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AN AQUATIC RESOURCE SURVEY OF SOUTHERN BAFFIN ISLAND, DISTRICT OF FRANKLIN NORTHWEST TERRITORIES

LAND USE INFORMATION SERIES

Background Report No. 5

Canada

AN AQUATIC RESOURCE SURVEY OF SOUTHERN BAFFIN ISLAND, DISTRICT OF FRANKLIN, NORTHWEST TERRITORIES

by

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PREFACE

The Northern Land Use Information Series (NLUIS) is an on-going environmental research and information mapping program for northern Canada, which provides a convenient reconnaissance-level information base to facilitate regional planning and the application of the Territorial Land Use Regulations. This map-series is jointly funded by the Department of Indian and Northern Affairs, and the Department of the Environment.

Since 1971, 383 maps covering 4.7 million sq.km. have been published for the Yukon and Northwest territories excluding some of the High Arctic islands and central Baffin Island. Information presented in text and map form includes a wide range of environmental-social topics such as wildlife information, fish resources, an ecological land classification, native land-use data, historical sites, proposed resource development activities, areas of conservation interest, and other information to assist in land-use planning and management. The program relies on the co-operation and assistance of several federal and territorial government departments, private research groups and local residents of the Yukon and Northwest territories. major participants include the federal Department of Fisheries and Oceans which provides the information on fish and marine mammal resources, the Department of Renewable Resources of the government of the Northwest Territories which is responsible for the terrestrial wildlife data, and the Lands Directorate of Environment Canada which produces the ecological land classification information, coordinates the socio-economic and cultural data collection, and is responsible for the overall production of the maps and texts.

In addition to the published maps, several reports such as this, have been prepared which are based on the background research used in the preparation of the maps. A list of these reports is included in Appendix 2.

(The views expressed in this report are those of the author and do not necessarily reflect those of Environment Canada or the Department of Indian and Northern Affairs).

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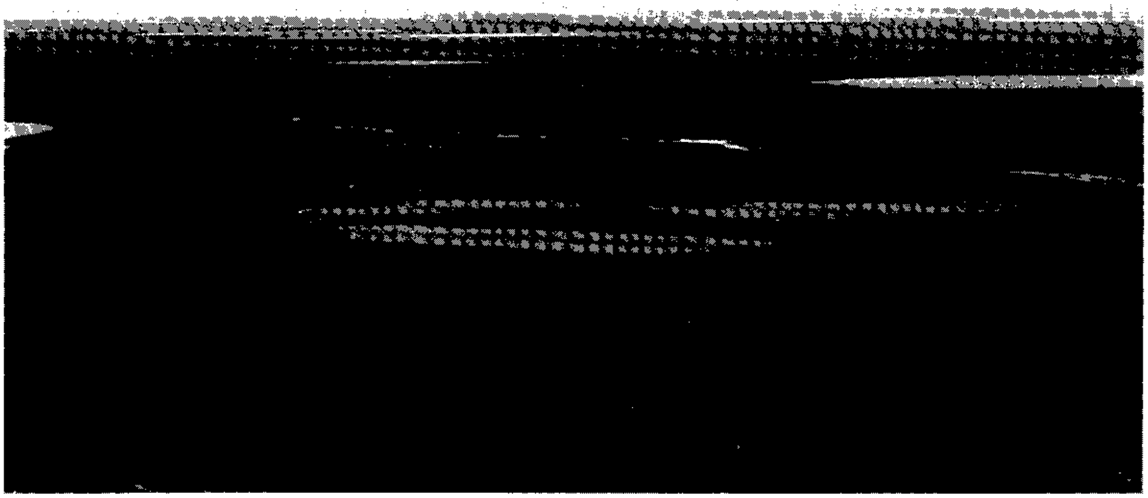


Plate 1. Seasonal streams and winterkill lakes on the Great Plain of the Koukdjuak.

INTRODUCTION

The Northern Land Use Information Series (NLUIS) is an environmental research and information mapping program for northern Canada, which provides a reconnaissance-level information base to facilitate regional planning and application of Territorial Land Use Regulations. The 1:250,000 scale maps produced include information on fish, wildlife, native land use, historical sites, proposed resource development activities, areas of conservation interest, and an ecological land classification. The area mapped in 1984 was southern Baffin Island (Fig. 1; map pocket). This report supplements comments on the 1984 maps by providing detailed information on the biology and utilization of fish species within the study area. It is one of an ongoing series of NLUIS reports detailing fisheries survey work in the Yukon and throughout the Northwest Territories (Appendix 7).

PHYSIOGRAPHY, GEOLOGY, AND GLACIAL HISTORY

A basic understanding of the physiography, geology, and glacial history of the study area will help readers to understand many of the biological and chemical characteristics of its freshwater drainages. Bostock (1967, 1970) recognized five distinct physiographic divisions within the area (Fig. 2). There is the Foxe Plain region, a subdivision of the younger, mainly stratified rocks which form the Borderlands, and there are the Baffin, Hall and Frobisher uplands and the Southampton Plain regions of the older, Precambrian rocks which form the Shield. These divisions have been drawn based on distinctive changes in topography and geology, often the result of their glacialogical history.

The Foxe Plain physiographic area of Baffin Island extends inland from Foxe Basin to include Nettilling and Amadjuak lakes and southeastward to Frobisher Bay in a narrow band which separates the Hall and Frobisher uplands (Fig. 2). A flat lowland, the Great Plain of the Koukdjuak, follows the coast of Foxe Basin in a band that is often 60 km wide and which extends inland along the Koukdjuak River to Nettilling Lake (Plate 2; Dunbar and Greenway 1956). It is formed on flat-lying or little deformed Palaeozoic sedimentary rock composed mainly of limestone and covered in many places by a layer of marine silt (McGill University 1958; Douglas 1971, 1973; Trettin 1975). The entire lowland is within 100 m elevation of sea-level (Fig. 3). Drainage is poor and it is dotted with shallow, round tundra ponds, many of them seasonal, and small, periodic runoff streams. The tidal mud flats along the coast are often 6 km wide. An impressive line of raised marine beaches marks the inland edge of the Great Plain of the Koukdjuak. Further inland, Foxe Plain is characterized by limestone plateaux which rise to over 200 m above sea level (asl). The plateaux are underlain by deformed Palaeozoic or Proterozoic granitic gneisses and granite. Their surfaces are often drift covered and gently undulating with relief in some areas of up to 50 m. Fault lines mark the plain's southern border with Frobisher Upland and separate it from the Hall Upland between Amadjuak Lake and Frobisher Bay. Drainages on the plateaux are better developed than on the lowland but still not deeply incised.

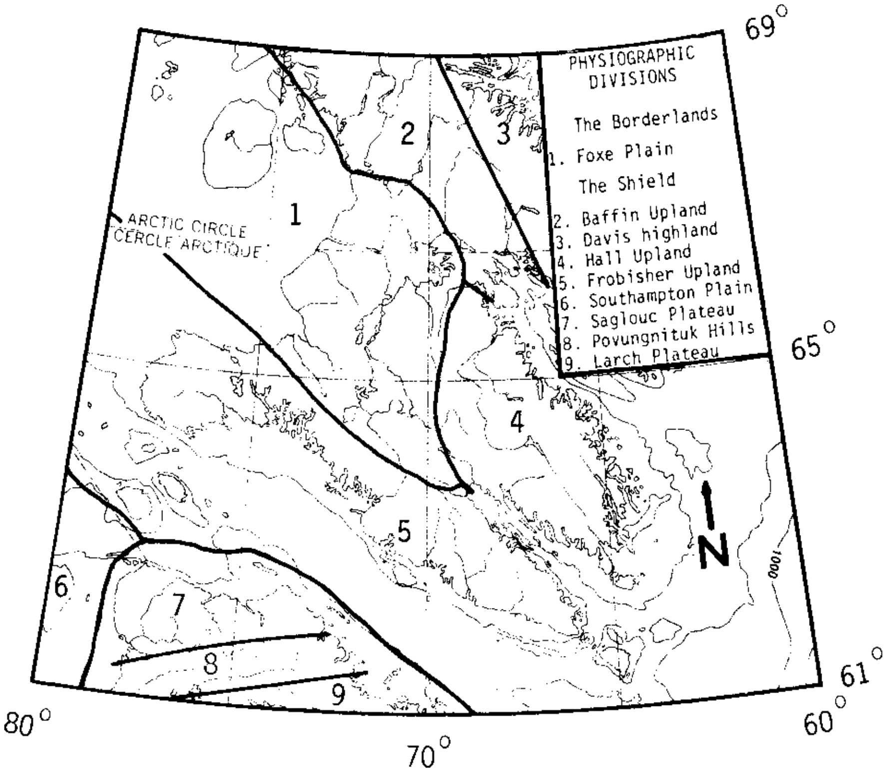


Figure 2. Physiographic subdivisions of the study area (after Bostock 1970).

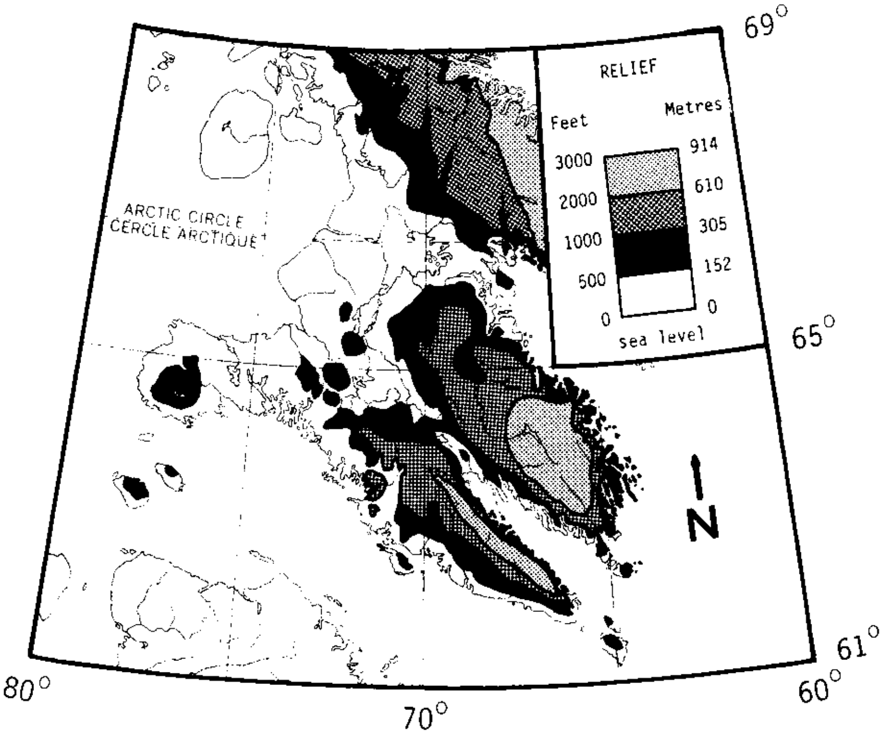


Figure 3. Topography of the study area (after National Atlas of Canada 1974).

Laurentide ice melted in the Foxe Plain area between 6 and 8 thousand years ago (Blake 1966; Prest et al. 1967; Andrews 1972; Prest 1973; Ives 1978; Andrews and Miller 1979; Mayewski et al. 1981; Dyke et al. 1982). Since then the land has rebounded between 100 and 180 m (Andrews 1972; Miller and Dyke 1974). The maximum marine submergence ranges from 50 m asl near Frobisher Bay, to about 130 m asl, along the Foxe Basin coast. All of Nettilling Lake and the Great Plain of the Koukdjuak were covered by ocean following glaciation, but Amadjuak Lake and most of the plateaux were not (Prest et al. 1967).

The Baffin Upland physiographic area borders on Foxe Plain and covers the northeastern corner of the study area (Fig. 2). It is formed on deformed Precambrian granitic gneisses, often overlain by younger sedimentary rocks (Douglas 1971, 1973). The land rises gradually from the west to form a rolling, featureless plateau with maximum elevations of about 500 m where it meets the Davis Highland (Fig. 3; Dunbar and Greenway 1956; McGill University 1958). Locally, particularly along the eastern edges, the terrain can be rugged and relief can exceed 60 m. The area's many lakes are drained by rivers either with incised valleys, like the Isurtoq River, which flow southwards from the plateau into Nettilling Lake, or with disorganized drainage patterns, like the broad, shallow Hantzsch River which flows westward into Foxe Basin.

Laurentide ice covered the Baffin Upland area until between 5 and 7 thousand years ago, and following glaciation the coastal lowland was inundated by marine waters to elevations of between 90 and 130 m and for up to 70 km inland from the present coastline (Andrews 1972; Prest 1973). The land has rebounded about 130 m in the east and 160 m in the west (Miller and Dyke 1974).

The Hall Upland physiographic area includes all of Hall Peninsula, west to the Foxe Plain physiographic area (Fig. 2). It is formed on intensely deformed Precambrian crystalline rock, mainly granitic gneiss, granulite, charnokite and schist, overlain in some areas by drift (Blackadar 1967; Douglas 1971, 1973). The central part of Hall Peninsula rises to an elevation of about 675 m (Fig. 3). Its surface is gently undulating, barren, and broadly dome shaped (Dunbar and Greenway 1956; McGill University 1958; Blackadar 1967). There are ice caps along the eastern coast and relatively few lakes. Several large rivers, notably the McKeand River, have their sources on the upland and flow in broad valleys, 80 to 100 m below the upland surface. These valleys become deeply incised and are often canyons for 75 km or more before entering the flooded, fiord-like coastal area. South of Chidliak Bay the coasts are spectacular, with high vertical cliffs rising from the sea (Barry et al. 1977). The low-lying western and southern shores of Blunt Peninsula and Loks Land, where elevations do not exceed 80 m for up to 6 km from the shore, are in marked contrast to the other parts of the coast. A belt of islands, rarely over 500 m asl, follows the coast, and raised marine beaches are common, especially on Sharko Peninsula. Northwest of Chidliak Bay the upland surface is lower, less than 500 m asl, and more rugged. Rivers are deeply incised and there are many small lakes and ponds. Near the northwestern edge of Hall Upland, where it merges with Foxe Peninsula, the elevation is less than 350 m, the rivers are broader and have shallower valleys, and drift deposits are much more extensive.

Laurentide ice melted in the Hall Upland area between 7 and 15 thousand years ago (Blake 1966; Prest 1973; Miller 1980). Since glaciation the land has rebounded between 30 and 140 m, with the rebound increasing from northeast to southwest (Andrews 1972; Miller and Dyke 1974). Marine inundation was least near the tip of Hall Peninsula, 30 m, and greatest near the upland's border with Foxe Plain, 100 m. During glaciation, several major moraine systems were deposited on Hall Peninsula (Blake 1966; Miller 1980), and small ice caps remain today near the southeastern coast of Hall Peninsula (Dunbar and Greenway 1956; Mercer 1975).

Frobisher Upland physiographic area includes the Meta Incognita and Foxe peninsulas of Baffin Island, and Nottingham, Salisbury, Resolution, and Big islands (Fig. 2). A fault line along the area's northern border separates it from Foxe Plain. It is formed on intensely deformed Precambrian granitic and volcanic rocks, mainly granitic gneisses, granulite and charnockite, often overlain by sedimentary drift (Blackadar 1967; Douglas 1971, 1973). Coastlines rise abruptly from the south coast of Frobisher Bay to over 650 m asl, with general elevations of 700 m and peak elevations at the Grinnell and Terra Nivea glaciers of about 900 m (Fig. 3; Barry et al. 1977). The land slopes away to the south and is characterized by rugged dome-shaped hills separated by steep valleys (Dunbar and Greenway 1956; McGill University 1958; Blackadar 1967). There is little drift on the surface and there are few lakes. Rivers on Meta Incognita Peninsula generally rise within a few kilometers of Frobisher Bay. Those flowing north are small, short and steep, while the larger rivers flow south. On the uplands their courses are poorly defined, but as they approach Hudson Strait their courses become well defined with deeply incised valleys. Resolution, Big, Salisbury, and Nottingham islands, south of Baffin Island, resemble Meta Incognita Peninsula in their geology and drainage patterns, but their peak elevations are less than 450 m. Between Markham Bay and Cape Dorset the elevations are generally less than 180 m but terrain remains rugged. There are very strong tidal currents and the tidal rise can be over 8 m (Dunbar and Moore 1980). The coastline is indented with long inlets and dotted with small islands and reefs. There are many lakes on the lowland neck of Foxe Peninsula and rivers draining them are shallow and seasonal. To the immediate north and west of Cape Dorset, Foxe Peninsula is rugged and rises to elevations of over 400 m. The southern coastline is precipitous and shallow rivers which radiate from the uplands near the peninsula's tip drop steeply to the ocean. Further to the north and west the elevations decrease and there is a broad lowland along the peninsula's north coast.

Laurentide ice melted in the Frobisher Upland area between 7 and 15 thousand years ago (Blake 1966; Prest 1973; Mayewski et al. 1981; Dowdeswell 1984). Since then the land has rebounded between 60 and 200 m, with the least rebound at Resolution Island and the greatest at the western tip of Foxe Peninsula (Andrews 1972; Miller and Dyke 1974). There remain two small ice caps on Meta Incognita Peninsula, Grinnell Ice Cap and Terra Nivea Ice Cap (Mercer 1975; Dowdeswell 1984). The maximum marine submergence following glaciation ranges from about 30 m at Resolution Island, to over 180 m at Nottingham Island and the western tip of Foxe Peninsula (Prest et al. 1967; Andrews 1972). Coastal areas of Meta Incognita Peninsula, and nearly all of Foxe Peninsula except upland areas near the western end, were covered by ocean.

The Southampton Plain physiographic area is represented in the study area only by Mansel Island (Fig. 2). It is formed on flat-lying or little deformed Palaeozoic sedimentary rock composed mainly of limestone and dolomite (Douglas 1971, 1973; Heywood and Sanford 1976). Laurentide ice covered the area until between 7 and 10 thousand years ago, and following the glacier's retreat the entire island was covered by ocean (Prest et al. 1967; Andrews 1972; Prest 1973). Since then the land has rebounded about 180 m and now rises gradually from the ocean to a maximum elevation of less than 110 m asl (Fig. 3). Local relief is low and the gently undulating surface is largely covered by Palaeozoic gravels and minor patches of vegetation (Dunbar and Greenway 1956; Heywood and Sanford 1976). There are extensive areas of raised beaches and old strand lines, and a low-lying valley running from east to west bisects the island near its centre. Drainage systems on Mansel Island are poorly developed and isolated tundra ponds, many of them seasonal, are common on the marshy southern and western thirds of the island.

CLIMATE

Southern Baffin Island has greater weather diversity than many regions of the Canadian Arctic (McGill University 1958; Thompson 1967; Maxwell 1981). Rugged ice-capped uplands, deep coastal fiords, low featureless plains, and ice-bearing coastal waters combine to produce striking climatic variations. Indeed, the high degree of cyclonic activity in southern Baffin Island distinguishes it from other regions of the Canadian Arctic.

The net annual solar radiation, temperature, precipitation and wind velocity generally increase from northwest to southeast across the study area (McGill University 1958; Bradley 1973; Barry et al. 1975; Fletcher and Young 1976; Bradley and England 1979; Maxwell 1980, 1981, 1982). In the north, the study area receives 4.2 x 10^5 $J \cdot m^{-2}$ of net annual solar radiation, whereas Resolution Island receives about 12.5 x 10^5 $J \cdot m^{-2}$. Mean annual temperature ranges range from 37°C in the western interior, north of Nettilling Lake, to 22°C at Resolution Island. In January, mean daily temperatures range from -32°C in the western interior to -20°C along the southeastern coast, and in July they range from +5 to +8°C across most of the island. The average daily temperature is below 0°C from September 5 to June 15 in the western interior and from September 30 to June 5 along the Hudson Strait coast. In the western coastal lowlands annual precipitation is normally less than 250 mm, of which 40 to 50% falls as rain. High elevations and moist marine air masses combine to produce precipitation of 200 to 600 mm annually along the southern and eastern coasts of Baffin Island. Of this precipitation 35 to 45% falls as rain. Fog and ice fogs are common along the southern coast, producing low visibilities and dangerous flying conditions (Plate 1). Wind velocities of 190 $km \cdot h^{-1}$ have been recorded in the Brevoort Island area. The dominant wind direction during December through February is from the northwest, but during the summer the dominant wind directions vary with location.

Ice on the lakes and rivers of southern Baffin Island begins to break up in early June and to form again in early September. On average the lakes are completely ice-free by mid-July and completely ice-covered by mid-October (Maxwell 1980). Break-up and freeze-up occur later in the larger rivers and lakes, and the open water season is shorter in upland lakes. In 1984 ice was forming in lakes on Meta Incognita Peninsula in early September. The rivers are seasonal, and even the largest stop flowing in mid-winter (Inland Waters Directorate 1980, 1983, 1984). The Sylvia Grinnell River (63°45'37"N, 68°35'38"W), which has a mean annual discharge of about 1×10^9 m^3, experiences its peak flows in early to mid-July. By mid-November the flow rates have fallen from the mid-July peaks of 400 $m^3 \cdot s^{-1}$ to less than 3 $m^3 \cdot s^{-1}$, and they remain low until early June. Measurable flow stops altogether in April. The Niaqunguk River (63°44'00"N, 68°27'10"W), which has a mean annual discharge of about 1×10^6 $m^3 \cdot s^{-1}$, begins flowing in early June and stops flowing in early November. Many of the smaller streams are periodic, flowing only during the spring thaw or after summer rains.

Waters along the southern coast of Baffin Island are characterized by the presence of first-year sea ice which develops each year (Crane 1978; Maxwell 1981, 1982; Jacobs and Newell 1979; Markham 1981). In a good year this ice disappears by mid-August along the southern coast, but remains as drifting pack ice in Foxe Basin. Icebergs are common in the Lake Harbour area during the summer months. In the winter, fast ice forms in protected areas, like the head of Frobisher Bay, but in mid-winter most of the ice is still moving first-year pack ice. Tidal ranges of from several meters in Foxe Basin to over 10 m at Frobisher Bay roughen coastal ice and make travel over the sea ice difficult and dangerous in many areas (Dunbar and Moore 1980; Akeeagok, H. Kilabuk, and P. Kilabuk, and Manning pers. comm.). Recurring polynyas which remain open year-round at the head of Cumberland Sound, in Frobisher Bay, and east of Cape Dorset are important overwintering areas for many marine mammals and seabirds (Dunbar 1981; Smith and Rigby 1981).

FLORA AND FAUNA

Many plant species have been recorded from southern Baffin Island, (Polunin 1940, 1947a, 1947b, 1948; Calder 1951; Porsild 1957, 1964; McLaren 1964). Plant communities in the area probably resemble those from Southampton Island (Reznicek and Svoboda 1982) and from the Arctic islands (Bliss and Svoboda 1984; Bliss et al. 1984). Of particular interest are the lush plant growths found in protected microhabitats along the Soper River.

The composition, structure and stature of tundra plant communities are determined largely by environmental factors (Reznicek and Svoboda 1982; Bliss and Svoboda 1984; Bliss et al. 1984). Soil moisture availability is closely and positively correlated with standing crop and productivity; plant cover and diversity increase with snow depth, except where there are late snow beds; and an essentially reciprocal relationship exists between wind speed, cover and aboveground standing crop.

Freshwater phytoplankton from southern Baffin Island have been studied by Moore (1981) and Wallen and Allen (1982). Marine phytoplankton have been studied extensively in the Frobisher Bay-Davis Strait-Foxe Basin areas (e.g. Bursa 1961; McLaren 1969b; Grainger 1979; Arctic Biological Station 1980).

Researchers working on southern Baffin Island in the past have studied freshwater (Reed 1963, 1964; Oliver 1964; Bushnell and Byron 1979), marine (Grainger 1962; Arctic Biological Station 1980), and terrestrial invertebrates (Danks 1981).

Some researchers who have studied birds in the area include Sutton and Parmlee (1955), Reed et al. (1980), Brown and Nettleship (1981), Prach et al. (1981), and Boyd et al. (1982). Some researchers who have studied the mammals include Brodie (1971), Davis et al. (1980), Stirling et al. (1980), Brodie et al. (1981), Mitchell and Reeves (1981), Smith and Hammill (1981), and Orr and Richard (1985). Geese, ducks, caribou, fox, polar bear, seals, walrus, and whales are very important economically to the people of southern Baffin Island (Bruemmer 1982; Donaldson 1983, 1984; Pattimore 1983a, b).

