Guests also visit the Camsell (65°40'N, 118°07'W) and Cruikshank rivers to angle for for grayling. (Falk and Dahlke 1974; Falk et al. 1974a, 1975; Moshenko and Gillman 1983; Dunn and Roberge 1989; L. Anderson, pers. comm.)
lake trout	1971--partial creel; 1972--3,635; 1973--partial creel; 1974--3,963 1978--1,935; 1984--2,564; 1987--1,815; 1988--1,780; 1989--1,353; 1990--1,229; 1991--NA; 1992-94--0;	- - 0.75 0.93 0.83 0.74 1.08 0.93 1.16 1.28 - -	- 1,320 - - 1,250 2,199 1,620 1,828 1,398 912 - 0	DFO estimated the sport harvest of lake trout using data from creel censuses of lodge guests in 1972, 1975, 1978, and 1984, from angler diaries in 1987-90. They sampled lake trout from angler's creels in 1972, 1974, 1978, and 1984. Partial creel censuses were conducted in 1971 and 1973. (Falk et al. 1973a, 1974a+c, 1975; Moshenko and Gillman 1978b, 1983; Yaremchuk 1986; Roberge and Dunn 1988; L. Anderson, pers. comm.)
lake whitefish	1984--0 kept (R);	0.25	1(R)	DFO sampled a few lake whitefish from angler's creels in 1972, and recorded lake whitefish in angler's creels in 1984. (Falk and Dahlke 1974; Dunn and Roberge 1989)

Table 4. Continued.

SPECIES	ESTIMATED TOTAL HARVEST (# of fish killed) ¹	AVERAGE NUMBER OF FISH CAUGHT PER ANGLER HOUR ²	ESTIMATED TOTAL NUMBER OF ANGLER DAYS ³	COMMENTS (references) ⁴
northern pike	1973--0 kept (R); 1974--2 kept (R); 1978--77 kept (R); 1984--15 kept (R); 1987--31; 1988--66; 1989--55; 1990--42; 1991--NA; 1992-94--0;	- - - 0.33 1.44 1.84 1.46 1.91 - -	- - - 38 (R) 74 96 122 71 - 0	DFO recorded northern pike in angler's creels in 1973, 1974, 1978, and 1984. They estimated the sport harvest of pike in 1987-90, using data gathered by the angler diary program. (Falk et al. 1974a, 1975; Moshenko and Gillman 1983; Dunn and Roberge 1989; L. Anderson, pers. comm.)
GREAT BEAR LODGE				Established in 1965, at Sawmill Bay (65°43'N, 118°54'W), this lodge now houses its guests at its Neiland Bay outpost (65°44'N, 119°47'W) on the south shore of Great Bear Lake (Fig. 3). The lodge still uses runway facilities at Sawmill Bay, but has not housed anglers there since the 1980's. Another outpost at Bear Island (65°33'N, 119°58'W) has been closed since 1989. Great Bear Lodge operates during July and August with a guest bed capacity of 54. Arctic grayling, lake trout, and northern pike are the main species sought. Lodge guests fish mainly in northern McVicar Arm (Fig. 4). They can also take fly-in trips to Hottah Lake (65°10'N, 118°35'W) to fish for lake trout and northern pike. The lodge participated in a number of creel censuses between 1971 and 1984, and in the angler diary program from 1987-89. These programs were designed by DFO to collect the data needed to manage the sport fishery. The Neiland Bay outpost has been closed since 1990, to facilitate stock recovery. (Falk et al. 1973a, 1974a+c; Wong and Willans 1973; Yaremchuk 1986; Anderson and Thompson 1991; EDT 1995; L. Anderson and C. Plummer, pers. comm.)
Arctic grayling	1972--97 kept (R); 1973--65 kept (R); 1979--14 kept (R); 1984--117 kept (R); 1987--145; 1988--146; 1989--152; 1990-94--0;	- - - 0.66 1.93 2.32 2.07 -	435 (R) - - 174 (R) 230 143 203 0	DFO recorded Arctic grayling from angler's creels in 1972 (Neiland Bay), 1973 (Neiland Bay), 1979 (Bear Island), and 1984 (both). A few grayling from angler's creels were sampled in 1971-73. DFO estimated the sport harvest of grayling in 1987-89 using data from the angler diary program. Fishermen from the lodge are also flown to Blackwater Lake (64°00'N, 123°05'W) or the mouth of the Great Bear River for grayling fishing. (Falk et al. 1973a, 1974a, 1982; Falk and Dahlke 1974; Dunn and Roberge 1989; L. Anderson, pers. comm.)