PREVIOUS AQUATIC RESEARCH

Two lakes on southern Baffin Island, Nettilling (Oliver 1964) and Ogac (McLaren 1967a, b; 1969a, b; Patriquin 1967), have been the subjects of whole ecosystem studies which are summarized below (Fig. 1). Other research, no less important, is discussed in the survey results and discussion section.

Nettilling Lake (66°30'N, 71°00'W)

Nettilling Lake, with a surface area of 5540 km^2, is the largest lake in the Canadian Archipelago (Inland Waters Directorate 1973). It can be divided into two morphological regions by a line from Caribou Point to Magnetic Point. West of this line the lake is situated on sedimentary rock and has a deep (up to 132 m), regular basin, almost devoid of islands (Oliver 1964). East of the line it is situated on crystalline rock of the Canadian Shield and has a very irregular basin with numerous islands. The western region of Nettilling Lake is cold monomictic while the eastern region is polar dimictic. The lake is oligotrophic and generally homothermic. It is elevated 30 m above sea level.

The lake is drained by the Koukdjuak River which has an estimated average summer flow rate of 3960 $m^3 \cdot s^{-1}$ (Manning 1943). Several large rivers flow into the lake including the Amadjuak River, which is the main inlet, and one from the Penny Ice Cap which empties silt laden water from the glacier into the northeastern area of the lake.

In May 1956 the ice thickness on Nettilling Lake varied between 1.5 and 1.9 m (Oliver 1964). Shore leads developed during the first week of July and by 25 July the ice was candled throughout and unsafe for travel. The lake became ice-free in early August and no ice had formed by 9 September, although large areas of thin ice formed along the edges of the Koukdjuak River on 1 September. Lake waters were generally 80% or more saturated by dissolved oxygen, pH ranged from 6.8 to 7.0, and total dissolved solids were low (11-42 ppm) suggesting low biological productivity (Oliver 1964). Chironomids made up over 95% of the macrobenthos, and *Cyclops scutifer*, *Diaptomus minutus*, and *Daphnia longiremis* dominated the planktonic crustacean community of Nettilling Lake.

Four fish species have been caught in Nettilling Lake: Arctic charr, Atlantic salmon, ninespine stickleback, and threespine stickleback (Thomson 1957; McPhail 1961, 1963; Oliver 1964; Sopuck 1977; Dick and Belosevic 1981). Anadromous and non-anadromous charr and ninespine stickleback are common in the lakes and in ponds nearby; threespine stickleback have been collected less often; and Atlantic salmon occasionally enter the lake in fall with migrating anadromous charr (Peet pers. comm.). Charr in the lake are slow growing and the anadromous charr do not grow as large as those to the west (Thomson 1957). They mature at ages 7 or 8 years and do not spawn annually.

Ogac Lake (62°52'N, 67°32'W)

Ogac Lake is a small (148 ha) meromictic lake located at the head of Ney Harbour (McLaren 1957, 1967a, b). It is divided into three distinct basins and separated from the sea by a sill. The lake receives fresh water runoff from the surrounding hills and influxes of sea water during the highest spring tides throughout the open water season. Tides in the area have a maximal range of 12 m and rise up to 1.2 m above lake level. Surface waters are fresh and deeper waters are saline with salinities of up to 28 ppt. The lake is up to 9% warmer than the nearby sea and temperature inversions occur when tidal water cools the surface waters and vertical stability prevents mixing. Oxygen is absent below 25 to 32.5 m, depending on the basin morphometry.

Ogac Lake is unproductive compared with most inshore marine environments (McLaren 1969b). Tides contribute negligible nutrients to the lake. Primary production is nitrogen limited and about 12 $g \cdot C \cdot m^{-2} \cdot yr^{-1}$, and overall zooplankton production is about 1 $g \cdot C \cdot m^{-2} \cdot yr^{-1}$.

A selection of widespread marine organisms inhabit the lake (McLaren 1969a). Among the most important zooplankters are the copepods *Pseudocalanus minutus* and *Oithona similis*, the chaetognath *Sagitta elegans*, and the medusa *Aglantha digitale*. Other species include a variety of amphipods, the sea urchin *Strongylocentrotus droebachiensis*, the molluscs *Mya truncata* and *Saxicaca arctica*, the polychaete *Cistendes granulata*, and Atlantic cod *Gadus morhua*.

In 1962, the population of cod over 25 cm in length was estimated at over 10,000 individuals, and of cod over 60 cm at over 500 individuals (Patriquin 1967). These fish are utilized by domestic fishermen from Frobisher Bay. The cod grow to lengths of over 140 cm, live to be 17 years old, and can weigh over 24 kg. They show great ranges in size at a given age, probably as a result of poor feeding conditions and cannibalism. Maturation occurs at a large size, 85 cm for females and about 65 cm for males. Spawning takes place from late May until early July in each of the lake basins. The eggs hatch in 22 to 26 days following spawning, mainly in early July.

Ogac Lake provides a valuable natural laboratory for studying many aspects of marine species ecology and the processes involved when a marine bay is isolated by the land rise following glaciation. It should be preserved as such for future studies.

COMMUNITIES

Residents of the communities of Cape Dorset, Frobisher Bay, Lake Harbour and Pangnirtung, and of their outpost camps, fish in the study area (Fig. 1, Table 1). In the past century there were also settlements at Amadjuak, and on Nottingham, Resolution, Brevoort, and Blacklead islands, all of which are now abandoned.

Cape Dorset (64°14'N, 76°32'W)

Cape Dorset is located on the north tip of Dorset Island, south of Foxe Peninsula. It was named after the Earl of Dorset by Luke Foxe, who explored parts of Hudson Bay and Foxe Basin in 1631, and has been inhabited since members of the Dorset Culture, an Inuit people who flourished in the Arctic between 1000 BC and 1100 AD, lived there (Higgins 1968; Kemp 1976). The present hamlet formed around the Hudson Bay Company trading post which was established there in 1913 and served as an important supply point for expeditions (e.g. Manning 1943; Soper 1981) exploring Foxe Basin (Millward 1930). It has grown to include an airport, a school (grades K-9), an Anglican church, nursing station, hotel, RCMP detachment, and community cooperative. In 1984 it had a population of 894 persons (NWT Data Book 1982; Government of the Northwest Territories 1985). Carving and graphic art are mainstays of the local economy and artists of the West Baffin Eskimo Cooperative have received international recognition for their work. Hunting, trapping and fishing continue to be important livelihoods (Labine 1984). Like other communities on southern Baffin Island, most residents live in government housing; there is a scheduled air service; and dry goods, heating oil, and foodstuffs are imported annually on the fall sealift.

Frobisher Bay (63°45'N, 68°31'W)

Frobisher Bay is located on Koojesse Inlet at the head of Frobisher Bay. Inuit fishermen, who traditionally visited this area in fall to fish for Arctic charr, first met Europeans in 1576, when Martin Frobisher sailed into the bay looking for gold (Government of the Northwest Territories 1985). When Frobisher found only fool's gold, the bay was largely bypassed, except by whalers, until C.F. Hall (1865) wintered there in 1861 and described the people and their surroundings. Thereafter, the area was visited frequently by traders, whalers, and other expeditions (Millward 1930). The community developed at its present site following the establishment there in 1942 of a weather station and an airport by the U.S. Air Force, as part of the wartime

Table 1. Location and occupancy of outpost camps within the study area (S. Akavak, Akeeagok, Allen, Dahlke, Fisher, Labine, Manning, Noble, Pattimore, and Wooley pers. comm.).

Community	Outpost	Coordinates	Occupation persons	Occupation months	Occupation year
Cape Dorset	Aqiatululavik	64°23'N, 74°42'W	8	12	1985
	Evalurdjuak	63°46'N, 72°12'W	7	6	1985
	Isoktok*	64°21'N, 76°10'W	8	12	1985
	Kagiaa	64°33'N, 75°37'W	10	12	1985
	Kangiqsukjuaq	64°23'N, 77°38'W	8	12	1985
	Shartowiktok	64°21'N, 76°11'W	13	12	1985
Frobisher Bay	Iqalugarjuruluit	63°28'N, 64°58'W	24	12	1985
	Iqulurauorolok	63°26'N, 67°23'W	9	12	1985
	Kuyait	62°53'N, 65°45.5'W	9	12	1985
	Minguqtuq	62°57'N, 66°05'W	15	12	1985
Lake Harbour	Umiakuvik	64°24.5'N, 71°36'W	12	12	1985
Pangnirtung	Kipisa**	65°16.5'N, 67°06'W	28	12	1984

* new outpost camp in 1985.
** Kipisa may or may not be occupied in 1985.

Northeastern staging route for sending planes to Europe (Meldrum 1975; Kemp 1976). While the Hudson Bay Company had trading posts on the Frobisher Bay coast beginning in 1914, it was not until 1950 that they moved to the site of the present community. The airport was not used during wartime, but it soon became an important northern supply and distribution centre, and offered employment opportunities which drew Inuit and others to settle there. In 1955, the Federal Government began construction of a complex of schools and residences, and by 1960 there were Anglican and Catholic churches, a variety of services, and both the RCMP and Department of Indian and Northern Affairs had established their regional headquarters in the community. A hospital was opened in 1964. In 1984, Frobisher Bay had a population of 2333 persons (Government of the Northwest Territories 1985), and all of the modern conveniences found in southern towns (NWT Data Book 1982). The major economic activities are wage employment with government or private industry, but fishing, sealing, trapping, carving, and handicrafts are also important.

Lake Harbour (62°51'N, 69°53'W)

Lake Harbour is situated on the south coast of Meta Incognita Peninsula nestled beneath steep cliffs at the head of Glasgow Bay. Inuit who inhabited the Lake Harbour area were among the first to have extensive contact with visiting Whites. Whaling ships made annual calls at the Lake Harbour anchorage, which is the best and most important harbour on southern Baffin Island, and often employed Inuit crewmen (Wakeham 1898; Kemp 1976). From the turn of the century until 1913 Inuit and Scottish miners were employed at a mica mine near Lake Harbour (Low 1906; Higgins 1968). The establishment of an Anglican Mission in 1909 served as the nucleus for the present community. It was followed by the establishment of a Hudson Bay Company trading post, in 1911, and an RCMP post in 1924. In 1984 the population of Lake Harbour was 252 persons (Government of the Northwest Territories 1985). In addition to the HBC store, church and RCMP detachment, the community now has a nursing station, school (grades K-9), transient centre, and community cooperative (NWT Data Book 1982). There is a small airstrip which can accommodate Twin Otter aircraft. Major economic activities are marine mammal harvesting, government wage employment, hunting, fishing, and carving. Members of the Kimik Cooperative are noted for their fine ivory carving and scrimshaw etching, and for their distinctive apple-green soapstone sculptures.

Pangnirtung (66°09'N, 65°43'W)

Pangnirtung is located on the scenic southeast shore of Pangnirtung Fiord, which is on the north shore of Cumberland Sound. The first European to visit Cumberland Sound was John Davis in 1585, and subsequently it became one of the main Arctic whaling centres (Anders et al. 1967; Kemp 1976; Mitchill and Reeves 1981). Whaling stations on Blacklead and Kekerten islands served as the jumping-off point for several early explorers of Baffin Island (Hall 1865; Millward 1930). Inuit living in the area became well known whaleboat skippers and travellers. The present community grew around a Hudson Bay Company trading post which was built there in 1921 (NWT Data Book 1982). The RCMP established a post there in 1923, and in 1927 the Anglican Church re-established its mission and soon opened a small school and hospital. In 1984 the population of Pangnirtung was 1022 persons (Government of the Northwest Territories 1985). It has a nursing station, school (grades K-9), hotel, community cooperative and a variety of local enterprises. Marine mammal harvesting, hunting, trapping, fishing, wage employment through government or private industry, carving/handicrafts, and tourism are important economic activities. Members of the Pangnirtung Inuit Cooperative are well known for their woven crafts, and their stone and bone carvings. Pangnirtung is the access point for Auyuittuq National Park.

MATERIALS AND METHODS

Fish and related biota were collected between 7 August and 10 September, 1984, from fresh and coastal marine waters within the survey area (Fig. 4). Sites were reached using a float-equipped Bell 206 L Long Ranger helicopter. Surface water samples, phytoplankton, aquatic invertebrates, freshwater and marine fishes, and information on fish utilization were collected. The sampling program ended prematurely on 2 September when the survey helicopter crashed into the Arctic Ocean near Lake Harbour (Plate 1).

WATER CHEMISTRY

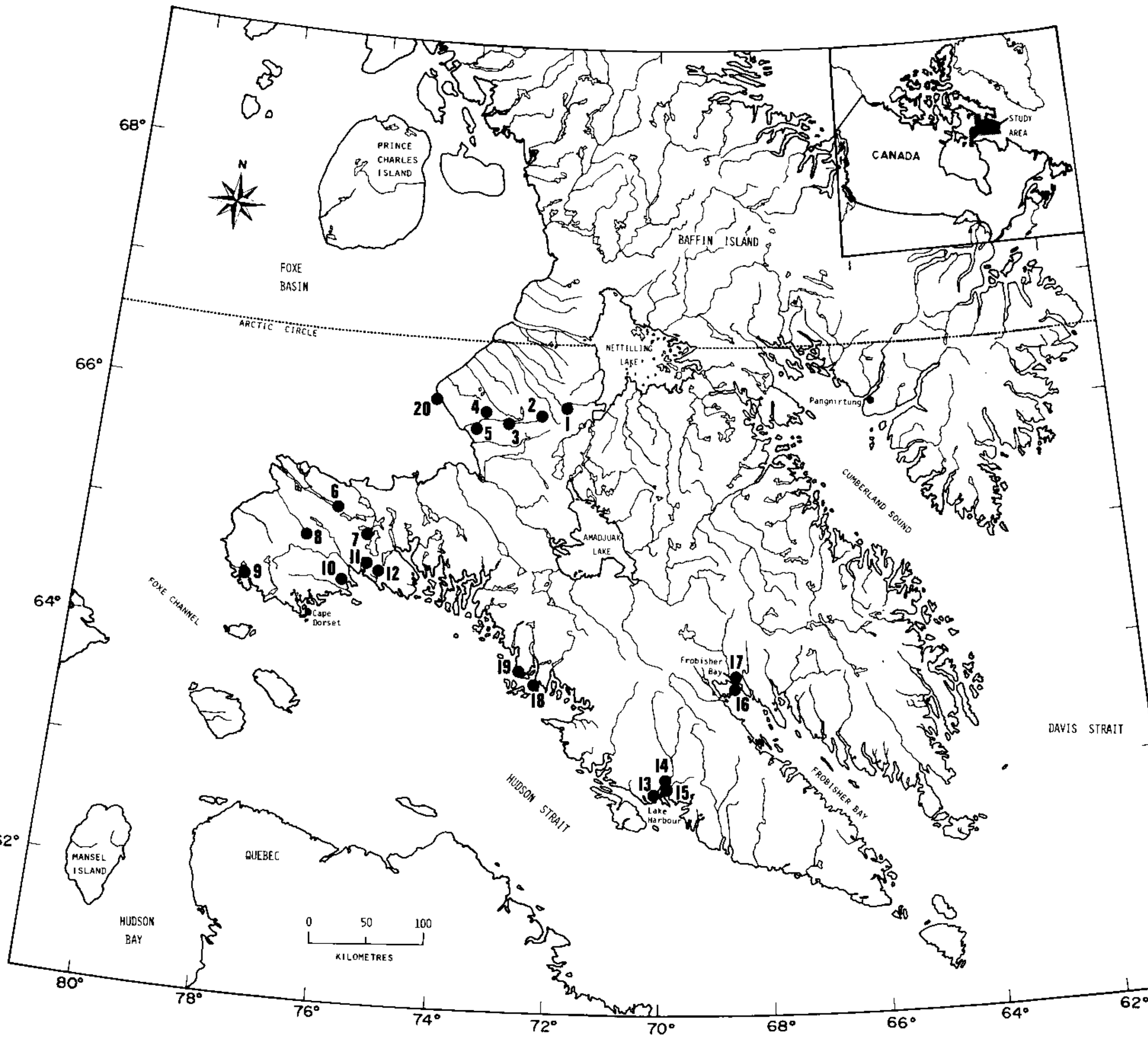
Because monomictic Arctic lakes circulate completely in the summer, water samples taken near their surfaces are representative of the lake's chemistry as a whole (Schindler et al. 1974a, b; Welch pers. comm.). Water samples were collected in litre polyethylene bottles held below the surface. Dissolved organic carbon, particulate carbon, nitrogen, and phosphorous; calcium, magnesium, potassium, sodium, chloride, and sulphate; and chlorophyll A samples were handled and stored as per Stainton et al. (1977). Most of the particulate and chlorophyll samples were destroyed by sea water when the helicopter crashed. Stainton's sample storage methods were not followed for dissolved nitrogen and phosphorous samples which were filtered but did not undergo ultra-violet combustion to break up the organics; specific conductance was measured on stored samples. These deviations in technique should not have seriously altered measurements because the samples were chemically dilute (Stainton pers. comm.). Laboratory pH measurements are reported and may differ slightly from actual lake values due to storage effects. The chemical analyses were performed by the Analytical Unit at the Freshwater Institute, Department of Fisheries and Oceans, Winnipeg. Secchi depth, secchi color, and surface water temperature (±0.1°C) were measured in the field.

PHYTOPLANKTON

Phytoplankton were collected non-quantitatively, using a 10 micron mesh Wisconsin net with a 10 cm mouth diameter, and quantitatively, using 250 ml dark bottles filled at arm's length below the surface. Specimens were preserved in Lugols solution and given to Dr. G.G.C. Robinson (Dept. of Botany, Univ. of Manitoba, Winnipeg) and to H. Kling (Freshwater Institute, Winnipeg) for identification. Time constraints did not permit their inclusion in this report (Robinson and Kling pers. comm.).

AQUATIC INVERTEBRATES

Zooplankton were collected from lakes in single vertical hauls using a 73 micron mesh Wisconsin net with a 25 cm mouth diameter. Specimens were preserved in 10% formalin and species abundances were



KEY TO SAMPLE LOCATIONS

site #		
1	unnamed lake stream	66°03'N,71°55'W 66°01'N,71°54'W
2	unnamed lake stream	65°56.5'N,72°20'W 65°56'N,72°20'W
3	tundra ponds & unnamed river	65°55'N,73°07'W
4	unnamed lake stream	65°57.5'N,73°25'W 65°57'N,73°25'W
5	unnamed lake	65°51.5'N,73°37'W
6	unnamed lake	65°05'N,76°06'W
7	Tessik Lake	64°50'N,75°25'W
8	Scarp Lake stream	64°51'N,76°41'W 64°52.5'N,76°45'W
9	unnamed lake	64°26'N,77°45'W
10	unnamed lake	64°36'N,76°03'W
11	Kinguk Lake	64°40'N,75°30'W
12	Neakok Lake	64°35'N,75°21'W
13	Pleasant Inlet	62°49'N,69°59'W
14	Soper Lake	62°54'N,69°53'W
15	unnamed lake ~ 0.5km north of Lake Harbour marine inlet, Lake Harbour	62°51.2'N,69°52'W 62°51'N,69°52'W
16	Koojesse Inlet	63°44'N,68°31'W
17	gravel pit pond, Frobisher	63°44.8'N,68°29.5'W
18	pond	63°44.5'N,72°17'W
19	island pond	63°49'N,72°33'W
20	tidal flats, Cape Dominion	66°00'N,74°18'W

Figure 4. Locations of sites sampled during the 1984 NLUIS survey of southern Baffin Island.

determined by dividing the number of individuals caught by the volume of water strained. Specimens were identified by Dr. and Mrs. K. Patalas who retained the collection at the Freshwater Institute in Winnipeg, Manitoba.

Specimens from ponds were collected non-quantitatively, using an aspirator or dipnet, and preserved in 10% formalin. They were identified and retained by Dr. & Mrs. Patalas except for the large cladoceran, Eurycercus sp. which was given to Dr. B. Hann of the University of Manitoba for taxonomic work.

A variety of other aquatic and marine invertebrates were collected either using an aspirator, from traps and nets, or from fish stomachs. They were preserved in alcohol and identified by researchers from several institutions (see Appendix 5). Specimens were retained either in the authors' or the identifying researchers' collections.

FISH

Fish were caught using gillnets, a beach seine, and minnow traps. Gillnets were Lundgren's green multifilament nylon survey type, 1.8 m deep and 60 m long, consisting of six 10 m panels of 10, 19, 33, 45, 55, and 60 mm mesh sizes (bar measure). Nets were generally set offshore on the bottoms of lakes, large rivers and the ocean. Fry were caught in the shallows using Gee's minnow traps. The traps were cylindrical, 44 cm long and 22 cm in diameter, with galvanized wire meshes 6.2 mm square. Mouth openings, 2 cm in diameter, were located at each of the inverted conical ends.

In the field, fish were weighed (Accu-Weight spring scales, round weight 0 to 30 ± 0.5 g; 30 to 2 000 ± 10 g; 2 000 to 10 000 ± 50 g), fork length (mm) was measured and otoliths were removed and stored in coin envelopes. Stomach contents were examined and the skin, mouth, gills, digestive tract, body cavity and swimbladder were examined for parasites. Sexual maturity was determined through gonad examination. Subsamples of fish were frozen or preserved for parasite and stomach content examination and pyloric caecal counts. Representative preserved fish specimens were sent to the National Museum of Natural Science (N.M.N.S.), in Ottawa.

Otoliths were used to age Arctic charr (Salvelinus alpinus) following the technique of Grainger (1953). Greenland cod (Gadus ogac) were aged from otoliths by M. Mikhail of the Freshwater Institute, and stickleback were also aged from otoliths.

Food items in stomachs were identified to at least order and stomachs were assigned fractional fullness values ranging from 0 (empty) to 1 (full) based on their apparent capacity and contents. A modification of Hynes' (1950) point method was used to assess the importance of food items consumed. Each food item was assigned 1, 2, 4, 8 or 16 points according to the volume of it present in the stomach, a full stomach, irrespective of the size of the fish, receiving a total of about 20 points. Modification consisted of assigning <1 point to minor quantities of small items, rather than ignoring their contribution to the diet (Smart and Gee 1979).

Parasite numbers were estimated in the field and preserved parasite samples were counted in the laboratory. Cestodes and acanthocephalans collected from fish in the field were relaxed in cold water, heat killed (except acanthocephalans), fixed in formyl-acetic acid, and stored in 70% ethanol. Nematodes were killed in hot 70% ethanol and stored in 70% ethanol. Parasitic copepods were fixed and stored in 70% ethanol.

Sexual maturity was assessed through gonad examinations and coded according to the following scale:

Male	Female	Development
1	7	immature
2	8	mature
3	9	near ripe
4	10	ripe
5	11	ripe and running
6	12	spent
0		sex indistinguishable

Gonads of immature Arctic charr were small and transparent. Mature females had eggs which were opaque and less than 1.6 cm in diameter (MacCallum and Regier 1984), while mature males had opaque pale red testes without noticeable sperm production. Eggs of near ripe females were generally 3 to 4 mm in diameter and clear yellow, but were attached to one another by networks of mesenteries and blood vessels. Near ripe males had enlarged, white testes without flowing sperm. Ripe fish released eggs or sperm if their sides were pressed firmly. The eggs were 3 to 4 mm in diameter, but free from one another. If the testes were slit, sperm oozed from the cut. Fish which released eggs or sperm while still in the net, or on handling, were termed ripe and running. When the fish finished spawning, they were termed 'spent'. Gonads of the spent females had moderate numbers of small eggs, and a few large eggs, sometimes already in the process of being resorbed. The testes of spent males were mottled red and white, with most of the gonad being heavily veined and only small bulges of white unreleased sperm. Gonads of other fish species were similarly classified, with the relative size of the species being taken into account.

DOMESTIC, COMMERCIAL, AND SPORT FISHING

Data on domestic, commercial, and sport fishing were collected by interviewing local fishermen, area Fisheries and Wildlife officials, and Fish Management personnel at the Freshwater Institute in Winnipeg. Included are the times, locations and methods of fishing, the species caught, and whenever possible the weight of the catch.

SURVEY RESULTS AND DISCUSSION

The 1984 sampling program was truncated when our helicopter crashed into the sea near Lake Harbour with us and our samples aboard. We escaped injury and most of our samples were recovered. However, in consequence our chemical and biological sampling data is localized to the western edge of the study area and limited to a few sites. These sites are representative of several habitat types and serve to fill the largest data gap, namely the description of inland lake systems with populations of lake-dwelling fishes.

WATER CHEMISTRY

Lakes throughout the study area are oligotrophic and cold monomictic (Table 2). They have short open water seasons, with ice on most lakes and rivers breaking up in June and forming again in early October. In the larger lakes and rivers, for example Nettilling Lake and the Koukdjuak River, both break-up and freeze-up occur later. The lake is not ice free until early August or frozen until midwinter, and the river breaks later than its tributary streams and does not stop flowing until midwinter. Like lakes elsewhere in the Canadian Arctic their chemical characteristics follow a continuum, with upland lakes situated on igneous Shield rocks at the one extreme and lowland lakes on calcareous sedimentary rocks at the other.

Lakes on Foxe Peninsula (sites 6, 8, 11, and 12) had chemical concentrations intermediate between those found in Arctic lakes with largely igneous or sedimentary basins (Stewart and MacDonald 1981; Stewart and Bernier 1982, 1983, 1984). Situated on igneous rock with varying amounts of sedimentary overburden, they had alkaline waters with intermediate hydrogen ion concentrations (pH 7.5 to 7.7), conductivities (55 to 90 $\mu S \cdot cm^{-1}$), and dissolved solid and nutrient concentrations. Calcium was the major ion contributing to the conductivity, but was present in lower concentrations than in lakes with largely sedimentary basin.

Shallow lakes situated on sedimentary strata between the Great Plain of the Koukdjuak and Nettilling Lake (sites 1 and 2) had higher hydrogen ion concentrations (pH 7.8 to 8.0) and conductivities (100 to 260 $\mu S \cdot cm^{-1}$) than the lakes on Foxe Peninsula. They were chemically similar to lakes on sedimentary stratas of Bathurst, Devon, King William, and Victoria islands (Stewart and MacDonald 1981; Stewart and Bernier 1982, 1983, 1984). Calcium was the major ion contributing to the conductivity, followed by chloride (site 2) and/or (site 1) sulphate.

A shallow tundra pond (site 4) situated on unconsolidated marine silts of the Great Plain of the Koukdjuak was alkaline, with the remarkably high conductivity of 1280 $\mu S \cdot cm^{-1}$. Sodium and chloride were the major contributing ions and other ions measured were present in high concentrations relative to most other freshwater systems that have been sampled in the Canadian Arctic (Stewart and MacDonald 1981; Stewart and

Table 2. Water chemistry data (means of n samples) for lakes on southern Baffin Island, NWT.

Sampling site (Fig. 4) Degrees north latitude Degrees west longitude Date (day/month/1984)	1 66°03' 71°55' 18/8	2 65°56.5' 72°20' 18/8	4 65°57.5' 73°25' 24/8	6 65°05' 76°06' 28/8	8 64°51' 76°41' 28/8	11 64°40' 75°30' 27/8	12 64°34' 75°21' 27/8
Field Data							
Surface water temperature (°C)	7	6.5	5	7	6	6	7
Depth (m)	2.5	1.5	1	2	6	11	9
Surface area (km^2)	7.4	4.4	1.3	20.6	5.1	22.3	4.8
Time of day (h)	1830	1925	1300	1500	1100	1445	1415
Light conditions[1]	s	s	s	c	c	o	o
Secchi depth (m)	2.5	1.5	0.1	2.0	6	9	7
Secchi color	pale green	v. pale green	grey brown	pale green	pale green	pale blue	pale green
Laboratory Data							
Number of samples (n)	2	2	4	2	2	2	2
pH	7.76	8.04	8.12	7.74	7.56	7.70	7.68
Conductivity at 25 C (μS/cm)	100	265	1280	90	55	80	75
Total dissolved nitrogen (μg/L)	260	390	468	560	305	180	172
Total dissolved phosphorus (μg/L)	13	8	26	52	32	9	9.5
Dissolved organic carbon (μMole/L)	190	320	425	385	235	235	280
Nutrients (μg/L)							
Suspended nitrogen				206	149		
Suspended phosphorus				7	2.25		
Suspended carbon				947	433		
Chlorophyll A				1.1	0.2		
Major Ions (mg/L)							
Sodium	0.7	1.2	170	3.9	1.1	3.2	3.3
Potassium	0.4	0.4	4.5	0.4	0.2	0.4	0.3
Calcium	17.7	29.4	59.4	12.7	8.3	11.1	7.9
Magnesium	1.2	3.1	18.5	1.5	0.8	1.1	0.9
Chloride	0.6	10.2	350	6.9	1.5	6.1	40
Sulphate	2.4	8.4	8.5	1.5	0.9	2.2	7.6

[1] c = clear, s = scattered cloud (1-5 tenths cover), o = overcast.

Table 3. Zooplankton species and their abundance (mean number of individuals per litre) in lakes on southern Baffin Island, N.W.T.

Sampling site (Fig. 4) Date (day/month/1984) Depth (m) Number of samples	1 18/8 2 2	2 18/8 surface 1	4 24/8 surface 1	5[1] 24/8 surface 1	6 28/8 1 2	8 28/8 5 2	9[2] 1/9 3.5 2	11 27/8 10 2	12 27/8 7 2
Ph. Arthropoda									
Cl. Crustacea									
Sub Cl. Copepoda									
O. Calanoida									
Eurytemora affinis				(3.2)					
Diaptomus minutus	6.17	(97.7)[3]		(78.2)	5.80	6.24	2.10	4.43	6.52
Diaptomus eiseni			(77.6)	(< 0.1)					
O. Cyclopoida									
Cyclops scutifer	1.44	(0.4)			25.00	13.14	18.45	21.73	9.40
Cyclops capillatus				(7.9)					
Sub Cl. Branchiopoda									
O. Cladocera									
Daphnia longiremis	0.01				6.20	0.20	0.23	0.76	0.48
Daphnia middendorffiana		(1.5)							
Daphnia pulex			(22.4)						
Daphnia middendorffiana x pulex				(10.5)					
Bosmina longirostris					1.30	1.46	0.01	0.34	0.10
Chydorus sphaericus		(0.4)				0.04		0.05	0.10
Holopedium gibberum					0.10			0.13	
Total ind/L	7.6	(100)	(100)	(100)	38.4	21.1	20.8	27.4	16.6
Number of species	3	4	2		5	5	4	6	5
Ph. Rotifera	27.7	p[4]			129.9	46.8	17.0	23.2	29.2
Asplanchna sp.					2.45	0.88	0.44	0.04	0.19

[1] Site 5 (65°51.5'N, 73°25'W) was a shallow tundra pond like site 4. It had a 0.1 m secchi, was located nearby, and was probably chemically similar.
[2] Site 9 (66°26'N, 77°45'W) had a secchi of 5 m. It was situated on similar strata and was probably chemically similar to sites 11 and 12.
[3] numbers in brackets indicate percent of the total catch for species caught in non-quantitative surface hauls.
[4] rotifers present.

Bernier 1982, 1983, 1984). These high values are probably due to leaching from the marine sediments, perhaps supplemented by the aerial transport of marine salts by winds from Foxe Basin.

Remarkable in all of the systems sampled were the high total dissolved phosphorous concentrations, 9 to 52 $\mu g \cdot L^{-1}$, relative to systems further to the north on Baffin Island, 4 to 8 $\mu g \cdot L^{-1}$ (Stewart and MacDonald 1981), and elsewhere in the Canadian Arctic which generally range from 4 to 20 $\mu g \cdot L^{-1}$ (Stewart and MacDonald 1981; Stewart and Bernier 1982, 1983, 1984). Total dissolved nitrogen and dissolved organic carbon were also present in moderate to high concentrations relative to other lakes in the Canadian Arctic.

AQUATIC INVERTEBRATES

Zooplankton

Seventeen species of crustacean zooplankton were caught during the survey, 3 calanoids, 4 cyclopoids, and 10 cladocerans (Table 3; Appendix 4, Table 16). Six of the species are pelagic and the remainder are littoral.

Lakes on southern Baffin Island are characterized by the presence of six pelagic species, *Diaptomus minutus*, *Cyclops scutifer*, *Daphnia longiremis*, *Bosmina longirostris*, *Chydorus sphaericus*, and *Holopedium gibberum*. The first three species were common in all of the lakes sampled (sites 1, 2, 6, 8, 9, 11, 12), while the others were caught less frequently and in smaller numbers (Table 3). *Cyclops scutifer* and *D. minutus* were the dominant species, with the former most numerous in samples from larger deeper lakes on Foxe Peninsula (sites 6, 8, 9, 11, 12) and the latter from small shallow lakes on sedimentary strata (sites 1 and 2). The same species are present and dominant in lakes on northern Baffin Island (Stewart and MacDonald 1981), eastern Baffin Island (Bushnell and Byron 1979), and in Nettilling Lake (Oliver 1964). *Bosmina longirostris* and *D. longiremis* were not found in any of the shallow lakes or ponds, and have not been found in lakes or ponds on the east side of Baffin Island (Bushnell and Byron 1979). Each of the six pelagic species is common in lakes on the territorial mainland, and only *D. minutus* and *H. gibberum* have not been found widely distributed in the Arctic islands (Stewart and Bernier 1982, 1983, 1984).

Other species that have been found in lakes on Baffin Island include pelagic *Daphnia rosea*, and the littoral species *Alonella nona*, *Cyclops capillatus*, and *Cyclops languidoides*, all from Nettilling Lake (Reed 1963, 1964; Oliver 1964), and *Cyclops magnus* from a lake on northern Baffin Island (Stewart and MacDonald 1981).

In the lakes, the number of pelagic crustaceans caught in quantitative vertical zooplankton hauls ranged from 7.6 to 38.4 individuals per liter of water filtered. These catches are similar to those from chemically similar lakes elsewhere in the Canadian Arctic (Stewart and Bernier 1982, 1983, 1984).

Shallow ponds contained the pelagic species D. minutus, C. scutifer, and C. sphaericus and a variety of littoral species including Eurytemora affinis, Diaptomus eiseini, C. capillatus, C. magnus, Cyclops vernalis, Daphnia pulex, Daphnia middendorffiana, D. pulex x middenforffiana, D. middendorffiana x pulex, Alona sp., and Eurycercus sp. (sites 4, 5, 17, and 19). Harpactacoids were present in some of the ponds. Bushnell and Byron (1979) also found Acroperus harpae, Alona guttata, and Macrothrix sp. in ponds on the eastern side of Baffin Island, near Broughton Island. Many of these species have wide but poorly known Arctic distributions (Reed 1963, 1964; MacDonald and Stewart 1980; Stewart and MacDonald 1981; Stewart and Bernier 1982, 1983, 1984).

Conspicuous by their absence from Baffin Island samples were Eubosmina longispina and Limnocalanus macrurus, both of which are present in lakes on nearby Melville Peninsula (Stewart and Bernier 1984).

Rotifers were present in the pelagic samples, sometimes in large numbers, and the large predatory rotifer, Asplanchna sp., was found in all of the deeper lakes (sites 6, 8, 9, 11, and 12).

Other invertebrates

A variety of aquatic and marine invertebrates which were not caught in plankton hauls were caught by other methods or found in fish stomachs (Appendix 3; Tables 13-15; Appendix 4, Table 16). Among them were the larger freshwater crustaceans Gammarus lacustris, Brachinecta paludosa, and Lepidurus arcticus; aquatic larvae, pupae, or nymphs of a variety of insects; and freshwater clams. All of these species are important fish foods and many had not been collected from this area before. In addition to their importance as food for fish, some species are also the intermediate hosts of a variety of fish parasites (Stewart and Bernier 1984). Parasitic invertebrate species are discussed in the fish sections, with the fishes they infect.

Conspicuous by its absence from the samples was the opossum shrimp Mysis relicta, a glacial relict species which is common in lakes on Melville Peninsula (Stewart and Bernier 1984).

FISH

The number of fish species in freshwater lakes on southern Baffin Island is greater than on northern Baffin Island, and is greater in coastal than in upland lakes (Appendix 2; Stewart and MacDonald 1981). Arctic charr Salvelinus alpinus, lake trout Salvelinus namaycush, Atlantic salmon Salmo salar, ninespine stickleback Pungitius pungitius, and threespine stickleback Gasterosteus aculeatus have all been reported caught in lakes on southern Baffin Island. Charr occur throughout the area in their anadromous or strictly fresh water forms. Ninespine and threespine stickleback are common in coastal lakes, up to elevations of 50 to 100 m, but the latter species may not be present on northern Baffin Island. Atlantic salmon have only been reported entering

Nettilling Lake (Peet pers. comm.) and in a lake near Cape Dorset (Labine pers. comm.; Plate 3). Lake trout have only been reported from the Hantzsch River on Baffin Island (Manning 1942) but no specimen was kept. Whereas charr and ninespine stickleback are well established on Baffin Island, the other species are near the northeastern edge of their ranges in the Canadian Arctic (Stewart and MacDonald 1981; Stewart and Bernier 1984).

Forty-five species of fish have been collected from coastal waters in or near the study area (Appendix 1). Two families in particular, the cods and sculpins, are both widely distributed and economically important. Greenland (Plate 4) and Atlantic cods which inhabit the saline waters of Soper and Ogac lakes, respectively, are the subjects of both scientific and economic interest.

Arctic charr

Distribution and abundance: Arctic charr occur throughout the fresh and coastal marine waters of southern Baffin Island (Appendix 2, Figs. 15 and 16). They inhabit virtually every body of fresh water that is not subject to winterkill, ranging from lakes near sea level with basins of sedimentary rock to lakes on the Shield over 600 m above sea level (Stewart and MacDonald 1981).

Anadromous Arctic charr utilize coastal marine waters and many coastal river systems in the study area (Appendix 2, Fig. 16). They migrate to salt water during ice break-up in late June or early July, spend the summer feeding at sea, and return upstream in late August or early September to overwinter in fresh water (Grainger 1953; Thomson 1957; Moore 1975b; Sopuck 1977; Dick and Belosevic 1981). In systems along the southern coast, where the vertical tidal range is up to 12 m, the main upstream migrations usually take place abruptly during the late August high spring tide (Hunter 1976; Kristofferson and Sopuck 1983; Akeeagok, Allen, Dahlke, Ikkidluak, H. and P. Kilabuk, Labine, Manning, and Noble pers. comm.). Young anadromous charr make their first seaward migration at age 5 to 7 years (Grainger 1953; Moore 1975b; Johnson 1980). While at sea, the charr can undertake migrations of over 500 km and do not always return to their natal rivers to overwinter (Gyselman 1984; McGowan and Peet pers. comm.). Coastal river systems used by anadromous charr have enough water during the summer to permit fish to move between their overwintering areas and the ocean. The overwintering areas are fresh water bodies, generally lakes, that do not winterkill.

Obstacles, such as strong rapids or small waterfalls, are often insurmountable to the charr and exclude anadromous charr from many of the coastal river systems. Steep coastlines limit the habitats available along the coasts of Hall, Meta Incognita, and Foxe peninsulas to a few low-lying coastal lakes. The Sylvia Grinnell River, situated on low-lying terrain at the head of Frobisher Bay, and the Koukdjuak River, on the Great Plain of the Koukdjuak, are two systems where the charr can penetrate well inland. Anadromous charr are excluded from most rivers on the Great Plain of the Koukdjuak by wide tidal flats, shallow river channels, and the dearth of suitable overwintering habitats.

Plate 3. Atlantic salmon caught by Adamie Ashevak at "Tariugajuk Lake" (64°26'N, 75°52'W) near Cape Dorset. (Photo credit G. Siemens, Cape Dorset, NWT)

Plate 4. Greenland cod caught at Soper Lake, near Lake Harbour. (Photo credit J. Reaburn, Lake Harbour, NWT)

Lake-dwelling charr, which remain in fresh water either by choice or because physical barriers prevent them from moving to and from the sea (landlocked populations), are the most widely distributed fish in the study area (Appendix 2, Fig. 15). They occurred in all of the freshwater, non-winterkill lakes that were sampled. Counts of their pyloric caeca ranged from 25 to 56, in the mid-range for other Arctic charr populations (Table 4; Scott and Crossman 1973; Johnson 1980; Stewart and Bernier 1984).

Lake-dwelling charr on southern Baffin Island, while numerous, were generally small. Catches of these charr per unit of sampling effort (100 m of gillnet set for 24 h) ranged from 19 to 112 fish weighing from 5 to 43 kg. They averaged 53 fish (standard deviation 32) weighing 17.6 kg (std. dev. 13.1). Other Arctic lakes with populations of lake-dwelling charr show a similar range of catch effort figures (Stewart and MacDonald 1981; Stewart and Bernier 1982, 1983, 1984). Higher catch effort statistics would be expected in systems with anadromous Arctic charr, particularly after they have returned to fresh water in the fall (Kristofferson and McGowan 1981).

Growth: Lake-dwelling charr grow slower and to a smaller maximum size than do anadromous charr in systems on southern Baffin Island (Table 5; Appendix 3; Grainger 1953; Thomson 1957; Moore and Moore 1974b; Kristofferson and McGowan 1981; Kristofferson and Sopuck 1983). Like lake-dwelling charr on Melville Peninsula and Southampton Island, those on southern Baffin Island show flexible growth and reproductive patterns (Stewart and Bernier 1984).

Individual lake-dwelling charr grew to lengths of 667 mm, weights of 2950 g, and lived up to 31 y (Table 5). Their condition factors seldom exceeded 1.0 and many individual fish were infected with many *Diphyllobothrium* spp. larvae, which gave a falsely positive impression of their actual condition. Anadromous charr in the area are generally in better condition, with condition factors greater than 1.0, and are infected with few *Diphyllobothrium* spp. larvae (Kristofferson and McGowan 1981; Dick and Belosevic 1981).

The growth patterns of individual charr affect the structure of lake-dwelling charr populations. In the survey area these populations had bimodal length-frequency distributions with one modal length class at 100 to 149 mm and another at 300 to 450 mm (Figs. 5-7). Because of variable growth rates, the ranges of ages within a given length class varied widely. Relative to populations on Melville Peninsula and Southampton Island, few charr in the smaller mode were mature (Stewart and Bernier 1984). The biology and significance of these small mature fish has been discussed by Stewart and Bernier (1984).

Reproduction: The age and size of fish at first maturity and first spawning vary with the fish's sex, lifestyle, and location on southern Baffin Island. On average, male charr mature at a younger age and at a smaller size than the females and the lake-dwelling charr mature at a younger age and at a smaller size than the anadromous charr. Lake-dwelling male charr caught during the survey were spawning at ages as young as 4 y and at lengths of only 102 mm, and females at 6 y and

Table 4. Counts of pyloric caeca from Arctic charr on southern Baffin Island.

Site # (Fig. 4)	6	7	8	9	10	11
Degrees north latitude	65°05'	64°42'	64°51'	64°26'	64°36'	63°40'
Degrees west longitude	76°06'	75°72'	76°41'	77°45'	76°03'	75°30'
Number of fish sampled	21	23	23	19	22	48
Mean number of pyloric caeca	39.0	36.0	32.6	34.1	38.4	38.0
Standard deviation from the mean	4.4	4.1	4.0	4.4	6.0	5.7
Range of caecal counts	33-49	29-45	25-40	26-44	28-56	26-53

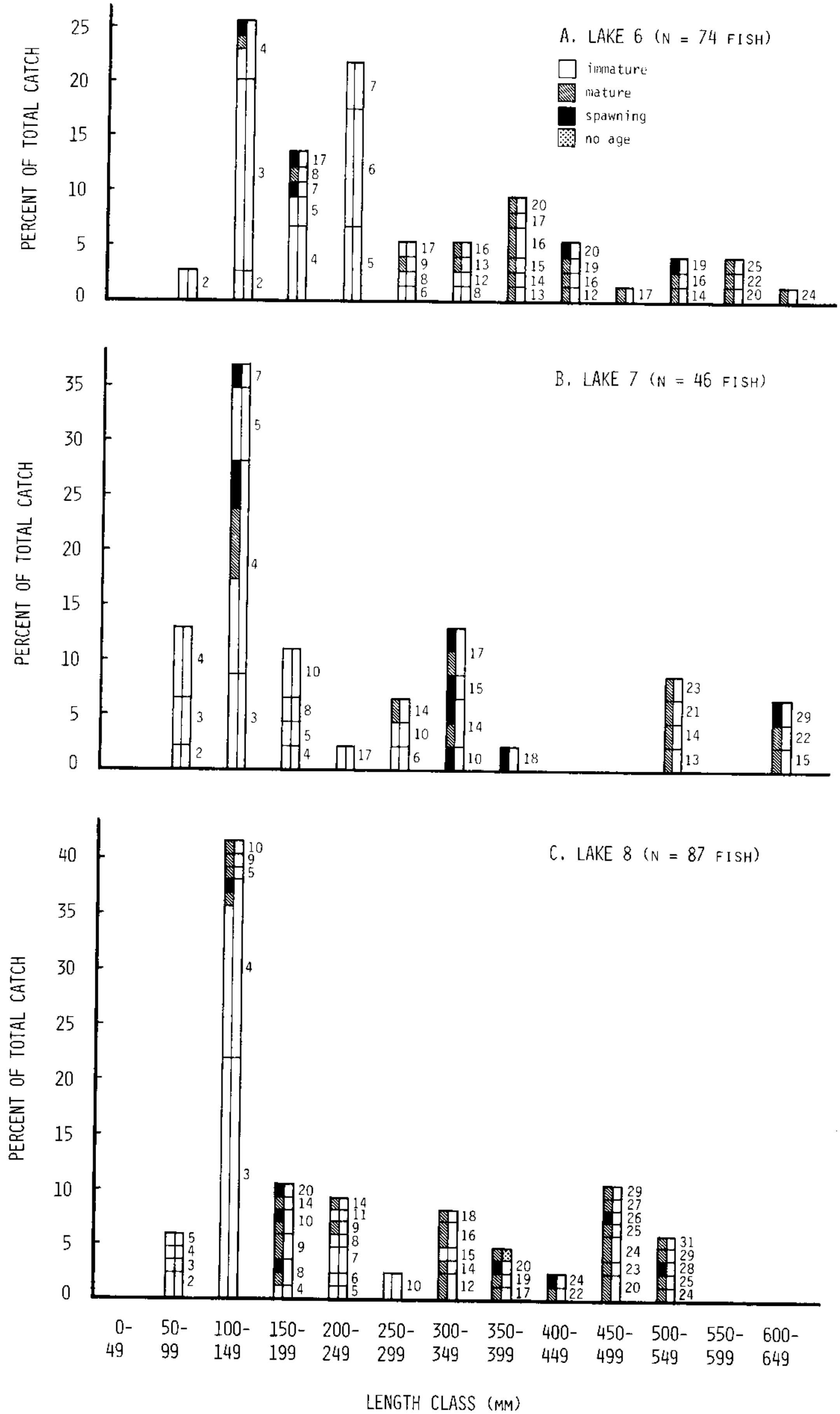


Figure 5a to c. Age frequency distributions by length class for Arctic charr populations from a) an unnamed lake, b) Tessik Lake, and c) Scarp Lake. The proportion of spawners, mature non-spawners, and immatures are shown for each age-length class.