Table 4. Continued.

SPECIES	ESTIMATED TOTAL HARVEST (# of fish killed) ¹	AVERAGE NUMBER OF FISH CAUGHT PER ANGLER HOUR ²	ESTIMATED TOTAL NUMBER OF ANGLER DAYS ³	COMMENTS (references) ⁴
lake trout	1971--partial creel; 1972--2,496 kept; 1973--2,292; 1974--partial creel; 1979-->1,026; 1984--1,626; 1987--1,153; 1988--746; 1989--868; 1990-94--0;	- - 0.66 - 0.78 1.02 1.35 1.34 1.16 -	- 435 (R) - - 1,195 1,068 1,155 748 970 0	DFO estimated the sport harvests of lake trout from creel censuses of lodge guests in 1972, 1973, 1979 and 1984, and from the angler diary program in 1987-89. They sampled lake trout from angler's creels in 1972 and 1973 at the Neiland Bay Outpost, in 1979 at the Bear Island Outpost, and in 1984 at both. The 1972 and 1973 estimates for a single outpost were extrapolated to give the lodge's total lake trout harvest. The 1979 harvest estimate is low since it is only for the Bear Island Outpost. Lodge guides also recorded field data on lake trout as part of an intensive creel census conducted by DFO in 1984. (Falk et al. 1973a, 1974a+c, 1975, 1982; Yaremchuk 1986; Roberge and Dunn 1988; L. Anderson, pers. comm.)
lake whitefish	1979--0 kept (R);	-	-	DFO recorded lake whitefish from angler's creels in 1979 (Bear Island). (Falk et al. 1982)
northern pike	1973--15 kept (R); 1979--8 kept (R); 1984--6 kept (R); 1987--52; 1988--64; 1989--55; 1990-94--0;	- - 0.78 3.83 4.45 2.24 -	- - 50 (R) 120 84 144 0	DFO recorded northern pike from angler's creels in 1973 (Neiland Bay), 1979 (Bear Island), and 1984 (both). They estimated the sport harvest of pike in 1987-89 using data from the angler diary program. (Falk et al. 1974a, 1982; Dunn and Roberge 1989; L. Anderson, pers. comm.)
PLUMMER'S GREAT BEAR LAKE LODGE (66°43'N, 119°42'W)				Established at its present location in 1968 (prior to this time it was located on Conjuror Bay of McTavish Arm), this lodge is situated on the Dease Arm of Great Bear Lake (Fig. 3). It operates during July and August with a guest bed capacity of 54. Arctic grayling, lake trout, and northern pike are the main species sought. Lodge guests fish mostly in Dease Arm, and some also visit northern McTavish Arm to fish for trout (Fig. 4). The lodge has an outpost camp at Tree River, in the Nunavut Settlement Area, where guests are flown to fish for Arctic charr. They can also fly-in to the Coppermine River (67°49'W, 115°04'W) to fish for charr in the Nunavut Settlement Area, and to the "Sulky River" (67°00'N, 119°34'W) to fish for grayling. The lodge participated in a number of creel censuses between 1972 and 1984, and in an angler diary program from 1987-90. These studies were designed by DFO to collect the data needed to manage the sport fishery. The 1987 data are not included here due to a low angler response rate. (Moshenko and Gillman 1983; Yaremchuk 1986; Roberge and Dunn 1988; Anderson and Thompson 1991; EDT 1995; L. Anderson and C. Plummer, pers. comm.)
Arctic grayling	1973--197 kept (R); 1977--212 kept (R); 1984--685 kept (R); 1988--1,028; 1989--561; 1990--261; 1991-94--NA;	- - 1.08 4.01 2.16 2.47 -	- - 341 (R) 475 382 183 -	Fishermen angle for grayling near the lodge. DFO recorded Arctic grayling in angler's creels in 1973, 1977 and 1984, and sampled a few fish from angler's creels in 1972 and 1973. They estimated the sport harvests of grayling in 1988-90 using data from the angler diary program. (Falk et al. 1973a, 1974a; Falk and Dahlke 1974; Moshenko and Gillman 1983; Dunn and Roberge 1989; L. Anderson, pers. comm.)