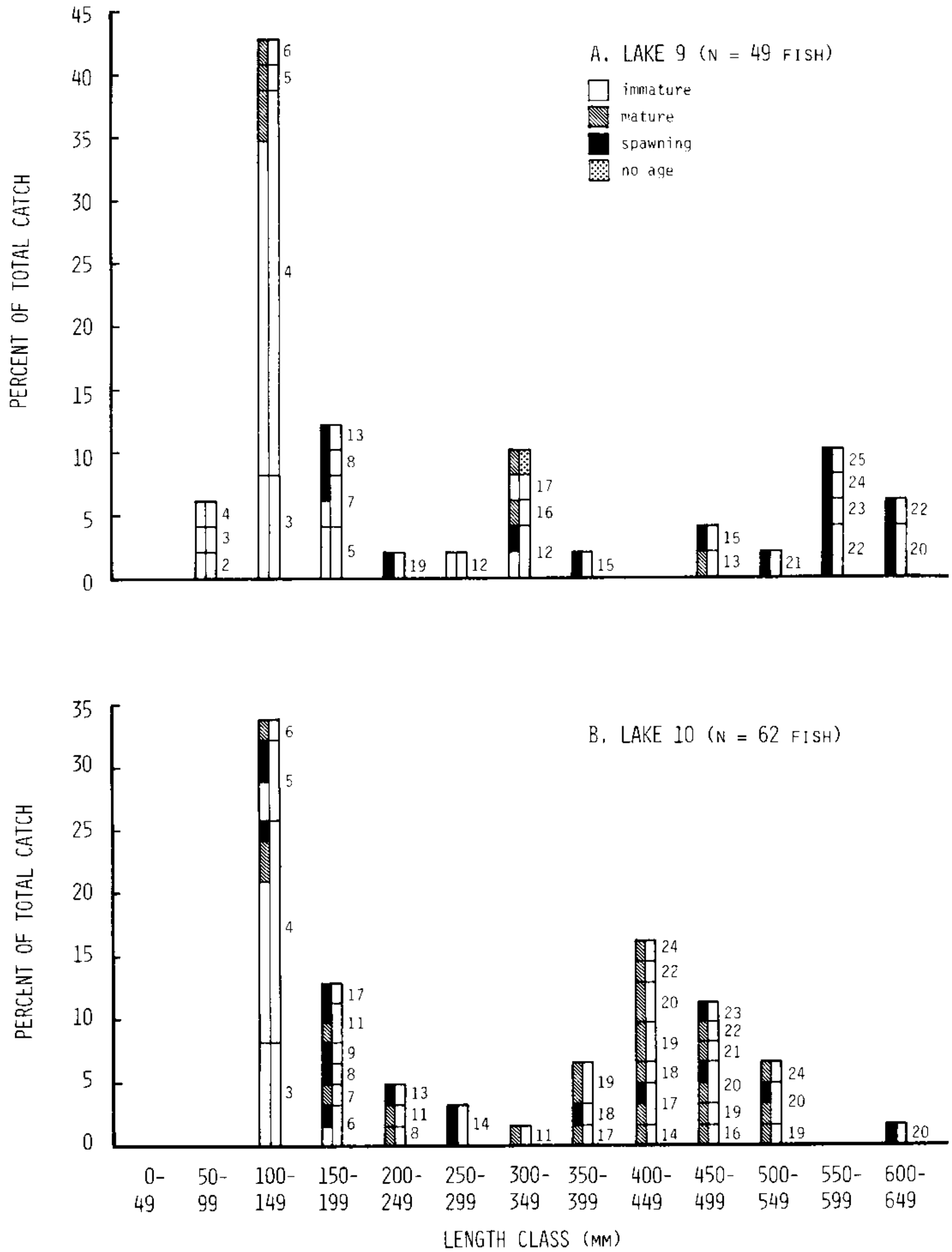


Figure 6a and b. Age frequency distributions by length class for Arctic charr populations from two unnamed lakes. The proportions of spawners, mature non-spawners, and immatures are shown for each age-length class.

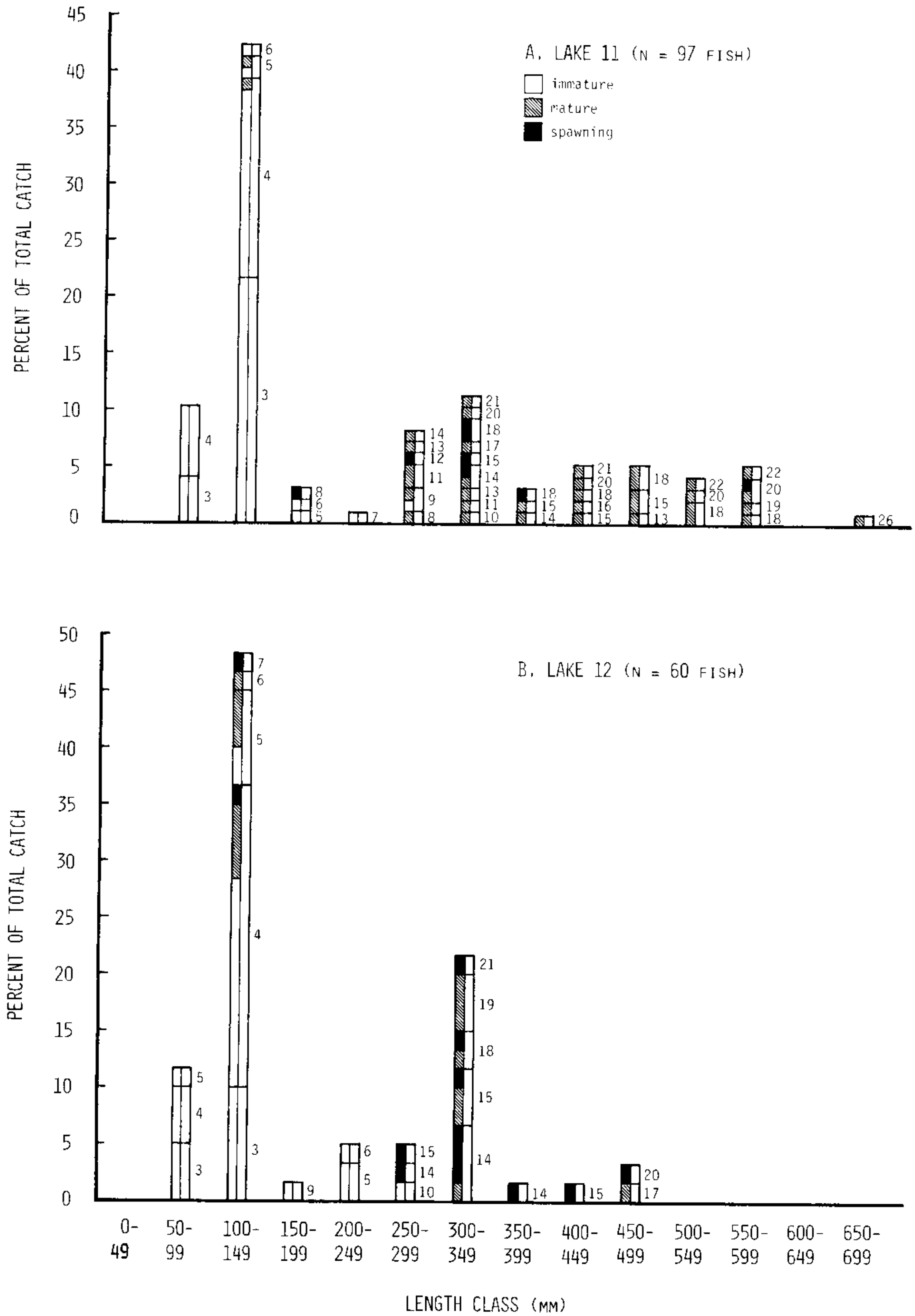


Figure 7a and b. Age frequency distributions by length class for Arctic charr populations from a) Kinguk and b) Neakok lakes. The proportions of spawners, mature non-spawners, and immatures are shown for each age-length class.

137 mm (Table 6; Appendix 3). Male charr from the mixed population in Nettilling Lake mature at ages of 7 y and females at 8 y, both at lengths of 200 to 245 cm (Thomson 1957). Anadromous charr from the Sylvia Grinnell River system mature at ages 10 to 12 years and lengths of 450 mm (Grainger 1953) and those in rivers on the east side of Hall Peninsula mature at ages of 10 y and lengths of 300 to 350 mm (Moore 1975a). These ages and sizes at maturation and first spawning have been observed across much of the Canadian Arctic (Johnson 1980; Stewart and Bernier 1984).

Sex ratios favoured males. For lake-dwelling charr sampled the ratios were:

	male	female	ratio M/F
immature	116	121	0.96
mature non-spawning	119	45	2.46
spawning	43	33	1.30
Totals	278	199	1.4

Reasons for the apparent preponderance of males in the lake-dwelling populations are unknown.

The charr do not spawn annually after reaching maturity. Only 32% of the mature lake-dwelling fish caught were in spawning condition. This intermittent spawning is a common feature of northern charr populations and also applies to the anadromous charr (Sprules 1952; Grainger 1953; MacCallum 1972; Johnson 1980; Stewart and MacDonald 1981; Stewart and Bernier 1982, 1983, 1984; MacCallum and Regier 1984). In general, egg and sperm production drains so much of the charr's energy reserves that it prevents them from spawning two years in succession (Dutil 1982, 1984). Small charr recover from this energy drain faster than larger charr, which may explain why the smaller charr spawn more frequently (Stewart and Bernier 1984). An individual charr might spawn as many as six or seven times if it matured at age 9 years and spawned every three years thereafter until the age of 25 years. Fecundity was much lower among small lake-dwelling female charr examined, which had egg counts ranging from 39 to 70, than among the large female anadromous charr, which had 3589 eggs on average at the Sylvia Grinnell River (Grainger 1953).

Charr which are host to large numbers of the cestode parasites Diphyllobothrium ditremum and D. dendriticum are seldom in spawning condition (Henricson 1978; Stewart and MacDonald 1981; Curtis 1984; Stewart and Bernier 1984). These parasites may pose such an energy drain on the charr that they can only spawn infrequently. This phenomenon was observed during the survey except for a lake (site 9) where 11 of 13 heavily infected charr caught were in spawning condition (Appendix 3, Table 13). Cannibalism may provide the food energy necessary for frequent spawning in this population.

Lake-dwelling charr began spawning in late August and continued into September (Table 6). Actively spawning charr were caught when the sampling began on August 19, and were present in populations sampled on September 1, when the sampling ended. Charr eggs were found in the stomachs of charr caught on August 19 (site 1) and September 1 (site 9,

Table 7). Spent charr were first caught on August 27 (site 12). Charr populations throughout the Canadian Arctic are fall spawners, some beginning in mid-August and others as late as mid-October (MacCallum 1972; Moore 1975a; Johnson 1980; Stewart and Bernier 1982, 1983, 1984; MacCallum and Regier 1984; Martin-Bergmann in prep.). Most populations have completed spawning by mid-October but some anadromous populations, like those in the lower reaches of the Jordan River, near Frobisher Bay (H. Kilabuk pers. comm.), and those in lakes near Chesterfield Inlet (Martin-Bergmann pers. comm.), only begin spawning at this time and continue until the end of October.

The majority of the charr were lake spawners since rivers in the study area are generally shallow and freeze solid in winter. Spawning charr have been observed in deep pools near the mouth of the Jordan River and there may be spawning in small deep pools where charr overwinter near the mouths of rivers at the heads of Balcom Inlet, Pleasant Inlet, and Waddell Bay (Fig. 1). Spawning takes place over areas of rock or gravel that are relatively free from detritus build-up and where water is deep enough that the eggs will not freeze (Johnson 1980), usually at least 2 m below the lake surface in southern Baffin Island. Moore (1975a) observed redd construction at systems which drained into Cumberland Sound. Charr began constructing the redds in the first week of September at depths of 1 to 11 m, in river or lake habitats, using coarse sand and gravel.

Following spawning, eggs remain in the gravel for about 180 days and hatch in late March and early April (MacCallum 1972; MacCallum and Regier 1984). Little is known about the fishes whereabouts immediately following hatch, but fry are abundant among pebbles in streams and along shallow shorelines during the summer months. Young anadromous charr generally make their first marine sojourn at age 5 to 7 years (Grainger 1953; Moore 1975b; Johnson 1980).

Diet: Arctic charr inhabiting freshwater and coastal marine habitats of southern Baffin Island are omnivorous opportunistic feeders (Grainger 1953; Thomson 1957; Moore and Moore 1974b; Dick and Belosevic 1981). They eat a variety of invertebrates, fish, fish eggs and plant material, and the large fish are more apt to be piscivorous or cannibalistic than the small fish. Similar feeding strategies and diets have been found in charr populations throughout the Canadian Arctic (Johnson 1980; Stewart and MacDonald 1981; McCart 1980; Stewart and Bernier 1982, 1983, 1984).

Aquatic insects, crustaceans, and fish formed the bulk of the diet of lake-dwelling charr which were sampled during the survey, in late August (Table 7, Appendix 3, Table 13). Chironomid and trichopteran larvae, the notostracan Lepidurus arcticus, and the large cladoceran Eurycercus sp. were particularly important food items for small charr. Large charr ate mainly fish or, in one case (site 6), the freshwater clam Sphaerium nitidum. Mysis relicta, the opossum shrimp, which is often an important item in the diet of charr in coastal Arctic lakes (Stewart and Bernier 1982, 1983, 1984), was conspicuously absent from the diet, suggesting that it may not be present in the lakes. The freshwater amphipod, Gammarus lacustris, also an important food item in many coastal Arctic lakes, was present in most of the lakes sampled but

Table 7. Diet of Arctic charr (Salvelinus alpinus) caught in the survey area (Fig. 4) during August and September, 1984.

	southern Baffin Island							
Sample site	1	6	7	8	9	10	11	12
Number of fish caught	14	74	46	88	49	62	97	60
Number of stomachs examined[1]	14	74	46	85	48	62	97	60
Number of stomachs empty	0	30	21	31	19	29	44	17
Food items								
Chironomidae	⬤	⬤	•	⬤	⬤	⬤	•	⬤
Diptera							·	•
Trichoptera			·	●	·	●	⬤	●
Notostraca	⬤	•	⬤	●	⬤	•	•	⬤
Amphipoda		•	●			·		·
Cladocera		·	●				⬤	·
Copepoda		·			·		·	·
Sphaeriidae	•	⬤	·	•		·		
fish eggs	●				●			
fish remains	●	●	⬤	⬤	●	⬤	●	●
algae balls	·	·	·		•	•	·	
digested remains							·	
Ostracoda		·	·	·	·	·	·	·
Acari			·			·	·	·
plant material					·			
pebbles			·					

[1] lab and/or field examinations.

Contribution to diet is ranked in order of importance from most important (⬤) to least important (·) and based on data presented in Appendix 3.

was seldom eaten. Small pelagic cladocerans, copepods, acarines, ostracods, and dipterans other than chironomids, contributed little to the charr diet.

Large and small charr ate the same invertebrate species but large charr also ate small charr, ninespine stickleback and threespine stickleback. Twenty-seven percent of the large charr had small charr or sticklebacks in their stomachs at the time of capture. Because the stomach contents represent only the previous day or two's diet, the number of cannibals among large charr was probably much greater. The smallest cannibal charr was 115 mm long and 5 years old and the smallest charr that had fed on stickleback was 99 mm long and 2 years old (Appendix 3, Table 13). Ninespine and threespine stickleback occur sympatrically with charr in the coastal lakes but they were found in few charr stomachs. During the summer months stickleback avoid the predations of larger fish by living in shallow stream and shoreline habitats. They are probably a more important prey item for the charr following freeze-up, when they are forced into deeper lake habitats.

Arctic charr, even a small spent female (site 9), ate eggs of their own species after spawning had begun in late August or early September. Algae balls (Nostoc sp.), which constituted the bulk of the plant material eaten by charr, were probably eaten by mistake because they resembled fish eggs in size and shape. While charr can digest eggs, they cannot digest algae balls which have been found intact in their lower intestines (Stewart and Bernier 1984).

Little is known about the winter diets of charr, but it appears that feeding during the winter is very limited. Charr caught through the ice of Arctic lakes in winter seldom have food in their stomachs (Martin-Bergmann in prep.).

Parasites: Seventeen species of metazoan parasites have been reported from the anadromous and lake-dwelling Arctic charr of southern Baffin Island (Thomson 1957; Mansfield 1958; Hunter 1961, 1964; Curtis 1979, 1984; Dick and Belosevic 1981). These parasites can be used to separate the anadromous from the lake-dwelling charr (Dick and Belosevic 1981). Particularly useful are Diphyllobothrium spp., Eubothrium salvelini and Proteocephalus longicollis, which are good indicators of a lake-dwelling lifestyle, and Brachyphallus crenatus, Prosorhynchus squamatus and Bothrimonus sturionis, which are good indicators of an anadromous lifestyle. These biological tags can provide a useful tool for fishery managers.

Lake-dwelling Arctic charr in the survey area were host to eleven species of metazoan parasites commonly found infecting fish of the genus Salvelinus. These included one species of trematode, five cestodes, one nematode, two acanthocephalans, and two copepods (Table 8; Appendix 3, Table 13). One other species, Schistocephalus solidus, is acquired by charr through their ingesting threespine and ninespine stickleback. Arctic charr are not normal hosts for this parasite and S. solidus can not survive in the charr. Cyathocephalus truncatus and Salmincola carpionis are new parasite records for Arctic charr from Baffin Island.

Table 8. Metazoan parasites of Arctic charr (*Salvelinus alpinus*) caught in the 1984 study area (Fig. 4).

Parasite	Sampling sites 1	6	7	8	9	10	11	12
TREMATODA								
Crepidostomum farionis (O.F. Müller, 1780) Lühe, 1909	●	●	●	●	●	●	●	●
CESTODA								
Cyathocephalus truncatus (Pallas, 1781) Kessler, 1868	●	●	●	●		●	●	●
Diphyllobothrium dendriticum[1] (Nitzsch, 1824) Lühe, 1910	●	●		●			●	●
Diphyllobothrium ditremum[1] (Creplin, 1825) Lühe, 1910	●	●	●	●	●	●	●	●
Eubothrium salvelini (Schrank, 1790) Nybelin, 1922	●	●	●	●	●	●	●	●
Proteocephalus sp.	●	●	●	●	●	●	●	●
Schistocephalus solidus[1,2] (O.F. Müller, 1776) Steenstrup, 1857			●					
NEMATODA								
Philonema agubernaculum Simon and Simon, 1936	●	●	●	●	●	●	●	●
ACANTHOCEPHALA								
Echinorhynchus sp.	●	●	●	●	●	●	●	●
Neoechinorhynchus rutili (O.F. Müller, 1780) Hamann, 1892			●			●		●
COPEPODA								
Salmincola carpionis (Krøyer, 1837) Wilson, 1915	●	●	●	●	●	●	●	●
Salmincola edwardsii (Olsson, 1869) Wilson, 1915	●	●	●	●	●	●	●	●

[1] plerocercoids.
[2] parasites acquired by ingesting sticklebacks.
● species present.

Infection rates were diet related, and the numbers of charr infected with parasites and of parasites per infected charr were low, except for Diphyllobothrium ditremum. Large lake-dwelling Arctic charr were commonly infected with many encysted D. ditremum plerocercoids (Appendix 3; Table 13). Heavy infections of 100 to 2000 or more plerocercoids per fish were related to the feeding of large charr on small infected charr and stickleback (Dick and Belosevic 1981; Curtis 1984). Two crustaceans which are commonly found on southern Baffin Island, Gammarus lacustris and Cyclops scutifer, are known vectors of eight of the species of parasites but contributed little to the charr diet in August (Table 7; Appendix 3; Table 13). Seven of these parasite species were common but present in small numbers. Two parasitic copepods S. carpionis and S. edwardsii, which do not require intermediate hosts, and the acanthocephalan Neoechinorhynchus rutili were also present in small numbers.

Henricson (1978) and Curtis (1984) suggested that heavy Diphyllobothrium infections decrease charr growth and spawning frequency and increase their mortality. Like charr populations on Southampton Island (Stewart and Bernier 1984), spawning frequency was low in the heavily infected charr from southern Baffin Island except at one lake (site 9). The flesh of heavily infected charr was soft and poor in quality.

In fish that were examined, the only parasite that could infect man was D. dendriticum (Jamieson and Freeman 1975; Freeman and Jamieson 1976). Although it has a holarctic distribution, the parasite is not as common in the Canadian Arctic as D. ditremum (Stewart and Bernier 1982, 1983, 1984; Curtis 1984). The usual method of human infection with D. dendriticum is by eating raw or poorly cooked fish which contain the encysted parasite. In recent years the incidence of infection in Canadian Inuit has decreased (Brown et al. 1948, 1950; Laird and Meerovitch 1961; Freeman and Jamieson 1976). However, this parasite still infects people on southern Baffin Island (Birch pers. comm.). Freeman and Jamieson (1976) considered D. dendriticum to be short-lived and of little consequence to the health of Inuit and suggested that the elimination of raw fish, which are an important source of Vitamin C, from the diet might do more harm than good.

Threespine stickleback

Threespine stickleback were caught or found in the stomachs of Arctic charr at four locations during the survey (Appendix 2, Fig. 18; Appendix 3, Table 14). They have only been reported from low-lying coastal lakes on southern Baffin Island, and the elevation of the highest lake where they were caught was only 60 m asl.

During the summer threespine stickleback inhabit shallow streams and shores where they are protected from the predations of charr and birds by rocks and vegetation. With the onset of winter, they are forced to return to deeper lake environments and presumably face increased predation pressure.

Specimens examined were feeding on chironomid larvae and pupae, a variety of crustaceans, freshwater clams, oligochaetes, and algae balls of the genus *Nostoc* (Appendix 3, Table 14). They were host to four species of larval metazoan parasites, *Crepidostomum farionis*, *Diphyllobothrium ditremum*, *Eubothrium salvelini* and *Schistocephalus solidus*, and to adult *Neoechinorhynchus rutili* (Table 9; Appendix 3, Table 14). These are the first North American records of *E. salvelini* and the first Arctic North American records of *N. rutili*, *C. farionis*, and *S. solidus* parasitizing threespine stickleback. Dick and Belosevic (1981) previously reported *D. ditremum* in threespine stickleback from Nettilling Lake. Johansen (1927c) reported a cestode, probably *S. solidus*, from the body cavity of threespine stickleback from Lake Harbour, Baffin Island.

Ninespine stickleback

Ninespine stickleback were caught or found in the stomachs of charr at five locations during the survey (Appendix 2, Fig. 19; Appendix 3, Table 13). All of the specimens were caught in low-lying lakes, the elevation of the highest lake being about 100 m asl (site 1). Soper (1928) reported catching them from a small mountain lake on Baffin Island located about 250 m asl. Like threespine stickleback, the ninespine stickleback spend the summer in shallow streams and along shallow shores.

Specimens examined were feeding on chironomids and copepods (Appendix 3, Table 16). They were host to three species of larval metazoan parasites, *D. ditremum*, *Proteocephalus* sp. and *S. solidus*, and to adult *N. rutili*. *Diphyllobothrium ditremum* has been found to parasitize ninespine stickleback from Nettilling Lake (Dick and Belosevic 1981), while this is the first Arctic North American record of *Proteocephalus* sp. parasitizing this host. Ninespine stickleback in Newfoundland and Ontario are known hosts to *Proteocephalus* sp. (Margolis and Arthur 1979), and those at Bernard Harbour, N.W.T., are host to *N. rutili* (Van Cleave and Lynch 1950). *Schistocephalus solidus* has been reported from ninespine stickleback at Bernard Harbour, N.W.T. (Cooper 1921), but has not previously been reported from the Canadian Eastern Arctic.

Marine fishes

Forty-five species of fish have been collected from coastal marine waters in or near the study area. Distributional information and references pertaining to them are given in Appendix 1 (Fig. 14, Table 12).

Fish doctor, Greenland cod, and sculpin fry of the genus *Myoxocephalus* were collected during the survey (Plate 4; Appendix 3, Table 15).

Greenland cod from Soper Lake grew to lengths of 602 mm, weights of 2370 g, and reached ages of at least 12 y (Appendix 3, Table 17; Fig. 8). They appear to spawn in April or May as L. Dahlke (pers. comm.) caught individuals in spawning condition in late March. The cod were eating a variety of marine crustaceans, polychaetes, and plant material and much of the material in their stomachs was digested beyond

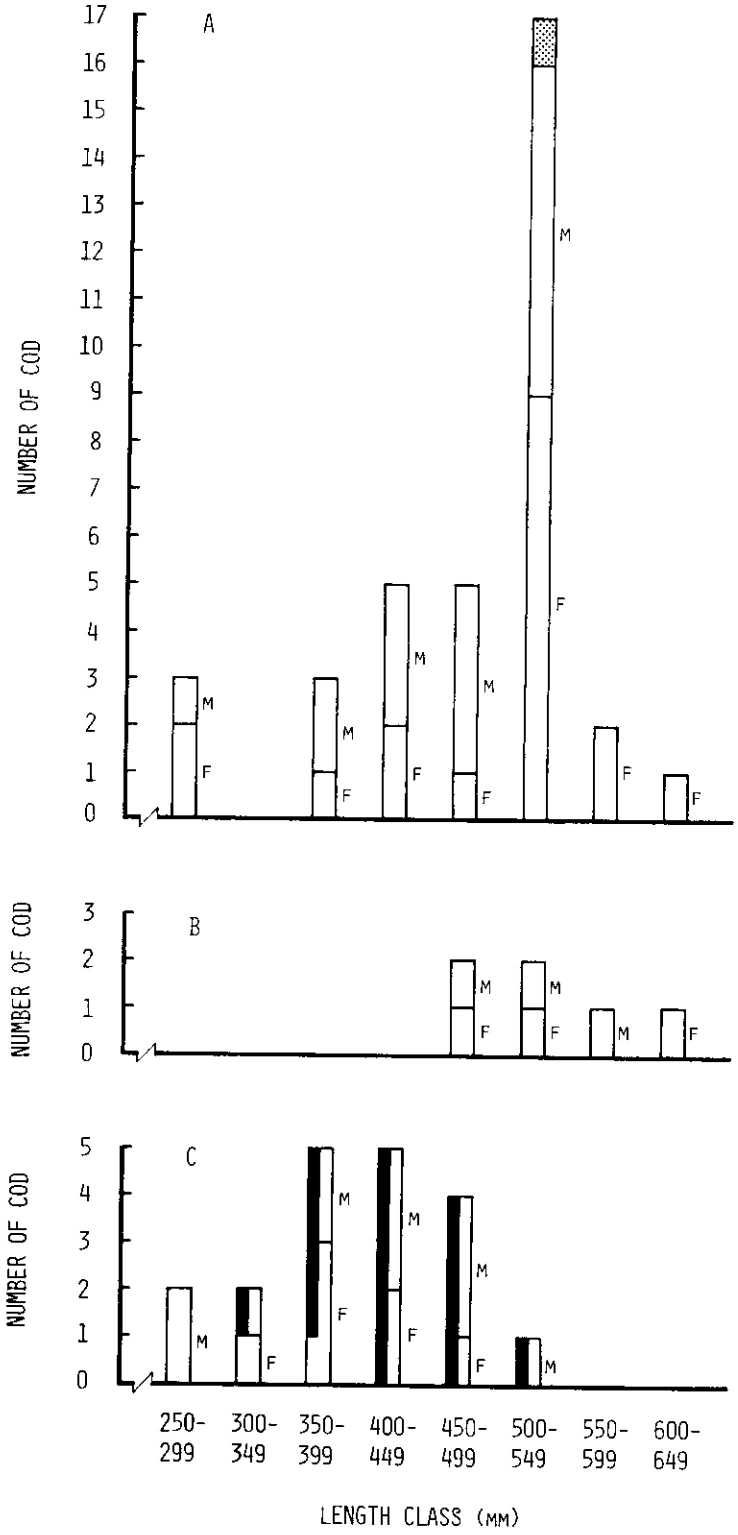


Figure 8a to c. Histograms of length frequency distributions for Greenland cod caught at Soper Lake, Baffin Island on a) 27 May 1984, b) in mid-July 1984, and c) on 24 February 1985, by L. Dahlke and J. Reaburn. Spawning male (M) and female (F) cod are shown in black. Stippling indicates fish whose sex was not determined. (February and May data courtesy of L. Dahlke).

identification. They were host to six species of metazoan parasites, Brachyphallus crenatus, Derogenes varicus, Pyramicocephalus phocarum (provisional identification), Contracaecum sp., an unidentified nematode, and Echinorhynchus sp. (Table 9). This appears to be the first North American report of B. crenatus, D. varicus, and Contracaecum sp. parasitizing Greenland cod. Echinorhynchus sp. has been reported from Greenland cod caught at Shepherd Bay, in the central Canadian Arctic (Stewart and Bernier 1983) and P. phocarum has been found to parasitize Greenland cod there (Stewart and Bernier unpublished data) and in the eastern Arctic (Wardle 1932).

DOMESTIC FISHING

Fish are an important food resource for residents of the study area (Fig. 1). They are a good source of protein that is inexpensive to obtain and can be stored, either dry or frozen, for future use. Fishermen concentrate their efforts on anadromous Arctic charr which are available in large numbers at predictable times and locations along the coasts and in coastal rivers and, together with lake-dwelling charr, are often abundant in inland lakes. The anadromous charr are larger, tastier, and freer from parasites than the lake-dwelling charr. Marine cods and sculpins are also caught on occasion and are eaten or fed to dogs.

There is domestic fishing near all of the communities in the area and further afield at their outpost camps, often in conjunction with the commercial fisheries. There is little overlap in fishing areas between communities, except where the fishery also serves as a meeting place for people from several communities. For example, people from all of the communities on southern Baffin Island will occasionally fish a lake at the head of Ptarmigan Fiord (64°35'N, 66°22'W) between March and May. The lake has a population of large anadromous charr, open water year-round near the outlet, and has been fished annually since 1981 (Akeeagok pers. comm.).

Fishing continues year-round, slowing only during freeze-up and in midwinter. Large numbers of fish are caught annually and the economic value of the catch is considerable (Table 10; Donaldson 1983, 1984; Pattimore 1983 a, b). Current catch estimates are probably conservative.

The areas fished vary seasonally with the movements of anadromous charr. In spring, May to mid-July, fishermen fish lakes with anadromous or healthy lake-dwelling charr, switching their efforts to the lake outlet streams and coastal river mouths when the rivers thaw and anadromous charr begin migrating to sea. In summer, mid-July to mid-September, they continue fishing along the coasts near river mouths until late August, when the charr return upstream, and then shift their fishing efforts to the lake outlet streams and overwintering lakes. In fall, mid-September to mid-November, and winter, mid-November to the end of April, fishermen concentrate their efforts on lakes where anadromous charr are overwintering. They also fish for lake-dwelling charr at inland lakes further afield, which they visit while hunting caribou.

Table 9. Metazoan parasites of threespine stickleback (Gasterosteus aculeatus), ninespine stickleback (Pungitius pungitius), and Greenland cod (Gadus ogac) collected in the 1984 study area (Fig. 4).

		Sampling sites					
Host	Parasite	1	2	7	10	14	15
G. aculeatus	TREMATODA						
	Crepidostomum farionis[1] (O.F.Müller, 1780) Lühe, 1909				●		
	CESTODA						
	Diphyllobothrium ditremum[2] (Creplin, 1825) Lühe, 1910			●			●
	Eubothrium salvelini[1] (Schrank, 1790) Nybelin, 1922				●		
	Schistocephalus solidus[2] (O.F.Müller, 1776) Steenstrup, 1857			●	●		●
	ACANTHOCEPHALA						
	Neoechinorhynchus rutili (O.F. Müller, 1780) Hamann, 1892				●		
P. pungitius	CESTODA						
	Diphyllobothrium ditremum[2] (Creplin, 1825) Lühe, 1910	●					
	Proteocephalus sp.[1]		●				
	Schistocephalus solidus[2] (O.F.Müller, 1776) Steenstrup, 1857	●					
	ACANTHOCEPHALA						
	Neoechinorhynchus rutili (O.F. Müller, 1780) Hamann, 1892	●			●		
G. ogac	TREMATODA						
	Brachyphallus crenatus (Rudolphi, 1802) Odhner, 1905					●	
	Derogenes varicus (O.F.Müller, 1784) Looss, 1901					●	
	CESTODA						
	Pyramicocephalus phocarum[2] (Fabricius, 1780) Monticelli, 1890					●	
	NEMATODA						
	Contracaecum sp.[1]					●	
	unidentified					●	
	ACANTHOCEPHALA						
	Echinorhynchus sp.					●	

[1] larval forms.
[2] plerocercoids; P. phocarum is a provisional identification after Wardle (1932).
● species present.

Table 10. Baffin Region Inuit Association estimates of the numbers of fish harvested by residents of communities and outpost camps in or near the study area in 1981 and 1982 (Donaldson 1983, 1984 Pattimore 1983a, b).

COMMUNITY or Outpost Camp	Fish Species	Year	Month												Total
			Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
CAPE DORSET	charr-SR[1]	1981	427	585	538	561	252	1364	4157	3198	95	52	25	133	(16237)
		1982	1195	601	405	395	439	1822	3239	1732	1098	671	327	475	12399
	-LL	1981	1					110	64		12	62	160		(419)
		1982	15	5	5	6	228	483	70		173	15		24	1024
	sculpin	1982						31	41	64					136
Aqiatululavik	charr-SR	1982	-[2]	274	123	37	-	-	-	-	-	-	500	-	934
Evalurdjuak	charr-SR	1982	-	-	-	-	-	-	-	-	-	85	-	90	175
	-LL	1982	-	-	-	-	-	-	-	-	-	140	-	30	170
Kangiqsukjuaq	charr-SR	1982				-	-	-				126	107	12	245
	-LL	1982				-	-	-				106	199	30	335
Shartowiktok	charr-SR	1982		24									60	15	99
	-LL	1982										116			116
FROBISHER BAY	charr-SR	1981			16	97	330	97	231	97	85	16			(969)
		1982[3]			153	172	313	288	535	573	513	308	67	1238	4106
	-LL	1981	113					2				162		1	(278)
	cod	1982					6	12	113						131
	sculpin	1982						2	4	68	29	5			108
Iqalugarjuruluit	charr-SR	1982					11	13	7	55	78	15			179
	sculpin	1982						24							24
Kuyait	charr-SR	1982						25	19	18	30				92
Minguqtuq	charr-SR	1982					31			31	-				62
	cod	1982						1							1
LAKE HARBOUR	charr-SR	1981	370			56	423	154	248	1011			212	560	(3034)
		1982	80	20	30	12	251	464	201	630	106	362	340	491	2987
	-LL	1981	23				34	86	2			22	300	15	(482)
		1982								3		33			36
	cod	1982	36	4	6	8	15		9		22	48	15	36	199
	sculpin									92	13				105
PANGNIRTUNG	charr-SR	1981	2450	1532	210	449	795		160	213		126	20	1340	(7295)
		1982	1678		917	853	1223	728	1276	910	335	329	726	1737	10712
	-LL	1982		1000											1000
	cod	1982												1	1
	sculpin	1982												36	36
Kipisa	charr-SR	1982		12	60			40					75	60	247
	-LL	1982		1	30								11		42
	cod	1982						6							6

[1] SR indicates anadromous Arctic charr, LL indicates non-anadromous Arctic charr.
[2] dash indicates that no data is available for that month, blank indicates data available but no fish recorded.
[3] Frobisher Bay 1982 data includes catches from Apex.

The systems fished depend not only on the presence of good fish, but also on the accessibility of the fishery. Fishermen travel to the fisheries by boat, plane, or all terrain cycle in summer, and by snowmobile during the remainder of the year. In winter, rough sea ice, thin snow cover, open water, and rugged terrain limit access. Cold temperatures, thick ice, and darkness also hamper fishing efforts. In spring and fall, ice and weather are unpredictable, although residents travel widely during both periods. In summer, strong tidal currents, high winds and waves, drifting sea ice, treacherous coastlines, and rugged terrain all hamper access to coastal fisheries. The lack of freshwater ice also makes it difficult to keep the fish fresh.

Fishing methods also vary with the seasons, either due to the location of the fishery, weather, or the species of fish being sought. Gillnets are used year-round. They are set from boats in the summer or under the ice using a jigger. Care must be taken to avoid damage to them from tidal currents and drifting ice, and to avoid freezing them into the ice. Jigs are seldom used in summer, except to catch marine cod and sculpin, but they are used throughout the remainder of the year, either with hooks attached or simply as a lure to attract fish to a hole cut in the ice where they can be speared with a leister. Spears are also used in late spring and summer to catch migrating anadromous charr which are trapped at rock weirs as they swim up or downstream. Angling, with rod and reel, is a popular summer pastime, and treble hooks are sometimes used to snag anadromous charr that congregate at river mouths in late summer.

Cape Dorset

Fishermen from Cape Dorset range along the southern coast of Baffin Island from Enukso Point in the west to White Bear Bay in the east (Higgins 1968; Kemp 1976; Labine pers. comm., 1984; Manning pers. comm.). They concentrate their fishing efforts on coastal lakes or along the coast near the lake outlets. Travel difficulties, such as high winds, shallow shores, high tides, and drifting pack ice, limit summer boat travel around the tip of Foxe Peninsula into Foxe Basin, and distance and rugged terrain hamper winter use of inland lakes to the east.

Most fish are caught between mid-June and the end of the first week of July, and in late August, as those are the times when anadromous charr are migrating to and from the sea via small streams and are easy to catch (Table 10). Anadromous charr are the preferred food fish and non-anadromous charr, which are often heavily parasitized and poor tasting in this area, are seldom eaten. Sculpin and marine clams are also harvested and eaten in the summer. Fish are an important food for Cape Dorset residents who have the largest reported domestic harvest on southern Baffin Island (Donaldson 1983, 1984; Pattimore 1983 a, b).

In the spring, anadromous charr are netted at Ihalukpiuk and Tessikakjuak lakes and in lakes north of Lonebutte Bay (64°31'N, 78°10'W; Fig. 9). They are jigged at lakes on the west side of Andrew Gordon Bay (64°26'N, 75°52'W; 64°29'N, 75°54'W) and west of Chorkbak Inlet (64°31'N, 74°45'W) in June and early July, trapped in mid- to late

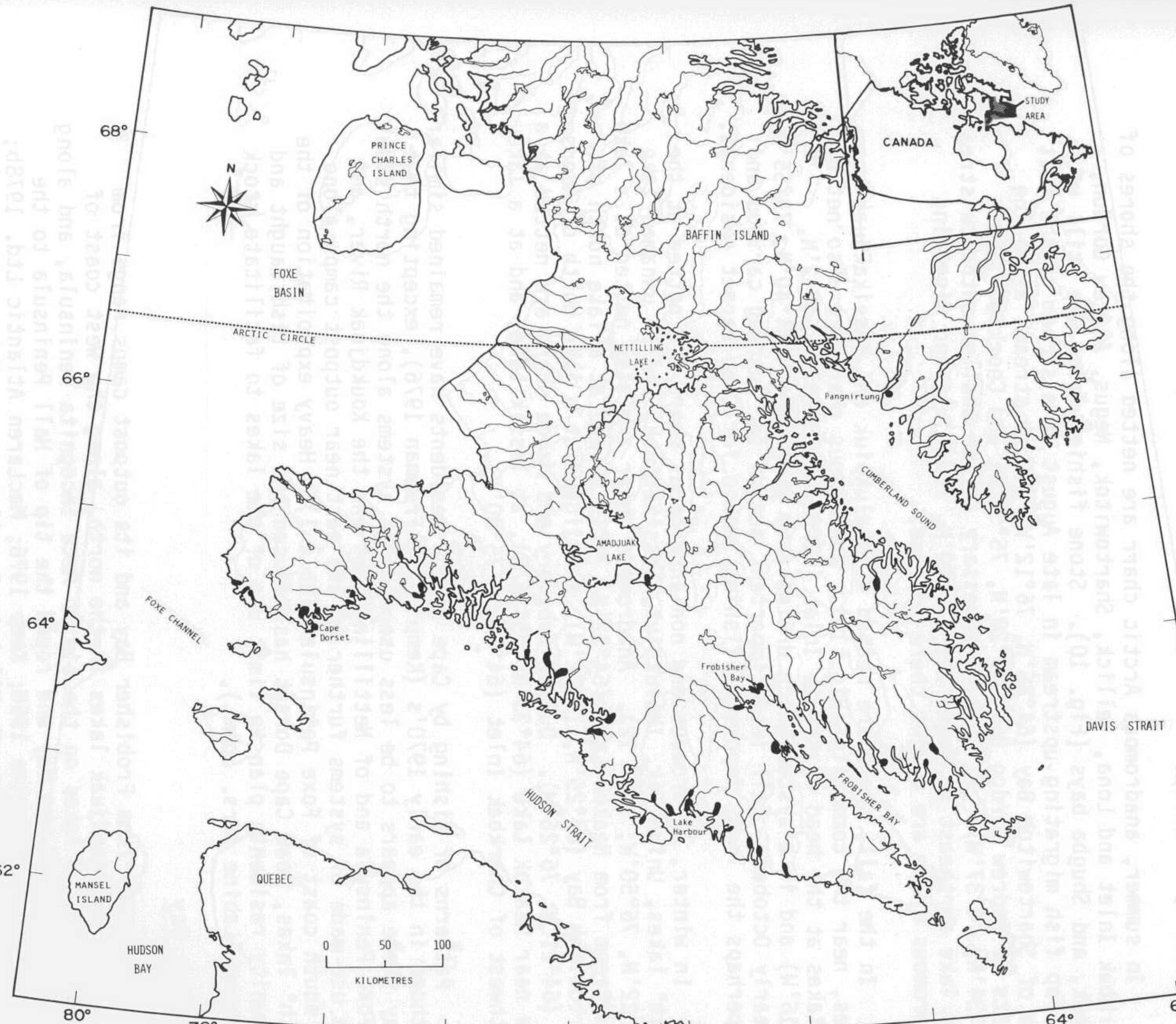


Figure 9. Areas visited in the spring, May to mid-July, by domestic fishermen.

June at a stone fishing weir on a stream which flows into the west side of Chorkbak Inlet (64°34'N, 74°37'W), and angled at the mouth of the Saunders River from late June until mid-July. In the spring non-anadromous charr are netted at a lake east of Schooner Harbour (64°26'N, 77°45'W), and caught with jig and spear at a lake east of Lona Bay (64°20'N, 77°15'W).

In summer, anadromous Arctic charr are netted along the shores of Chorkbak Inlet and Lona, Tellick, Shartowitok, Negus, Andrew Gordon, Shubuk, and Shugba bays (Fig. 10). Stone fishing weirs are still used to trap fish migrating upstream in late August at a stream on the west side of Shartowitok Bay (64°25'N, 76°12'W) and at streams along the coasts of Andrew Gordon Bay (64°29'N, 75°54'W) and Chorkbak Inlet (64°34'N, 74°37'W). No weir is necessary at the shallow entrance stream to a lake northeast of Negus Bay (64°19'N, 76°24'W), and migrating anadromous charr are caught there by hand.

In the fall, charr are netted at Ihalukpiuk and Tessikakjuak lakes, near the community (Fig. 11). Anadromous charr are also netted in lakes at the head of Keltie Inlet (64°39'N, 73°10'W; 64°42'N, 73°16'W) and in a system which drains into Shugba Bay (64°40'N, 73°55'W) in early October. Fall is an important season for hunting caribou and is perhaps the least important fishing season for Cape Dorset residents.

In winter, anadromous and non-anadromous charr are netted at the "Fish" lakes, Uningalik, Ihalukpiuk, Tessikakjuak, and an unnamed lake (64°22'N, 76°50'W; Fig. 12). Anadromous charr are also netted at a lake downstream from Neakok Lake (64°32'N, 75°15'W) and at a lake north of Shartowitok Bay (64°25'N, 76°12'W), and jigged at a lake north of Negus Bay (64°21'N, 76°26'W). During February and March charr are netted at a lake near Neakok Lake (64°33'N, 75°26'W), at Tessik Lake, and at a lake northwest of Chorkbak Inlet (64°48'N, 75°00'W).

Patterns of fishing by Cape Dorset residents have remained similar to those in the early 1970's (Kemp 1976; Freeman 1976), excepting that today there appears to be less use made of systems along the north side of Foxe Peninsula and of Nettilling Lake and the Koukdjuak River, and more use made of systems further to the east near outpost camps along the south coast of Foxe Peninsula (Table 1). Heavy exploitation of the "Fish" lakes, near Cape Dorset has reduced the size of fish caught and community residents plan to limit use of the lakes to facilitate stock recovery (Labine pers. comm.).

Frobisher Bay

Fishermen from Frobisher Bay and its outpost camps range from Nettilling and Amadjuak lakes in the north, along the west coast of Frobisher Bay to lakes on the tip of Meta Incognita Peninsula, and along the east coast of the bay and round the tip of Hall Peninsula to the Lemieux Islands (Higgins 1968; Kemp 1976; MacLaren Atlantic Ltd. 1978b; Akeeagok, Allen, Dahlke, H. Kilabuk, P. Kilabuk, and Noble pers. comm.). They concentrate their fishing efforts on coastal lakes and along the coast at lake outlets near the community and its outpost camps (Table 1). There is little winter fishing south of Grinnell Glacier, as

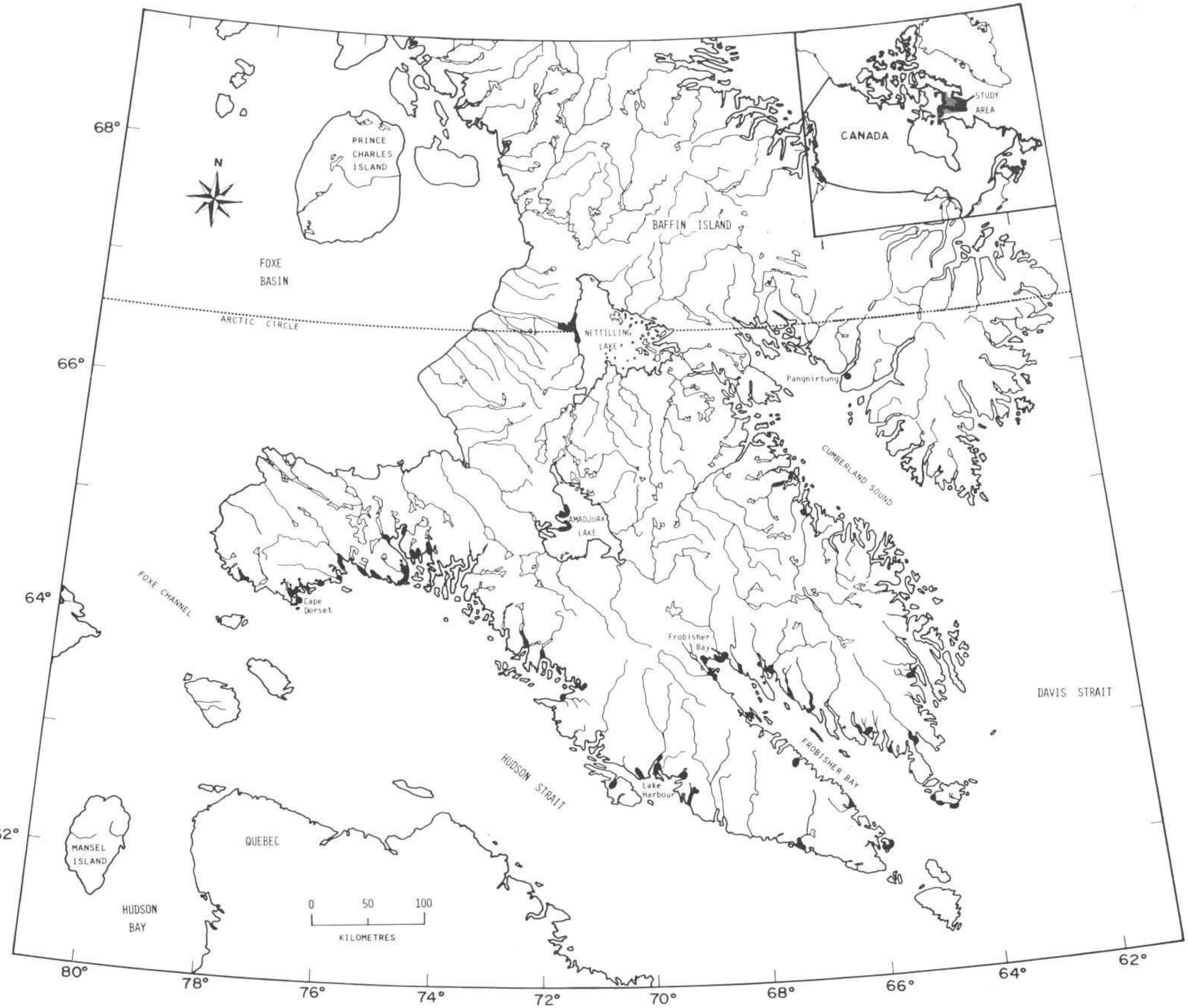


Figure 10. Areas visited in the summer, mid-July to mid-September, by domestic fishermen.