Table 4. Continued.

SPECIES	ESTIMATED TOTAL HARVEST (# of fish killed) ¹	AVERAGE NUMBER OF FISH CAUGHT PER ANGLER HOUR ²	ESTIMATED TOTAL NUMBER OF ANGLER DAYS ³	COMMENTS (references) ⁴
lake trout	1972--6,828; 1973--5,494; 1977--3,413; 1984--3,932; 1988--1,811; 1989--1,328; 1990--884; 1991-94--NA;	- 0.74 0.56 1.05 1.35 1.10 1.16 -	3,192 - 2,635 2,191 1,496 1,251 714 -	Sport harvests of lake trout were estimated by DFO from creel censuses of lodge guests in 1972, 1973, 1977 and 1984, and from angler diaries in 1988-90. Trout from angler's creels were sampled in 1972, 1973, 1977, and 1984. Lodge guides also recorded field data on lake trout as part of an intensive creel census conducted by DFO in 1984. (Falk et al. 1973a, 1974a+c, 1975; Moshenko and Gillman 1983; Yaremchuk 1986; Roberge and Dunn 1988; L. Anderson, pers. comm.)
lake whitefish	1984--0 kept (R);	0.94	2 (R)	DFO sampled a few lake whitefish from angler's creels in 1972, and recorded lake whitefish in guests creels in 1984. (Falk and Dahlke 1974; Dunn and Roberge 1989)
northern pike	1973--1 kept (R); 1984--15 kept (R); 1988--11; 1989--8; 1990--44; 1991-94--0;	- 0.38 1.53 1.12 0.99 -	- 12 (R) 18 14 28 0	DFO sampled a few northern pike from angler's creels in 1972, and recorded northern pike in angler's creels in 1973 and 1984. They estimated the sport harvest of pike in 1988-90 using data from the angler diary program. (Falk et al. 1974a; Dunn and Roberge 1989; L. Anderson, pers. comm.)
TROPHY LODGE (62°43'N, 109°10'W)				Established in 1967, this lodge is situated on Ford Bay in the Smith Arm of Great Bear Lake, and operates an outpost camp at Good Hope Bay (66°19'N, 124°20'W) (Fig. 3). It operates during July and August with a guest bed capacity of 40. Arctic grayling, lake trout, and northern pike are the main species sought. Lodge guests fish mostly in Smith Arm, but occasionally visit Preble Bay in Keith Arm (Fig. 4). They can also fly-in to Lac Belot (66°55'N, 126°18'W), Lac-de-Bois (66°40'N, 125°15'W), or other locations on the Anderson River system to fish for lake trout or northern pike; to the Anderson River (69°50'N, 120°45'W) to fish for inconnu; or to the Coppermine River (67°49'N, 115°04'W) to fish for Arctic charr and Arctic grayling. The lodge participated in a number of creel censuses between 1972 and 1984, and in an angler diary program from 1987-90. These studies were designed by DFO to collect the data needed to manage the sport fishery. (Yaremchuk 1986; Roberge and Dunn 1988; Dunn and Roberge 1989; Anderson and Thompson 1991; EDT 1995; L. Anderson and C. Plummer, pers. comm.)
Arctic grayling	1972--39 kept (R); 1973--459 kept (R); 1976--437 kept (R); 1980--434 kept (R); 1985--762 kept (R); 1987--1,137; 1988--577; 1989--396; 1990--313; 1991-94--NA;	- - - 1.61 5.55 5.13 3.64 4.82 -	- - - 351 (R) 470 418 323 205 -	Information on the 1972 catch was provided to DFO by the lodge. DFO recorded Arctic grayling from angler's creels in 1973, 1976, 1980 and 1984, and sampled a few grayling from the angler's creels in 1973. They estimated the sport harvest of grayling in 1987-90 using data from the angler diary program. (Falk et al. 1973a, 1974a; Falk and Dahlke 1974; Moshenko and Gillman 1978a; Gillman and Roberge 1982; Dunn and Roberge 1989; L. Anderson pers. comm.)

Table 4. Continued.