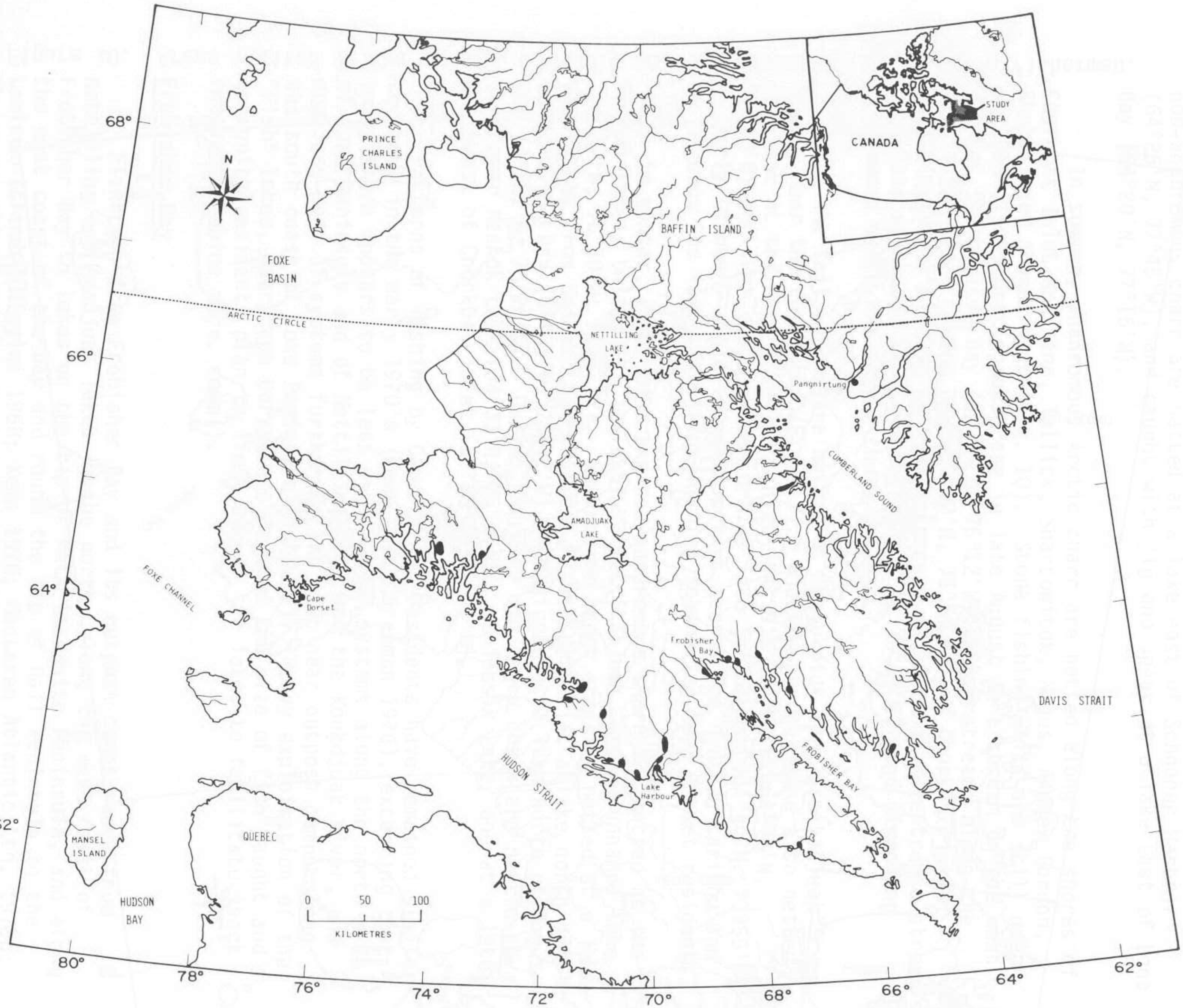


Figure 11. Areas visited in the fall, mid-September to mid-November by domestic fishermen.

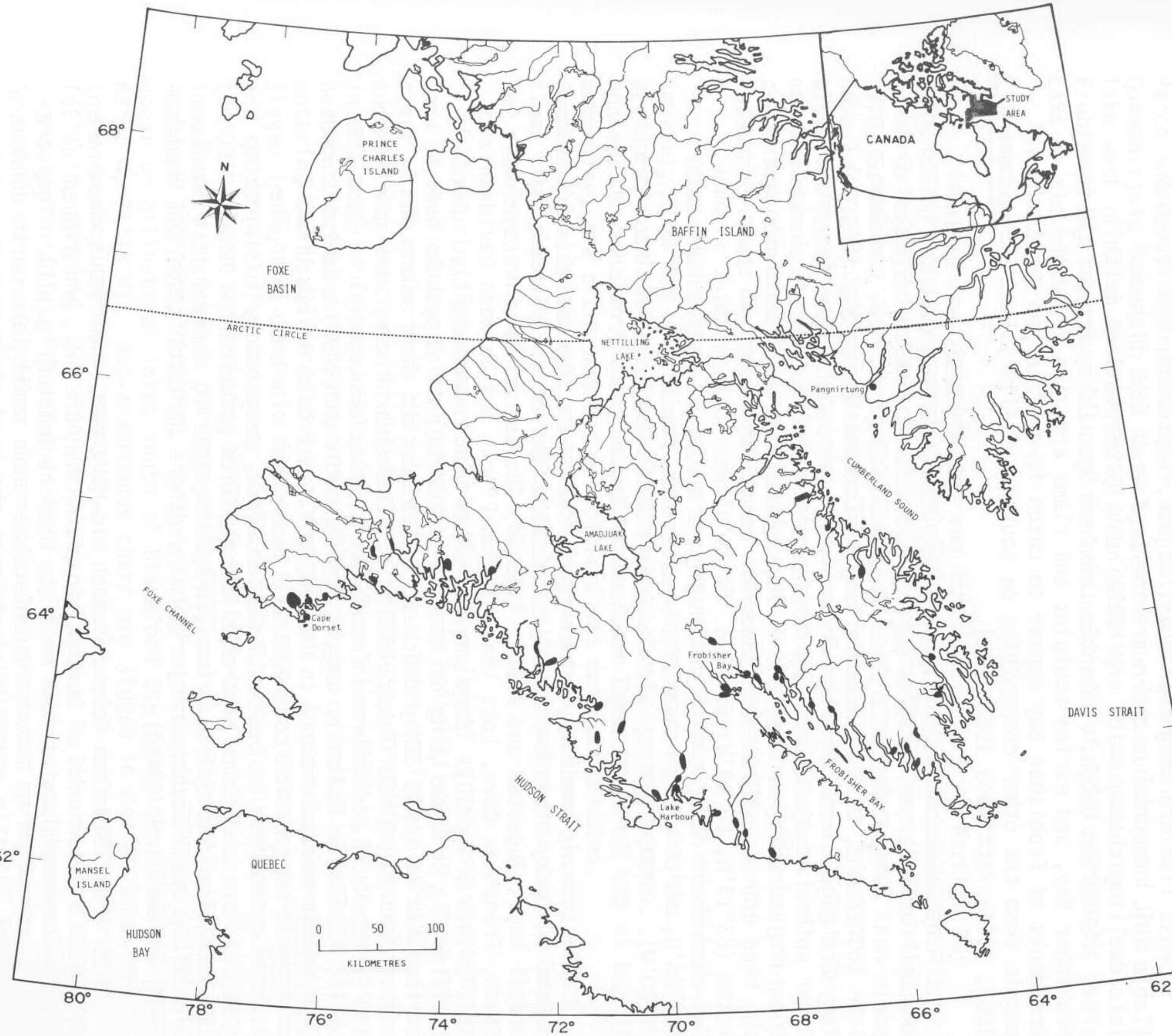


Figure 12. Areas visited in the winter, mid-November to the end of April, by domestic fishermen.

open water and steep shorelines restrict winter travel from Frobisher Bay; similarly, shallow coastlines, drifting sea ice, and poor weather restrict travel to Loks Land. Upland lakes which are difficult to reach and contain small landlocked fish are seldom fished.

Most fish are caught in July, August, September, and December (Table 10). Anadromous charr are the preferred food fish and lake-dwelling charr, which are often heavily parasitized in this area, are seldom eaten. Atlantic cod from Ogac Lake, Arctic cod from Frobisher Bay, and marine sculpins and clams are also harvested. Residents of Frobisher Bay appear to catch fewer fish per capita than people from the other communities on southern Baffin Island (Donaldson 1983, 1984; Pattimore 1983 a, b).

Many lakes and rivers that are fished in spring are also fished in the fall and winter. Anadromous Arctic charr are netted or jigged from pools near the mouth of the Armshow River in May and June, and from a lake (63°28.5'N, 67°23'W) at the head of Cormack Bay in May (Fig. 9). They are jigged near an area of open water near where the Nuvungmiut River enters Amadjuak Lake and at the river which enters and drains Quaminirjuaq Lake, in May, and in May and June at lakes east of, and at the head of, Wiswell Inlet. Charr are caught with jig and spear at two lakes (63°13'N, 68°16'W; 63°18'N, 68°18'W) near Jaynes Inlet in June. Non-anadromous charr are jigged in May at a lake on Barrow Peninsula (63°06'N, 66°25'W) and at a lake west on Anna Maria Port (63°46'N, 68°00'W). The latter may also contain anadromous fish. Arctic cod are jigged in the spring through cracks in the sea-ice of Frobisher Bay.

In summer, anadromous charr are netted near river mouths along the coasts of Foul, Wiswell and Koojesse inlets, Cornelius Grinnell and Wadell bays, Augustus and Potter islands, The Bay of Two Rivers, York Sound, Frenchman Cove, Loks Land, Newton Fiord, and between Davidson and Best points (Fig. 10). Some angling takes place concurrently. Several families fly to Nettilling or Amadjuak lakes in late August to hunt caribou and to fish. They catch anadromous Arctic charr along the western shores of both lakes, and in the Koukdjuak River, with gillnets and rod and reel. Fishermen from Frobisher Bay also travel to Ogac Lake to jig landlocked Atlantic cod in August, and catch marine sculpins with jigs and in coastal nets. In late August, just before high tide, anadromous charr which congregate at the mouths of rivers near The Narrows and on the east side of Newton Fiord, preparatory to migrating upstream, are snagged with treble hooks. This practice has been discouraged at the Sylvia Grinnell River because it damages fish stocks by killing small fish and injuring many others (Kristofferson and Sopuck 1983; Dahlke pers. comm.).

In the fall, from October until mid-November, anadromous charr are netted at a lake north of Burton Bay (63°45'N, 68°21'W), and jigged at lakes east of, and at the head of, Wiswell Inlet (Fig. 11). They are jigged and netted in November and December at a small lake north of Anna Maria Port (63°47'N, 67°55'W), a lake at the head of Cormack Bay, and from deep pools along the Sylvia Grinnell River (e.g. 64°02'N, 68°58'W).

In the winter, anadromous charr are netted in November and December at the lakes north of Burton Bay and at the head of Cormack Bay, and at the river west of The Narrows (Fig. 12). From January to March they are netted at a lake east of Newton Fiord (63°07'N, 66°07'W), and jigged in January at a river entering the head of Wadell Bay. In March and April anadromous charr are netted at Qualluatik and Quamanirjuaq lakes, in the river system of the latter lake, and in a lake west of Allen Island (63°29.5'N, 65°05'W). Fishermen from Frobisher Bay sometimes fish at the northwest end of Sylvia Grinnell Lake in the winter.

Lake Harbour

Fishermen from Lake Harbour and its outpost camp at Markham Bay range along the southwestern coast of Baffin Island from Amadjuak in the north to Pritzler Harbour in the south (Higgins 1967; Kemp 1976; Freeman 1976; S. Akavak, T. Akavak, Ikkidluak, Johnson, and Padluk pers. comm.). They concentrate their fishing efforts on coastal lakes or along the coast near lake outlets, seldom travelling inland to fish for non-anadromous charr in lakes on the rugged uplands. Strong tidal currents prevent netting and travel in some of the narrow fiords, and rotten or rough ice prevent fall and winter travel to Big Island.

Fish catches peak in August and again in December and are lowest in early fall and midwinter (Table 10). Anadromous charr are the preferred food fish and most fish are used for human consumption. Non-anadromous charr, particularly those from lakes north of the community, are often heavily parasitized and are seldom eaten. Greenland cod are caught at Soper Lake year-round and sculpin are caught along the coasts in August and September. Fish remain an important food for residents of Lake Harbour.

In spring, anadromous Arctic charr are jigged at lakes east of the head of Shaftesbury Inlet (62°46'N, 69°22'W; 62°39'N, 69°19'W), at a river which drains into the head of Barrier Inlet (62°36'N, 68°50'W), and at lakes northwest of Bruce Harbour (62°49'N, 70°16'W) (Fig. 9). In May, they are jigged below the falls on a river between Bruce and Beaumont harbours (62°53'N, 70°30'W) and jigged or netted at rivers entering the heads of Balcom and Wight inlets. Anadromous charr are jigged in May and June at a lake near Lake Harbour (62°49'N, 69°56'W), and caught with jig and spear at lakes near the head of White Bear Bay (64°00'N, 74°20'W; 63°53'N, 72°07'W), at Boas Lake and a lake immediately downstream (64°00'N, 74°19'W), and at a lake east of Amadjuak (64°04'N, 72°40'W). In June, they are caught with jig and spear or gillnets at lakes south of Blandford Bay (63°31'N, 71°17'W; 63°31'N, 71°15'W). Non-anadromous charr are jigged in May at lakes near the community (62°50'N, 69°53'W) and near the east arm of McKellar Bay (62°46'N, 69°22'W), and in June and early July at a lake on Big Island (62°44'N, 70°40'W). The latter lake may also contain anadromous charr. Greenland cod are jigged at Soper Lake throughout the spring and sculpin are jigged at ice edges along the coast in late spring.

In summer anadromous charr are caught along the coasts of Pleasant and Ava inlets and of Shaftesbury, White Bear, Blandford, and Markham bays. Nets are set below the low tide mark, sometimes in tidal pools (Fig. 10). Anadromous charr are also netted during the summer at the lakes northwest of Bruce Harbour, and in August at the lakes near the head of White Bear Bay, at Boas Lake and the lake downstream, and at the lake east of Amadjuak. In late August migrating anadromous charr are trapped at weirs on the outlet streams of a lake east of the head of Shaftesbury Inlet (62°37.5'N, 69°14'W) and at the head of White Bear Bay (63°53'N, 72°07'W). In July and August, sport anglers catch non-anadromous charr in lakes near the community (62°52'N, 69°44'W; 62°50'N, 69°53'W). They are also netted in early September at the lake on Big Island. Sculpin are caught in the summer either by hand at low tide, with jigs, or in coastal gillnets.

In fall, after freeze-up, anadromous charr are jigged from the Soper River, below the falls, and Greenland cod are jigged from Soper Lake (Fig. 11). Anadromous charr are also netted at the lakes northwest of Bruce Harbour and jigged at the river between Bruce and Beaumont harbours and occasionally, at a small lake south of Beaumont Harbour (62°55'N, 70°45.5'W). Gillnets or jig and spear are used in October to catch anadromous charr at a lake at the head of Pritzler Harbour, and in October and November at a lake south of Blandford Bay (63°31'N, 71°15'W). Non-anadromous charr are caught with jig and spear or with jigs by caribou hunters when they visit lake-like widenings of the Ramsay and Soper rivers in October and November.

In the winter, during November and December, fishermen catch anadromous charr with jigs at the lakes east of the head of Shaftesbury Inlet, with gillnets at a river which drains into Barrier Inlet, and with both net and jig in rivers at the heads of Balcom and Wight inlets (Fig. 12). Anadromous charr are also netted during December and January at the lakes at the head of White Bear Bay, at Boas Lake and the lake immediately downstream, at the lakes east of Amadjuak, and northwest of Ava Inlet (64°54'N, 72°00'W). Non-anadromous and anadromous charr are netted in the lakes northwest of Bruce Harbour, from December until March, and non-anadromous charr are caught with jig and spear at a lake east of Chudliasi Bay (63°17'N, 71°10'W) and in the Soper River in December. There is little fishing in February and March.

Pangnirtung

Residents of Pangnirtung's Kipisa outpost camp harvest anadromous and lake-dwelling Arctic charr and marine cod along the west coast of Cumberland Sound (Anders et al. 1966; Kemp 1976; Freeman 1976; MacLaren Atlantic Ltd. 1978b; Akeeagok, Dahlke, Noble pers. comm.). Anadromous charr are the preferred food fish and most of the fish caught are used for human consumption. In 1982, Kipisa residents harvested an estimated 247 anadromous charr, 42 non-anadromous charr, and 6 cod (Table 10).

Anadromous Arctic charr are harvested using nets and jigs nearly year-round at "Opingivik Lake" (Figs. 9-12). Fishing only stops briefly during the fall freeze-up. Anadromous charr are also harvested from a lake at the head of Ptarmigan Fiord (64°35'N, 66°22'W) between March and May. This lake serves as a meeting place for people from Lake Harbour, Cape Dorset, Frobisher Bay, and Pangnirtung who come to fish at the lake. In late August anadromous charr are netted and angled along the coast near the outlet to "Opingivik Lake" and occasionally near the outlet to a small lake west of Chidliak Bay (64°58'N, 66°54'W). The latter lake is also fished in March. Pangnirtung fishermen make some domestic use of fish caught during commercial fisheries in the McKeand River (65°30'N, 68°00'W) and Okalik Bay (64°01'N, 65°16'W) areas.

COMMERCIAL FISHING

Members of the communities of Cape Dorset, Frobisher Bay, Lake Harbour, and Pangnirtung all catch anadromous Arctic charr for commercial sale. Fishing provides a ready source of cash income for the fishermen, but at present the commercial fisheries only serve the communities on southern Baffin Island. Although fishing efforts continue almost year-round, most fishing occurs from March to May, through the lake ice, or in August and September, at or near coastal river mouths (Allen pers. comm.). Fishermen use 139 mm (stretched mesh) gillnets to catch the large anadromous charr (Manual of Fisheries Acts and Regulations 1984). The fish are frozen, either whole or gutted, or on rare occasions they are dried. Most fish are sold to community residents directly, marketed through community co-operatives or Hunters and Trappers Associations, or sold at the Frobisher Bay Hunters and Trappers Association Store. They are seldom exported to southern markets because fishermen lack the facilities necessary to process them properly for commercial sale, and because of high shipping costs. Commercial harvest records are often incomplete and tend to underestimate the catches because some fish are sold directly from fisherman to consumer.

Cape Dorset

In 1983-84, there were seven commercial fishing licenses issued to Cape Dorset residents (Labine 1984). These fishermen sell their catches to the West Baffin Eskimo Co-Operative or Hunters and Trappers Association in Cape Dorset for resale within the community. No catch statistics are available. In 1983 the Hunters and Trappers Association imported 1300 kg of anadromous Arctic charr from Pangnirtung and sold it in the community.

Only two lakes in the Cape Dorset area have records of commercial fishing (Fig. 13, Table 11). Both lakes drain into Shugba Bay (64°40'N, 73°55'W; 64°40'N, 73°47'W) and have quotas on commercially caught anadromous Arctic charr of 5500 and 2700 kg (round weight) respectively (Manual of Fisheries Acts and Regulations 1984). Both lakes have been fished sporadically since 1972, and in 1984-85 the commercial harvest from the lakes was an estimated 450 kg (Labine pers. comm.).

The community is interested in establishing new fisheries, and to this end have requested permission from the Department of Fisheries and Oceans to test the commercial potential of a number of lakes in the area (Yaremchuk and Wong 1984; Labine pers. comm.). Between 1977 and 1980, testing was planned but never undertaken at Tessikakjuak Lake, Ashuna Lake, and eight other lakes (64°26'N, 77°45'W; 64°24'N, 77°36'W;

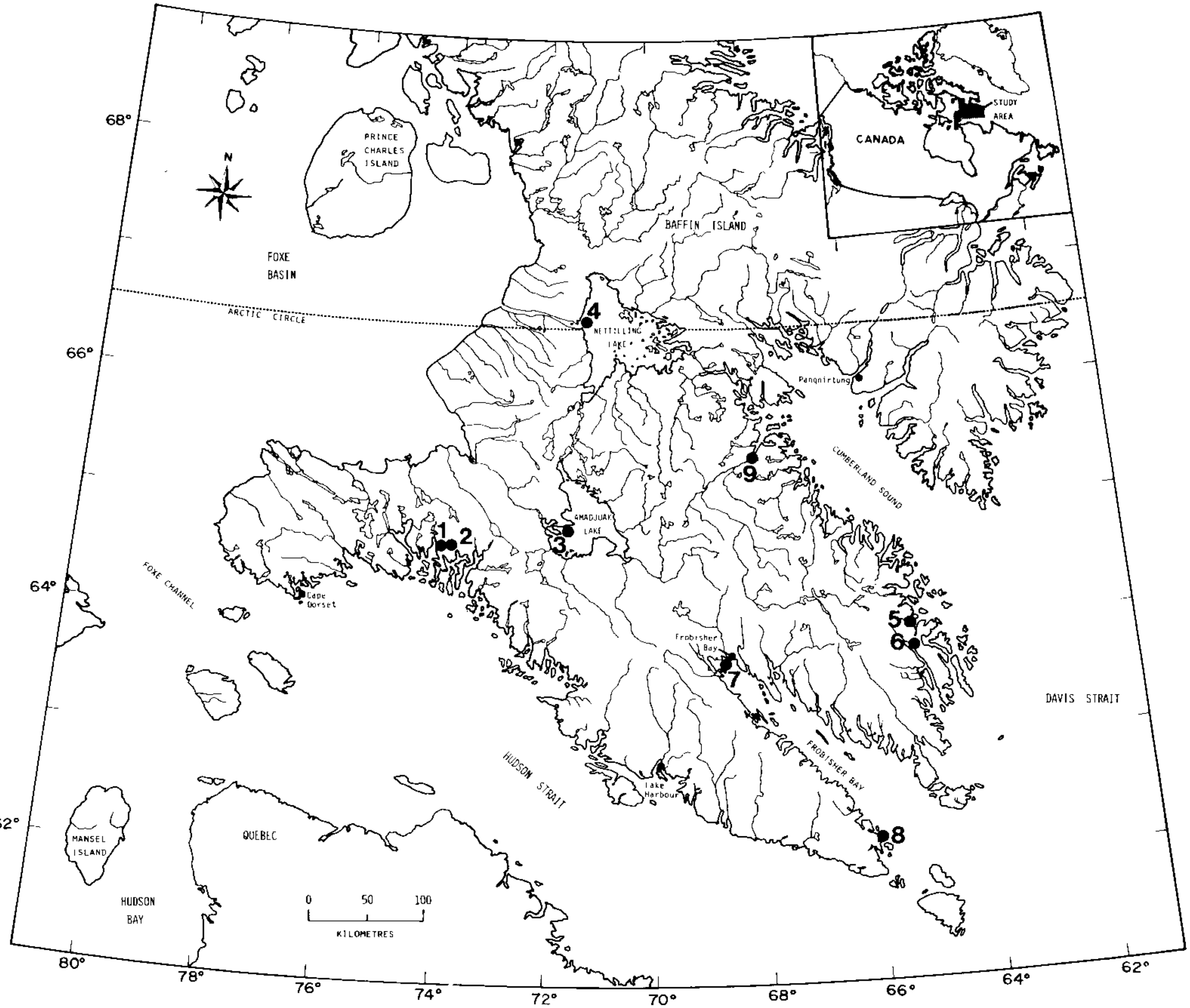


Figure 13. Sites in the study area where Arctic charr have been commercially harvested.

Table 11. Commercial fisheries in the study area with records of Arctic charr harvests and their 1984-85 production (Kristofferson and McGowan 1981; Kristofferson and Sopuck 1983; Manual of Fisheries Acts and Regulations 1984; Yaremchuk and Wong 1984; Akeeagok, Allen, Dahlke, P. Kilabuk, Labine, and Noble pers. comm.).