SPECIES	ESTIMATED TOTAL HARVEST (# of fish killed) ¹	AVERAGE NUMBER OF FISH CAUGHT PER ANGLER HOUR ²	ESTIMATED TOTAL NUMBER OF ANGLER DAYS ³	COMMENTS (references) ⁴
lake trout	1972--3,709; 1973--3,850; 1976--2,758; 1980--2,497; 1985--2,965; 1987--1,717; 1988--1,094; 1989--1,170; 1990--970; 1991-94--NA;	- 0.83 0.65 1.23 0.88 1.60 1.43 1.35 1.10 -	- - 1,600 1,995 1,908 1,247 1,005 1,101 809 -	Sport harvests of lake trout were estimated from creel censuses of lodge guests prior to 1986, and from the angler diary program in 1987-90. Information on the 1972 catch was provided to DFO by the lodge. DFO sampled lake trout from angler's creels in 1973, 1976, 1980, and 1985. They also conducted an experimental gillnet fishery in the area in 1980, and tagged 405 lake trout. Lodge guides recorded field data on lake trout as part of an intensive creel census conducted by DFO in 1984. (Falk et al. 1973a, 1974a+c; Moshenko and Gillman 1978a; Gillman and Roberge 1982; Yaremchuk 1986; Roberge and Dunn 1988; L. Anderson, pers. comm.)
northern pike	1973--53 kept (R); 1976--87 kept (R); 1980--126 kept (R); 1985--172 kept (R); 1987--233; 1988--150; 1989--173; 1990--174; 1991-94--NA;	- - - 1.72 4.77 4.32 3.67 4.48 - -	- - - 189 (R) 220 184 196 171 - -	DFO recorded northern pike from angler's creels in 1973, 1976, 1980 and 1984, and sampled a few pike from the angler's creels in 1973. They estimated the sport harvests of pike in 1987-90 using data from the angler diary program. Anglers can travel by boat to a "hotspot" for pike fishing at the Whitefish River (65°52'N, 124°45'W). (Falk et al. 1974a; Moshenko and Gillman 1978a; Gillman and Roberge 1982; Dunn and Roberge 1989; L. Anderson, pers. comm.)

¹ Estimates of the total number of fish killed include fish retained ("kept") as trophies, eaten for shore lunches, and that died after being released (estimated at 7% by Falk et al. 1974b). The 1971-3 harvest estimates for lake trout were taken from Falk et al. (1975) who recalculated the original data to reflect improved methodology. These estimates differ somewhat from those originally published Falk et al. (1973a, 1974a), and are thought to be more accurate. Where an estimate of the total harvest was not available, the number of fish kept for trophies is shown. Where these latter data are followed by an "(R)", they are records of the actual creel census data and, as such, underestimate both the actual number of fish kept and the total number of fish killed.

² Substantial differences are noted between the catch per unit effort data collected by creel census (1973-84) and that from the angler diary program (1987-90). Until the reasons for these differences are understood, these data should not be compared directly. The angler diary program data shown here differs slightly from that calculated by L. Anderson (unpubl. data). She did not consider the by-catch of directed angling (i.e. pike caught when fishing for trout) in her calculations. Consequently, her catch per unit of fishing effort was a few percentage points lower on the whole.

³ These data are based only on the lodge guests. They do not consider lodge employees or other who may have been fishing in the vicinity of a lodge. Data denoted with an "(R)" are based on the actual creel census records. They are not estimates of the total number of angler days.

⁴ Sources of information are referenced with the lodge to which they refer. Outfitters operating from communities or with moveable camps are not listed.

⁵ "NA" and dashes (-) indicate that data were not available.

Table 5. Licences to take fish from the Sahtu Dene and Metis Settlement Area for scientific purposes issued by the Department of Fisheries and Oceans (DFO), Central and Arctic Region, to DFO (1990-94) and non-DFO (1985-94) researchers. Note: DFO did not begin issuing licences to their own fisheries programs until 1990.

LICENCE HOLDER	AREA	PURPOSE	PERIOD
DFO RESEARCHERS			
D.A. Metner DFO, Winnipeg, MB	Lac Belot and Colville Lake	Collection of lake trout, lake whitefish, and burbot for heavy metal and other analyses. (Muir et al. 1994)	1993
R.F. Tallman DFO, Winnipeg, MB	Waters in the vicinity of Norman Wells	Collection of up to 200 inconnu using gillnets, and radio-tagging of 20 inconnu to identify spawning sites and follow seasonal fish movements.	1994
B. Hunt DFO, Yellowknife, NT	Great Bear Lake	Collection of fishes from Great Bear Lake.	1994
NON-DFO RESEARCHERS			
R. Hagen Renewable Resources, GNWT, Norman Wells, NT	Norman Wells	Investigation of species of fin fish present in Hogan Lake, Bosworth Creek, and Edie Lake.	1993
B. Humphrey Seakem Oceanography, Sidney, BC	Norman Wells area	An assessment of freshwater impacts from the Norman Wells oilfield development (ESL and McCart 1986)	1986
J.D. Morgan EVS Consultants N. Vancouver, BC	Norman Wells area	In situ bioassays of hydrocarbon inputs using burbot and Arctic grayling. (Morgan et al. 1987)	1985
R. Olmsted McLaren Plansearch Corp. Vancouver, BC	Fort Norman	Fish sampling to monitor fall fish migrations.	1985
M. Prevost Inland Waters Directorate Regina, SK	Norman Wells and Sans Sault Rapids	Sampling of forage fish for chemical analysis.	1985
C. Sikstrom Esso Resources, Calgary, AB	Norman Wells area	Capture of fish to analyse their tissue for light hydrocarbon contamination. (Dawson 1985)	1985
G. Smith Hatfield Consulting W. Vancouver, BC	Fort Good Hope and Déline areas	Capture of burbot for studies to determine whether their condition is related to hydrocarbon exposure (Lockhart et al. 1989)	1985

Appendix 1. Continued.	MACKENZIE RIVER TRIBUTARIES												
	Redstone River (1)	Keele River (2)	Big Smith Creek (3)	Great Bear River Tributaries				Great Bear River (7)	Little Bear River (8)	Stewart Creek (9)	Oscar Creek (10)	Carcajou River (11)	Mountain River (12)
				Great Bear Lake (A) ⁴	Porcupine River (4)	St. Charles Creek (5)	Brackett River (6)						
least cisco (<u>Coregonus sardinella</u>)	-	-	-	-	-	-	P	P	-	-	P	-	-
longnose dace (<u>Rhinichthys cataractae</u>)	-	-	-	-	-	P	P	P	P	-	P	-	-
longnose sucker (<u>Catostomus catostomus</u>)	P	P	P	P	-	P	P	P	P	P	P	P	P
mountain whitefish (<u>Prosopium williamsoni</u>)	P	P	P	-	-	-	P	P	-	-	P	-	P
ninespine stickleback (<u>Pungitius pungitius</u>)	-	-	-	P	P	-	-	P	-	P	-	P	P
northern pike (<u>Esox lucius</u>)	-	P	P	P	P	P	P	P	-	P	P	P	P
northern redbelly dace (<u>Phoxinus eos</u>)	-	-	-	-	-	-	-	-	-	-	P	-	-
pond smelt (<u>Hypomesus olidus</u>)	-	-	-	P	-	-	-	-	-	-	P	-	-
round whitefish (<u>Prosopium cylindraceum</u>)	-	P	P	P	P	P	P	P	-	P	P	-	P
slimy sculpin (<u>Cottus cognatus</u>)	P	P	P	P	P	P	P	P	P	P	P	P	P
spoonhead sculpin (<u>Cottus ricei</u>)	-	-	-	-	-	-	-	-	-	P	P	P	P
spottail shiner (<u>Notropis hudsonius</u>)	-	-	-	-	-	-	P	P	-	P	-	-	-
trout perch (<u>Percopsis omiscomaycus</u>)	-	-	P	P	-	P	P	P	P	P	P	P	P
walleye (<u>Stizostedion vitreum vitreum</u>)	-	-	-	P	-	-	P	P	-	P	P	P	P
white sucker (<u>Catostomus commersoni</u>)	-	-	P	-	-	-	P	P	-	-	P	-	P

	MACKENZIE RIVER TRIBUTARIES										MACKENZIE RIVER MAINSTEM (B)
	Hanna River (13)	Donnelly River (14)	Hume River (15)	Ramparts River (16)	Tsintu River (17)	Hare Indian River (18)	Loon River (19)	Tieda River (20)	Ontaratie River (21)		
Arctic cisco (<u>Coregonus autumnalis</u>)	-	P	-	-	-	-	P	-	-		P

Appendix 1. Continued.