	Waters (Fig. 13)	Coordinates	Years fished	1984 (kg round weight)	
				Catch Quota	Production
	Cape Dorset				
1.	Approach Lake	64°40'N, 73°55'W	1972, 1978, 1979 1983, 1984	5 500	180∞
2.	Camp Lake	64°40'N, 73°47'W	1972, 1978, 1983, 1984	2 700	270
	Frobisher Bay				
3.	Amadjuak Lake	65°00'N, 71°00'W	1977, 1979, 1981	9 100	-
4.	Nettilling Lake	66°33'N, 71°20'W	1963-66, 1974-77	22 700	-
5.	Okalik Bay	64°01'N, 65°16'W	1978, 1981, 1983	1 400	617
6.	Qualluatik Lake	63°46'N, 65°07'W	1978, 1983, 1984	900	1 332
7.	Sylvia Grinnell River	63°44'N, 68°34'W	1947-66	-	-
8.	Unnamed Lake	62°11'N, 66°00'W	1959-66, 1978	-	-
	Pangnirtung				
9.	Irvine Inlet - McKeand River	65°30'N, 68°00'W	1977, 1979, 1981, 1984	4 500	2 411

∞Cape Dorset production figures from Labine (pers. comm.), Frobisher Bay and Pangnirtung from Dahlke (pers. comm.).

64°20'N, 76°46'W; 64°00'N, 72°20'W; 64°09'N, 72°38'W; 64°05'N, 72°17'W; 64°38'N, 73°09'W; 64°34'N, 74°55'W). During that time period three other lakes were tested (64°40'N, 73°20'W; 64°42'N, 73°16'W; 64°39'N, 73°10'W) and yielded anadromous Arctic charr (Yaremchuk and Wong 1984; Dahlke pers. comm.). There are annual domestic fisheries at many of these lakes and none have been assigned commercial quotas. Testing of Neakok, Tessik, Eshulik, Kinguk, and two other lakes (64°35'N, 75°54'W; 64°31'N, 78°01'W) is planned for the winter of 1984-85 (Labine pers. comm.).

Commercial fishing for lake-dwelling charr in the large lakes on Foxe Peninsula is impractical because of the fish's small size, poor condition and taste, high levels of parasitism, and resultant low market value.

Frobisher Bay

Commercial fishing has a longer history at Frobisher Bay than elsewhere in the study area. It began in 1947, when the Shaw Steamship Company harvested anadromous Arctic charr from the estuary of the Sylvia Grinnell River, and progressed to include an extensive assessment of the commercial potential of Nettilling Lake. The present fishery operates on a small scale and Arctic charr from Pangnirtung, Hall Beach and Igloolik, and Greenland cod from Lake Harbour, are imported to Frobisher Bay for sale at the Hunters and Trappers Association Store. Some charr are also sold by the Hudson's Bay Company.

Commercial fishermen have harvested anadromous Arctic charr from the Sylivia Grinnell River system on and off since 1947 (Grainger 1948, 1953; Wright 1950; Hunter 1958, 1965, 1976; Kristofferson and Sopuck 1983). Fishing takes place in the estuary adjacent the river mouth and was initiated by the Shaw Steamship Company who removed large quantities of charr in 1947, 1948, and 1950. During these early commercial fishing efforts, nets were also set in Koojesse Inlet, the Bay of Two Rivers, and Foul Inlet. Between 1951 and 1957 there was only subsistence and sport fishing at the Sylvia Grinnell River but, in 1958, the Department of Indian Affairs and Northern Development re-established the commercial fishery and set an annual harvest quota of 4500 kg (round weight). From 1958 to 1962 this quota was filled quickly and fishing was good, however, the returns declined thereafter until, in 1966, the commercial fishery closed. Since then, the returns on fishing effort have remained low and the fish small.

In 1976 and 1977, Department of Fisheries and Oceans researchers studied the Sylvia Grinnell charr population (Kristofferson and Sopuck 1983). They found that the size and age composition of the population had declined considerably since earlier studies (Grainger 1953; Hunter 1958) and concluded that subsistence and sport fishing efforts were probably sufficient to prevent recovery of the charr stock to commercially viable levels. To facilitate recovery they recommended closure of the river to all types of fishing from the head of the falls to a point at least 100 m downstream. Since 1983 the river has been closed to all fishing from the head of the falls to a point 25 m downstream (Dahlke pers. comm.). With local co-operation this has virtually eliminated snagging, a practice which harvests large numbers of small fish and injures others, and should speed stock recovery.

Commercial fishing at Nettilling Lake began with a series of test fisheries which were conducted between 1963 and 1966, by the Department of Indian Affairs and Northern Development (Budgell 1967). While catches of anadromous Arctic charr were good, the fishery was not economically viable at that time. A second series of test fisheries was conducted between 1974 and 1977, by the GNWT Fish and Wildlife Service and the federal Fisheries and Marine Service (Sopuck 1977; Dick and Belosevic 1981), with the result that the lake was assigned a commercial quota of 22700 kg (round weight; Manual of Fisheries Acts and Regulations 1984). Fishing takes place near a fishing camp located at the outlet to Nettilling Lake on Niko Island (66°31.5'N, 71°32'W) in the Koukdjuak River. Anadromous charr are netted as they return upstream to the lake in late August and September. In 1977, commercial fishermen from Frobisher Bay harvested 24700 kg of charr (Fig. 13, Table 11). Nettilling Lake has not been harvested commercially since then, but it may be harvested in 1985-86 with support from the GNWT Department of Economic Development (Dahlke pers. comm.).

There are quotas on commercially caught anadromous Arctic charr of 9100 kg (round weight) at Amadjuak Lake, 700 kg at Qualluatik Lake, and 2300 kg in the Newton Fiord area (63°07'N, 66°07'W; Fig. 13, Table 11; Manual of Fisheries Acts and Regulations 1984). Amadjuak Lake was fished in 1977, and from 1979 to 1981 (Yaremchuk and Wong 1984). In 1981 the combined commercial harvest of lake-dwelling and anadromous charr was 2200 kg. The quota at Qualluatik Lake was met in 1978 and again in 1984. There is no record of commercial fishing in the Newton Fiord area, which is an important domestic fishery.

Between 1978 and 1984, sixteen lakes were test netted to assess the commercial fishing potential of their Arctic charr populations (Yaremchuk and Wong 1984; Akeeagok, Allan, Dahlke and Noble pers. comm.) There were no fish caught in ten of the lakes (63°44'N, 64°56'W; 63°40'N, 64°33'W; 63°34'N, 64°38'W; 63°12'N, 65°35'W; 63°49'N, 65°12'W; 63°55'N,65°18'W; 63°59'N, 65°34'W; 63°28.5'N, 64°34'W; 63°14'N, 65°09'W; 63°24'N, 65°45'W) and few were caught in four others (63°08'N, 64°58'W; 63°18'N, 65°38'W; 62°11'N, 66°00'W; 62°10'N, 66°05'W). Netting generally took place in April or October and was very limited. That no fish were caught does not mean that fish are absent, more probably the populations were small landlocked fish which were not succeptible to capture in the large mesh commercial gillnets. Quamanirjuak Lake (63°15'N, 65°33'W) yielded more fish but they had a relatively high mortality rate, suggesting that the population was already being exploited by commercial fishermen (Kristofferson and McGowan 1981; Kristofferson and McGowan pers. comm.). Quotas were not assigned to any of these systems. A commercial quota of 3600 kg was assigned to Koukdjuak Lake (65°35'N, 71°27'W) in 1977, following successful testing in 1975 (Yaremchuk and Wong 1984). There is no record of fishing at the system since then, and the quota is no longer in effect.

Test fisheries were to be conducted at Mingo Lake and three other lakes (63°48'N, 64°52'W; 62°06'N, 66°11'W; 62°56'N, 65°35'W) in the

Frobisher Bay region (Yaremchuk and Wong 1984; Dahlke pers. comm.). None of these fisheries were conducted.

In addition to the anadromous charr fishery, Atlantic cod were fished commercially, by the Shaw Steamship Company ship "Arctic Sealer", at Acadia Cove, Resolution Island, between August 31 and September 8, 1950 (Wright 1950). Cod apparently entered the bay in late August to feed on shrimp. Over 2500 cod were caught by handline and jig, all of which were salted for sale in the south.

Small non-anadromous charr are less attractive than the larger anadromous fish, mainly due to their high levels of parasitism and resultant poor taste and condition. They are seldom sold commercially in Frobisher Bay.

Lake Harbour

Fishing at Lake Harbour is mainly domestic, there is little commercial fishing. There are quotas on commercially caught anadromous Arctic charr of 900 kg (round weight) at two rivers, one which flows into Blandford Bay (63°31'N, 71°15'W) and the other which flows into Markham Bay (63°26'N, 71°30'W). The former has been opened for fishing regularly since 1974, but there are no records of commercial fishing at either river (Manual of Fisheries Acts and Regulations 1984; Yaremchuk and Wong 1984).

In 1979 and 1980, test fishery permits were issued so that the commercial potential of anadromous Arctic populations near Lake Harbour could be assessed. Permits were requested for five locations: 62°49'N, 69°55'W; 62°39'N, 69°12'W; 62°37'N, 68°48'W; 62°24'N, 68°35'W; and 62°22'N, 68°23'W (Yaremchuk and Wong 1984). There is no record that the test fisheries were conducted and permits were re-issued for the latter two locations, and for an unnamed lake (62°15'N, 67°35'W), in 1984 (Dahlke pers. comm.).

A lake north of Wight Inlet (62°15'N, 68°14'W) was tested in 1984 and yielded 341 kg of Arctic charr (Dahlke pers. comm.). To date, no quota has been assigned to the lake.

Pangnirtung

Pangnirtung has an active commercial fishery which markets anadromous Arctic charr in Frobisher Bay. However, there is little fishing in the study area by Pangnirtung commercial fishermen. Fishing does take place in the Irvine Inlet - McKeand River area, which has a quota of 4500 kg (round weight) on commercially caught anadromous Arctic charr (Fig. 13; Table 11; Manual of Fisheries Acts and Regulations 1984; Yaremchuk and Wong 1984; Akeeagok, Dahlke and Noble pers. comm.). The area was fished in 1977 and 1979, and has probably been fished annually since 1981. In 1984, fishermen from Pangnirtung harvested 2411 kg of charr from the area. Fishing takes place between December and May and fishermen probably use some of their catch for domestic purposes.

Between 1977 and 1980, test fisheries were conducted at "Ikaluit" (65°02'N; 67°07'W) and "Opingivik" (65°14'N, 67°22'W) lakes (Kristofferson and McGowan 1981; Yaremchuk and Wong 1984). Anadromous Arctic charr were caught at both lakes but, as they are also domestic fisheries, neither lake was assigned a commercial quota (Manual of Fisheries Acts and Regulations 1984). Another lake west of Brown Inlet (65°26'N, 67°38'W) was harvested in 1972 and was assigned a test quota in 1978. It was not tested, or assigned a commercial quota.

SPORT FISHING

Residents of the communities on southern Baffin Island and visitors to the area catch Arctic charr and Greenland cod for sport. In the spring and fall they catch lake-dwelling and anadromous charr through the lake ice using jigs. In summer, anadromous charr are angled at river mouths near the communities and lake-dwelling and anadromous charr are angled at nearby lakes. Greenland cod are jigged at Soper Lake throughout the spring, summer, and fall.

Popular sport fisheries near Cape Dorset are the "Fish" lakes and lakes and rivers between the community and Andrew Gordon Bay. People at Frobisher Bay angle near the mouth of the Sylvia Grinnell River and sometimes fly to Nettilling Lake, York Sound, or a lake at the head of Ptarmigan Fiord (64°35'N, 66°22'W) to catch anadromous charr. Clams and mussels are also collected and eaten by some residents of Frobisher Bay (Dahlke pers. comm.). Lake Harbour residents jig for cod in Soper Lake and angle lake-dwelling charr from lakes within walking distance of the community. Sport fishermen from Pangnirtung seldom cross Cumberland Sound to fish in the study area.

There are no commercially operated sport fishing camps in the study area, although Peyton Lodge in Pangnirtung does operate a camp nearby, on Clearwater Fiord at the head of Cumberland Sound. There are commercial outfitters in each of the communities who will take people sport fishing (Government of the Northwest Territories 1985). Most sport fishing on southern Baffin Island is done near Pangnirtung, where there are good populations of large anadromous charr.

SUMMARY

Samples of water and aquatic and marine biota were collected between 7 August and 10 September 1984, from southern Baffin Island. Sampling efforts were concentrated on The Great Plain of the Koukdjuak, Foxe Peninsula, and near the communities of Lake Harbour and Frobisher Bay.

Lakes throughout the area are oligotrophic and probably cold monomictic. They have short open water seasons with ice on most lakes and rivers breaking up in June and forming again in early October. On The Great Plain of the Koukdjuak the lakes are shallow and winterkill and the streams are seasonal. Water in the lakes sampled was alkaline, with conductivities below 260 $\mu S \cdot cm^{-1}$ except on The Great Plain of the Koukdjuak where the conductivity was very high. Calcium was the major ion contributing to the conductivity except on the plains, where sodium and chloride were the major contributing ions. Total dissolved phosphorus concentrations ranged from 9 to 52 $g \cdot L^{-1}$.

Populations of pelagic crustacean zooplankton in lakes on southern Baffin Island are characterized by the presence of *Diaptomus minutus*, *Cyclops scutifer*, *Daphnia longiremis*, *Bosmina longirostris*, *Chydorus sphaericus*, and *Holopedium gibberum*. *Cyclops* was the most numerous genus in samples from deeper lakes, *Diaptomus* was numerous in shallow lakes, and the ponds harboured a variety of littoral species. Conspicuous by their absence from invertebrate samples were *Limnocalanus macrurus*, *Eubosmina longirostris*, *Gammaracanthus loricatus* and *Mysis relicta*. Many freshwater, marine, and terrestrial invertebrates were found in this area for the first time and a distribution list is included.

Arctic charr inhabited every non-winterkill lake sampled, threespine and ninespine stickleback were found in coastal lakes with elevations less than 100 m, and Atlantic salmon were reported from a lake near Cape Dorset. No lake trout were caught. All of the species are fall spawners but few individuals spawn annually. They are omnivorous opportunistic feeders and host a variety of metazoan parasites. Charr are also host to *Diphyllobothrium dendriticum* which can infect man. Species biology and previous research on the fishes of southern Baffin Island are discussed.

Domestic and commercial fishing are important to the area economy. Anadromous Arctic charr are the most sought after fish. They are large, tasty, accessible, and host to few parasites. Most fishing takes place in or near coastal river mouths where the charr are readily available at predictable times of the year.

Atlantic cod from Ogac lake and Greenland cod from Soper Lake, and marine sculpin and shellfish are also eaten. Greenland cod biology is discussed and marine fish species distributions are included.

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APPENDIX 1 MARINE FISH SPECIES DISTRIBUTIONS

MARINE FISH SPECIES DISTRIBUTIONS

Research on marine fishes in the Canadian Arctic has been limited by expense and logistical difficulty to comparatively shallow, short-term test fisheries. Consequently, distributional information on marine fishes in the survey area is incomplete and life history information is lacking, particularly for deep water species.

Table 12 lists marine fish species that have been collected in the survey area, together with approximate catch locations (Fig. 14). The table references specimens collected during this survey, published collection records, personal communications from fisheries biologists, and specimens in the National Museum of Natural Sciences (N.M.N.S.) and Royal Ontario Museum (R.O.M.) collections.

Most of the marine fishes reported from the survey area were collected by scientists from the Arctic Biological Station, Ste. Anne de Bellevue, Quebec. Researchers from that institution have studied marine ecology in the area since the late 1940's. Their work includes research on physical, chemical and biological oceanography (e.g. Dunbar 1947, 1958; Bursa 1961; Grainger 1962, 1971, 1975; Wacasey et al. 1979; Arctic Biological Station 1980; Atkinson and Wacasey 1983; Hunter et al. 1984).

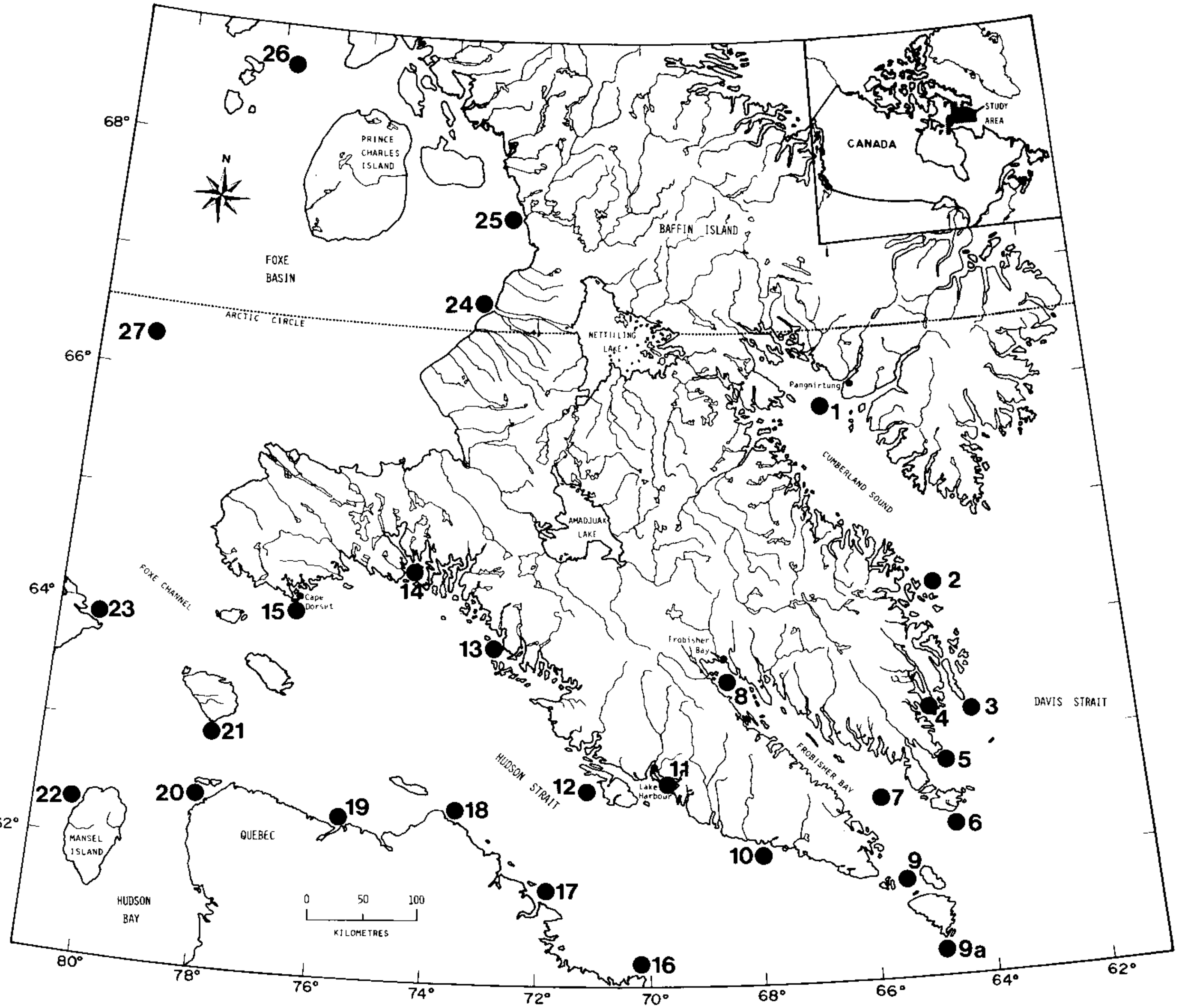

Figure 14. Locations where fish have been caught in marine waters in or near the 1984 study area.

Table 12. Distribution records of fish species caught in marine waters in or near the 1984 study area.

Species Name: Scientific	Species Name: Common	Catch Location (Fig.) and References
F. Salmonidae		
Salmo salar (Linnaeus, 1978)	Atlantic salmon	1, 2 (Bean 1879; Dunbar and Moore 1980)
Salvelinus alpinus (Linnaeus, 1758)	Arctic charr	Present throughout coastal marine waters of the study area between June and September. See text for further information.
F. Osmeridae		
Mallotus villosus (Muller, 1776)	capelin	15, 16, 20 (Hunter et al. 1984); 3, 9, 20 (NMNS[1]); 11 (ROM[2]).
F. Gadidae		
Boreogadus saida (Lepechin, 1774)	Arctic cod	8 (Atkinson and Wacasey 1983; Ellis 1962; Grainger 1971; Wacasey et al. 1979); 1 (Bean 1879); 3, 5-7 (Den Beste and McCart 1978); 11 (Dunbar 1947); 1, 7 (Dunbar and Moore 1980); 5 (Halkett 1928; Soper 1928); 14, 27 (Hildebrand 1939); 3, 4 (Hunter et al. 1980); 3-9, 15, 20, 26, (Hunter et al. 1984); 21 (Johansen 1927a-c; ROM); 9, 10 (MacLaren Atlantic Ltd. 1978a); 3, 4, 6-8, 20 (NMNS); 17, 21 (Vladykov 1934).
Gadus morhua Linnaeus, 1758	Atlantic cod	1 (Dahlke pers. comm.); 8 (Hunter et al. 1984; ROM); 9a (Wright 1950).
Gadus ogac Richardson, 1836	Greenland cod	11 (this survey); 12 (Boulva 1972); 8, 15 (Hunter et al. 1984); 8 (ROM).
Gaidropsarus argentatus (Reinhardt, 1837)	silver rockling	7 or 8 (McAllister et al. 1980).
F. Zoarcidae		
Gymnelis retrodorsalis Le Danois, 1913	aurora unernak	5 (Den Beste and McCart 1978); 8 (Hunter et al. 1984; McAllister et al. 1981; NMNS; Wacasey et al. 1979).
Gymnelis viridis (Fabricius, 1780)	fish doctor	11 (this survey); 1 (Bean 1879; Dunbar and Moore 1980; Ellis 1962); 6 (Den Beste and McCart 1978); 27 (Hildebrand 1939); 6-9, 15, 16, 20, 22, 23 (Hunter et al. 1984); 4, 7, 8, 20 (NMNS); 11 (ROM); 8 (Wacasey et al. 1979).
Lycodes sp.		5 (Den Beste and McCart 1978); 11 (NMNS).
Lycodes mucosus Richardson, 1855	saddled eeelpout	1 or 2 (Bean 1879; Dunbar and Moore 1980); 3 (Hunter et al. 1980); 3, 7, 18 (Hunter et al. 1984); 3, 6 (NMNS).
Lycodes pallidus Collett, 1878	pale eelpout	8 (Hunter et al. 1984); 3, 8 (NMNS).
Lycodes polaris (Sabine, 1824)	polar eelpout	8 (Hunter et al. 1984; NMNS; Wacasey et al. 1979).
Lycodes reticulatus Reinhardt, 1835	Arctic eelpout	7, 8 (Hunter et al. 1984); 8 (NMNS).
F. Stichaeidae		
Eumesogrammus praecisus (Kroyer, 1837)	fourline snakeblenny	1, 16, 20 (Hunter et al. 1984); 20 (NMNS).
Stichaeus punctatus (Fabricius, 1780)	Arctic shanny	11 (Dunbar 1947); 6 (Den Beste and McCart 1978); 3, 4 (Hunter et al. 1980); 3, 11, 20 (Hunter et al. 1984); 20 (NMNS).
F. Lumpenidae		
Anisarchus medius (Reinhardt, 1838)	stout eelblenny	5, 7, 8, 20, 22 (Hunter et al. 1984); 4, 20 (NMNS); 8 (Wacasey et al. 1979).
Leptoclinus maculatus (Fries, 1837)	daubed shanny	3, 4 (Hunter et al. 1980); 7, 8 (Hunter et al. 1984); 8 (Wacasey et al. 1979).
Lumpenus fabricii (Valenciennes, 1836)	slender eelblenny	6 (Den Beste and McCart 1978); 8 (Wacasey et al. 1979).
Lumpenus lampretaeformis (Walbaum, 1792)	snake blenny	7 or 8 (Den Beste and McCart 1978; McAllister et al. 1980).
F. Ammodytidae		
Ammodytes sp.		10 (McLaren Atlantic Ltd. 1978a).
Ammodytes americanus DeKay, 1842	American sandlance	21 (Johansen 1927b).
Ammodytes dubius Reinhardt, 1837	northern sandlance	8, 20 (Hunter et al. 1984); 19 (Vladykov 1934); 20 (NMNS).
F. Cottidae		
Artediellus uncinatus (Reinhardt, 1835)	snowflake hookear	7, 8 (Hunter et al. 1984); 7 (NMNS).
Gymnocanthus sp.		2 (Bean 1879); 11 (Dunbar 1947).
Gymnocanthus tricuspis (Reinhardt, 1832)	Arctic staghorn sculpin	5, 6 (Den Beste and McCart 1978); 2 (Ellis 1955); 8 (Ellis 1962); 7 (Dunbar and Moore 1980); 3, 4 (Hunter et al. 1980); 1, 3, 7, 8, 13, 15-18, 20, 23 (Hunter et al. 1984); 21 (Johansen 1927a-c); 3, 4, 6-8 (NMNS); 21 (Vladykov 1934).