	MACKENZIE RIVER TRIBUTARIES									MACKENZIE RIVER MAINSTEM (B)
	Hanna River (13)	Donnelly River (14)	Hume River (15)	Ramparts River (16)	Tsintu River (17)	Hare Indian River (18)	Loon River (19)	Tieda River (20)	Ontaratu River (21)	
Arctic grayling (<u>Thymallus arcticus</u>)	P	P	P	P	P	P	P	P	-	P
Arctic lamprey (<u>Lampetra japonica</u>)	-	P	-	-	-	-	-	-	-	P
broad whitefish (<u>Coregonus nasus</u>)	-	P	P	P	-	P	P	-	-	P
burbot (<u>Lota lota</u>)	P	P	P	P	-	P	P	-	-	P
chum salmon (<u>Onchorhynchus keta</u>)	-	-	-	-	-	-	-	-	-	P
dolly varden (<u>Salvelinus malma</u>)	-	-	-	-	-	-	-	-	-	P
emerald shiner (<u>Notropis atherinoides</u>)	-	-	-	-	-	-	-	-	-	-
flathead chub (<u>Platygobio gracilis</u>)	P	P	P	P	-	-	-	-	-	P
goldeye (<u>Hiodon alosoides</u>)	-	-	-	-	-	-	-	-	-	P
inconnu (<u>Stenodus leucichthys</u>)	P	P	-	P	-	-	-	-	P	P
lake chub (<u>Couesius plumbeus</u>)	P	P	P	P	P	P	P	P	P	P
lake cisco (<u>Coregonus artedii</u>)	-	-	-	-	-	-	-	-	-	P
lake trout (<u>Salvelinus namaycush</u>)	-	-	-	-	-	-	P	P	-	P
lake whitefish (<u>Coregonus clupeaformis</u>)	P	P	-	P	P	P	P	P	-	P
least cisco (<u>Coregonus sardinella</u>)	-	-	-	-	-	P	P	P	-	P
longnose dace (<u>Rhinichthys cataractae</u>)	-	-	-	-	-	P	P	-	-	P

Appendix 1. Continued.

	MACKENZIE RIVER TRIBUTARIES									MACKENZIE RIVER MAINSTEM (B)
	Hanna River (13)	Donnelly River (14)	Hume River (15)	Ramparts River (16)	Tsintu River (17)	Hare Indian River (18)	Loon River (19)	Tieda River (20)	Ontaratu River (21)	
longnose sucker (<u>Catostomus catostomus</u>)	P	P	P	P	P	P	P	P	P	P
mountain whitefish (<u>Prosopium williamsoni</u>)	-	-	-	-	-	-	-	-	-	P
ninespine stickleback (<u>Pungitius pungitius</u>)	-	P	-	-	-	-	P	P	-	P
northern pike (<u>Esox lucius</u>)	P	P	P	P	P	P	P	P	P	P
northern redbelly dace (<u>Phoxinus eos</u>)	-	-	-	-	-	-	-	-	-	P
pond smelt (<u>Hypomesus olidus</u>)	-	-	-	-	-	-	-	-	-	P
round whitefish (<u>Prosopium cylindraceum</u>)	P	P	P	-	-	P	P	P	-	P
slimy sculpin (<u>Cottus cognatus</u>)	P	P	P	P	P	P	P	-	P	P
spoonhead sculpin (<u>Cottus ricei</u>)	-	-	-	P	-	P	-	-	-	P
spottail shiner (<u>Notropis hudsonius</u>)	-	-	-	-	-	P	-	-	-	P
trout perch (<u>Percopsis omiscomaycus</u>)	P	P	P	P	-	P	-	-	P	P
walleye (<u>Stizostedion vitreum vitreum</u>)	P	P	-	P	P	P	-	-	P	P
white sucker (<u>Catostomus commersoni</u>)	P	-	P	P	-	P	-	-	P	P

* See following page for footnotes and references.

Appendix 1. Continued.

¹ "P" indicates that a fish species has been reported to occur in a particular river drainage or lake.

² Fish identified as Arctic charr (*Salvelinus alpinus*) are included here as Dolly Varden (*Salvelinus malma*). There is confusion in the literature with respect to the separation of these species and many of the identifications have been tentative. Recent genetic studies by Reist et al. (1996) suggest that, with few exceptions, fish in this drainage basin are Dolly Varden.

³ Individual male Arctic charr (*Salvelinus alpinus*) and sockeye salmon (*Onchorhynchus nerka*) in spawning condition were sent to DFO from Great Bear Lake, but no further catch data are available (J. Reist, pers. comm.).

⁴ Deepwater sculpin (*Myoxocephalus quadricornis thompsoni*) have also been reported from Great Bear Lake (McPhail and Lindsey 1970).

REFERENCES:

- 1) **Redstone River:** Hatfield et al. 1972; Dryden et al. 1973; Jessop et al. 1974;
2) **Keele River:** Hatfield et al. 1972; Dryden et al. 1973; Stein et al. 1973; Jessop et al. 1974;
3) **Big Smith Creek:** Hatfield et al. 1972; Shotton 1973; Stein et al. 1973; McCart et al. 1974; Slaney and Co. Ltd. 1974;
A) **GREAT BEAR LAKE:** Miller 1947; McPhail and Lindsey 1970; Scott and Crossman 1973; Johnson 1975c; Lee et al. 1980; J. Reist, pers. comm.;
4) **Porcupine River:** Hatfield et al. 1972; Dryden et al. 1973; Chang-Kue and Cameron 1980
5) **St. Charles River:** Hatfield et al. 1972; Dryden et al. 1973; Chang-Kue and Cameron 1980
6) **Brackett River:** Hatfield et al. 1972; Dryden et al. 1973; Shotton 1973; Chang-Kue and Cameron 1980
7) **Great Bear River:** Hatfield et al. 1972; Dryden et al. 1973; Lombard North Grp. Ltd. 1973; Shotton 1973; Stein et al. 1973; McCart et al. 1974; Jessop and Lilley 1975; Chang-Kue and Cameron 1980; McCart 1982;
8) **Little Bear River:** Hatfield et al. 1972; Dryden et al. 1973; Stein et al. 1973;
9) **Stewart Creek:** Hatfield et al. 1972; Stein et al. 1973; Jessop et al. 1974; Jessop and Lilley 1975;
10) **Oscar Creek:** Hatfield et al. 1972; Dryden et al. 1973; Lombard North Grp. Ltd. 1973; Shotton 1973; Stein et al. 1973; McCart et al. 1974; Jessop et al. 1974;
11) **Carcajou River:** Wynne-Edwards 1947; Hatfield et al. 1972; Dryden et al. 1973; Stein et al. 1973; Jessop and Lilley 1975;
12) **Mountain River:** Hatfield et al. 1972; Dryden et al. 1973; Stein et al. 1973; Jessop et al. 1974;
13) **Hanna River:** Hatfield et al. 1972; Lombard North Grp. Ltd. 1973; Shotton 1973; McCart et al. 1974;
14) **Donnelly River:** Hatfield et al. 1972; Lombard North Grp. Ltd. 1973; Tripp and McCart 1974; Stein et al. 1973; McCart et al. 1974;
15) **Hume River:** Hatfield et al. 1972; Dryden et al. 1973; Shotton 1971, 1973; Stein et al. 1973; Jessop et al. 1974;
16) **Ramparts River:** Hatfield et al. 1972; Dryden et al. 1973; Shotton 1971, 1973; Stein et al. 1973;
17) **Tsintu River:** Dryden et al. 1973; Shotton 1973;
18) **Hare Indian R.:** Hatfield et al. 1972; Dryden et al. 1973; Lombard North Grp. Ltd. 1973; Shotton 1973; Stein et al. 1973; Schultz International Ltd. 1974; Jessop and Lilley 1975; Lilley 1975; Sutherland and Gohlke 1978.
19) **Loon River:** Hatfield et al. 1972; Dryden et al. 1973; Shotton 1973; McCart et al. 1974; Schultz International Ltd. 1974; Reist 1987;
20) **Tieda River:** Hatfield et al. 1972; Dryden et al. 1973; Shotton 1973; Stein et al. 1973; McCart et al. 1974; Schultz International Ltd. 1974; Reist 1987;
21) **Ontaratue River:** Hatfield et al. 1972;
B) **MACKENZIE RIVER:** Hatfield et al. 1972; Stein et al. 1973; Chang-Kue and Cameron 1980; Envirocon Ltd. 1981;