Table 12. Cont'd.

Species Name		
Scientific	Common	Catch Location (Fig.) and References
Icelus bicornis (Reinhardt, 1841)	twohorn sculpin	7, 8 (Atkinson and Wacasey 1983); 5 (Den Beste and McCart 1978); 27 (Hildebrand 1939); 3, 4 (Hunter et al. 1980); 7, 8, 11, 22 (Hunter et al. 1984); 8, 15, 22 (McAllister 1963); 4, 5, 7, 8 (NMNS); 1, 11 (ROM); 8 (Wacasey et al. 1979).
Icelus spatula Gilbert and Burke, 1912	spatulate sculpin	5, 6 (Den Beste and McCart 1978); 3, 4 (Hunter et al. 1980); 3-9, 20 (Hunter et al. 1984); 8, 9 (McAllister 1963); 4-8 (NMNS); 8 (Wacasey et al. 1979).
Myoxocephalus quadricornis (Linnaeus, 1758)	fourhorn sculpin	7 (Atkinson and Wacasey 1983); 2 (Ellis 1955); 7-9, 17 (Hunter et al. 1984); 21 (Johansen 1927a-c); 24, 25 (Manning 1942); 11, 21, 24 (ROM).
Myoxocephalus scorpioides (Fabricius, 1780)	Arctic sculpin	1, 2 (Bean 1879); 1, 2, 7 (Dunbar and Moore 1980); 2, 5, 8 (Ellis 1955); 1, 8 (Ellis 1962); 3, 4 (Hunter et al. 1980); 1-9, 15-17, 20 (Hunter et al. 1984); 21 (Johansen 1927a-c); 3, 4 (NMNS); 1, 2, 11, 21 (ROM); 17 (Vladykov 1934).
Myoxocephalus scorpius (Linnaeus, 1758)	shorthorn sculpin	11 (this survey); 1, 2 (Bean 1879; Dunbar and Moore 1980); 3, 5, 6 (Den Beste and McCart 1978); 11 (Dunbar 1947); 2, 5 , 8 (Ellis 1955); 1, 8 (Ellis 1962); 3, 4 (Hunter et al. 1980); 1-9, 11, 13, 15-17, 20, 26 (Hunter et al. 1984); 21 (Johansen 1927a-c); 1 (Moore and Moore 1974a); 3, 4, 6-8 (NMNS); 1, 8, 11, 20 (ROM).
Myoxocephalus sp.		13 (Soper 1928); 21 (Vladykov 1934).
Triglops murrayi Gunther, 1888	moustache sculpin	3 (Hunter et al. 1980); 8 (Wacasey et al. 1979).
Triglops pingelii Reinhardt, 1831	ribbed sculpin	3, 5-7 (Den Beste and McCart 1978); 11 (Dunbar 1947); 8 (Grainger 1953); 3, 4, (Hunter et al. 1980); 1, 3-9, 16 (Hunter et al. 1984); 3, 4, 6-8 (NMNS); 1 (ROM).
Triglops nybelini Jensen, 1944	bigeye sculpin	3 (Hunter et al. 1980); 7 (Hunter et al. 1984).
F. Agonidae		
Aspidophoroides monopterygius (Bloch, 1786)	alligatorfish	20 (NMNS).
Aspidophoroides olriki Luken, 1876	Arctic alligatorfish	11 (Dunbar 1947); 3 (Hunter et al. 1980); 3, 6-9, 11, 17 (Hunter et al. 1984); 4, 7, 8 (NMNS); 8 (Wacasey et al. 1979).
Leptagonus decagonus (Bloch and Schneider, 1801)	Atlantic poacher	3, 5, 7 (Den Beste and McCart 1978); 11 (Dunbar 1947); 3 (Hunter et al. 1980); 6, 8 (Hunter et al. 1984).
F. Cyclopteridae		
Cyclopterus jordani Soldatov, 1929	smooth lumpfish	8 (NMNS).
Cyclopterus lumpus Linnaeus, 1758	lumpfish	7 (Hunter et al. 1984).
Eumicrotremus derjugini Popov, 1926	leatherfin lumpsucker	6 (Den Beste and McCart 1978); 1, 7, 8 (Hunter et al. 1984); 8 (NMNS; Wacasey et al. 1979).
Eumicrotremus spinosus (Fabricius in Muller, 1776)	Atlantic spiny lumpsucker	5, 6 (Den Beste and McCart 1978); 11 (Dunbar 1947); 8 (Grainger 1953); 3, 7, 8 (Hunter et al. 1984); 9, 10 (MacLaren Atlantic Ltd. 1978a); 6, 8 (NMNS).
F. Liparididae		
Liparis sp.		21 (Johansen 1927a-c).
Liparis fabricii Kroyer, 1847	gelatinous snailfish	2, 7, 11 (Able and McAllister 1980); 3, 6, 7 (Den Beste and McCart 1978); 11 (Dunbar 1947); 3, 4 (Hunter et al. 1980); 2-9 (Hunter et al. 1984); 8 (NMNS).
Liparis gibbus Bean, 1881	dusky snailfish	4 (Hunter et al. 1980); 3, 8 (Hunter et al. 1984); 8 (NMNS).
Liparis tunicatus Reinhardt, 1837	Greenland seasnail	1, 2 (Bean 1879; Dunbar and Moore 1980); 3, 5-7 (Den Beste and McCart 1979); 8 (Ellis 1962; Hunter et al. 1984; Wacasey et al. 1979).
F. Pleuronectidae		
Hippoglossoides platessoides (Fabricius, 1780)	Canadian plaice	7, 8 (Hunter et al. 1984); 8 (NMNS).
Liopsetta putnami (Gill, 1864)	smooth flounder	7 (Hunter et al. 1984).
Reinhardtius Hippoglossoides (Walbaum, 1792)	Greenland halibut	1 (Dahlke pers. comm.); 6-8, 20 (Hunter et al. 1984); 9 (MacLaren Atlantic Ltd. 1978a); 3, 20 (NMNS); 8 (Wacasey et al. 1979).

1 Specimen in the National Museum of Natural Sciences fish collection.
2 Specimen in the Royal Ontario Museum fish collection.

APPENDIX 2 FRESHWATER FISH SPECIES DISTRIBUTIONS

FRESHWATER FISH SPECIES DISTRIBUTIONS

This appendix illustrates catch records of each fish species that has been collected from lakes in the study area or from nearby drainages. Within the study area the distributions are exhaustive, elsewhere they include only catch records that have been listed in previous Northern Land Use Information Series (NLUIS) reports. The distribution maps include catch reports where species identifications have been verified by several researchers, preferably supported by preserved specimens, and they also include reports from fishermen. The latter are generally very reliable, except in the case of landlocked Arctic charr which are known in some localities as "trout". For this reason, "trout" reported by the fishermen have not been included in the distributions.

Four symbols were used on the figures to differentiate between new, previous, and verbal catch reports. The solid circles (●) denote sites sampled during this survey, open circles (○) denote sites sampled during previous NLUIS surveys, open squares (□) denote reports from the scientific literature and museum collections, and open diamonds (◇) denote verbal reports. The fishes caught at a site are shown on distribution maps for the individual species, and the study area is outlined on each map (Figs. 15 to 19).

ARCTIC CHARR (Figs. 15 and 16)

This species has been found in virtually all fresh water bodies on Baffin Island that have been sampled and are not subject to winterkill.

Lake-dwelling Arctic charr have been collected from the Hantzsch River (Manning 1942, 1943), Nettilling Lake (Halkett 1928; Soper 1928; Thomson 1957; McPhail 1961; Oliver 1964; Budgell 1967; Hantzsch 1977; Sopuck 1977; Dick and Belosevic 1981), Amadjuak Lake (Yaremchuck and Wong 1984), Sylvia Grinnell Lake (Mansfield 1958; Hunter 1976; Kristofferson and Sopuck 1983), "Doreen" Lake (63°45'N, 69°05'W; Mansfield 1958), "Shona" Lake (63°40'N, 68°20'W; Mansfield 1958; McPhail 1961; Curtis 1979), "Salvelinus" Lake (62°50'N, 67°22'W; McLaren 1957), a lake near Cape Dorset (McPhail 1961), and from Nottingham Island (Johansen 1927a). They have been reported in systems on the north side of Foxe Peninsula (Kemp 1976) and near the communities of Cape Dorset (Labine and Manning pers. comm.), Lake Harbour (S. Akavak, T. Akavak, Ikkidluak, Johnson, Padluk, and Reaburn pers. comm.), and Frobisher Bay (Akeeagok, Allen, Dahlke, H. Kilabuk, P. Kilabuk, and Noble pers. comm.). During the survey, they were caught in all of the systems sampled on Foxe Peninsula (Appendix 3) and in a lake southwest of Nettilling Lake. Charr were not caught in three lakes sampled on the Great Plain of the Koukdjuak River. Lake-dwelling charr are common in lakes up to elevations of 600 m on northern Baffin Island (Stewart and MacDonald 1981) and occur on the islands and mainland adjacent to Baffin Island (Scott and Crossman 1973; Johnson 1980; Stewart and MacDonald 1981; Stewart and Bernier 1983, 1984).

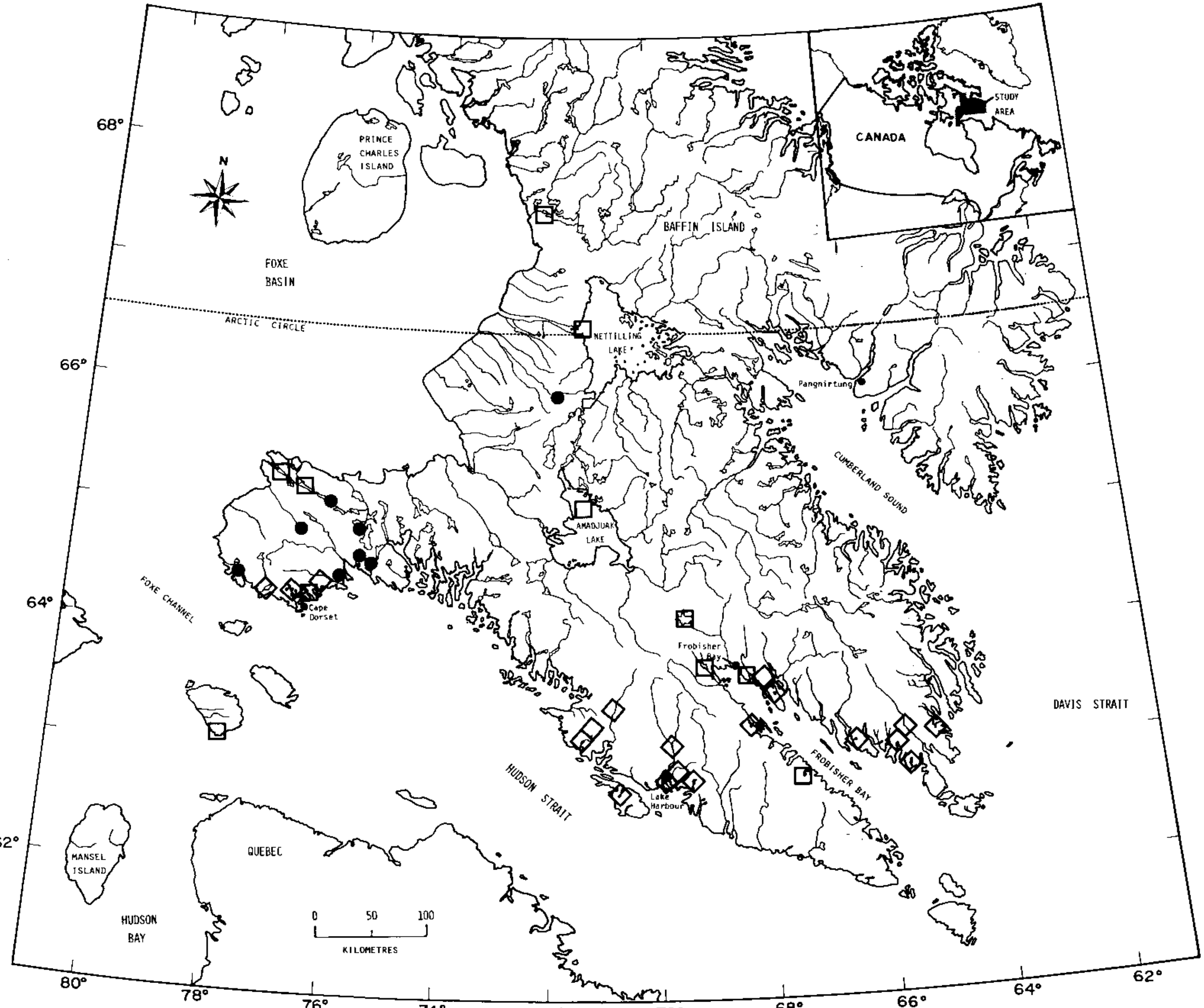

Figure 15. Distribution of lake-dwelling Arctic charr Salvelinus alpinus.

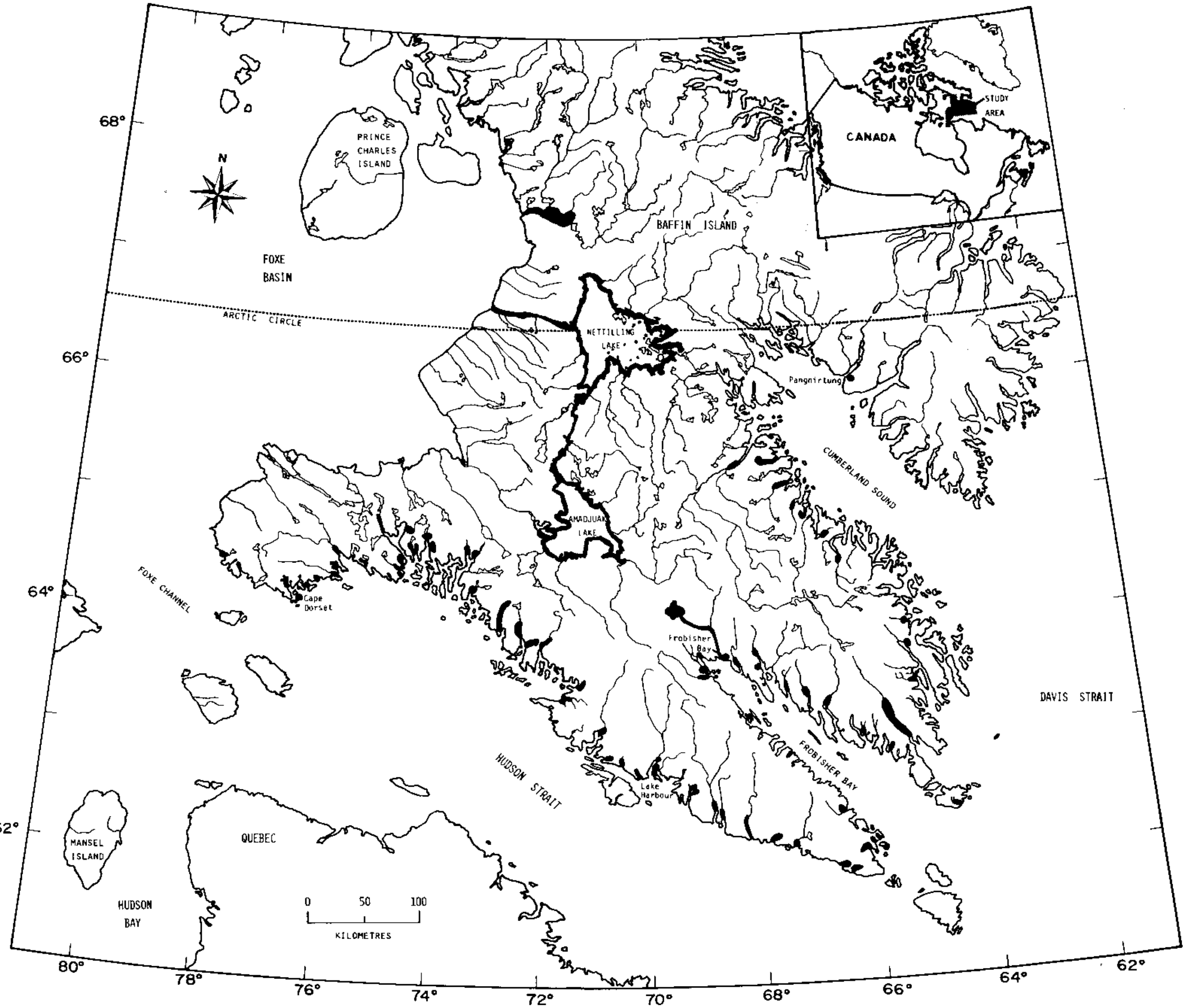

Figure 16. Distribution of anadromous Arctic charr <u>Salvelinus alpinus</u>.

Anadromous Arctic charr inhabit lakes and rivers in the study area which are accessible to them from the ocean. Reports discussing anadromous charr in the southern Baffin Island area include: Johansen 1927a; Halkett 1928; Soper 1928; Manning 1942, 1943; Wright 1950; Grainger 1953; McLaren 1957; Thomson 1957; Hunter 1958, 1964, 1965, 1976; McPhail 1961; Oliver 1964; Anders et al. 1966; Budgell 1967; Renewable Resources Consulting Ltd. 1972; Toews 1973; Moore 1975a, b; Moore and Moore 1974b; Meldrum 1975; Kemp 1976; Sopuck 1977; Den Beste and McCart 1978; Johnson 1980; Dick and Belosevic 1981; Kristofferson and McGowan 1981; Donaldson 1983, 1984; Pattimore 1983a, b; Kristofferson and Sopuck 1983; Hunter et al. 1984; Yaremchuck and Wong 1984. Locations of many of the systems containing anadromous charr were communicated to the authors by S. and T. Akavak, Akeeagok, Allen, Dahlke, Ikkidluak, H. and P. Kilabuk, Labine, Manning, and Noble (pers. comm.). Many of these areas are fished by residents of the communities on southern Baffin Island, the coastal waters in July and August and lakes and rivers during the remainder of the year. Anadromous charr are common in coastal waters and river systems of the adjacent islands and mainland (Scott and Crossman 1973; Johnson 1980; Stewart and MacDonald 1981; Stewart and Bernier 1983, 1984).

LAKE TROUT (Fig. 17)

On Baffin Island this species has only been reported from the Hantzsch River (Manning 1942). No specimens were kept and the presence of lake trout on Baffin Island has yet to be confirmed. Trout do occur to the west, on Melville Peninsula and Southampton Island (Stewart and Bernier 1984), and to the south, in the Ungava (Martin 1955; Martin and Olver 1980).

ATLANTIC SALMON (Fig. 17)

This species had been caught entering Nettilling Lake (Peet pers. comm.) and in a lake near Cape Dorset (64°26'N, 75°52'W; Labine pers. comm.). Both records are supported by photographic evidence (Plate 3). Atlantic salmon have been collected from coastal waters off southern Baffin Island (Bean 1879; Dunbar and Moore 1980) and from lakes in the Ungava (Hunter et al. 1984).

THREESPINE STICKLEBACK (Fig. 18)

This species has been collected from Nettilling Lake (Halkett 1928; Soper 1928; Thomson 1957; Oliver 1964; Coad 1974; Dick and Belosevic 1981; Hagen and Moodie 1982; Hunter et al. 1984), lakes near the communities of Cape Dorset (Hunter et al. 1984), Lake Harbour (Coad 1973, 1974; Hagen and Moodie 1982; Hunter et al. 1984) and Frobisher Bay (Johansen 1927a; Curtis 1977; Hagen and Moodie 1982; Hunter et al. 1984), near the abandoned Hudson Bay post at Amadjuak (Halkett 1928; Soper 1928), and from Frobisher Bay and Cumberland Sound (Hunter et al. 1984). During the survey of lakes on southern Baffin Island, it was collected from three lakes on Foxe Peninsula and from a shallow lake

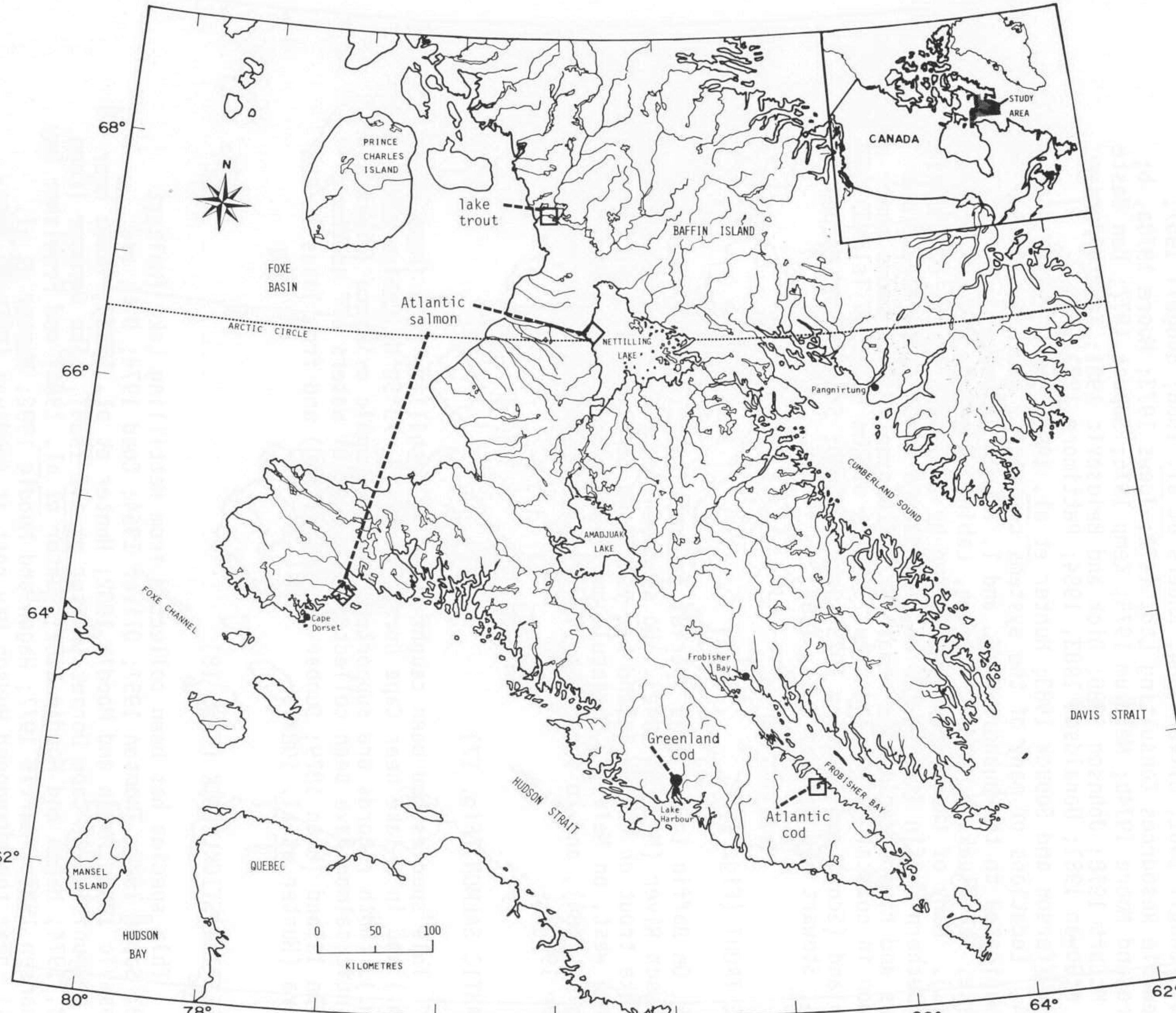

Figure 17. Distributions of lake trout Salvelinus namaycush, Atlantic salmon Salmo salar, Atlantic cod Gadus morhua, and Greenland cod Gadus ogac.

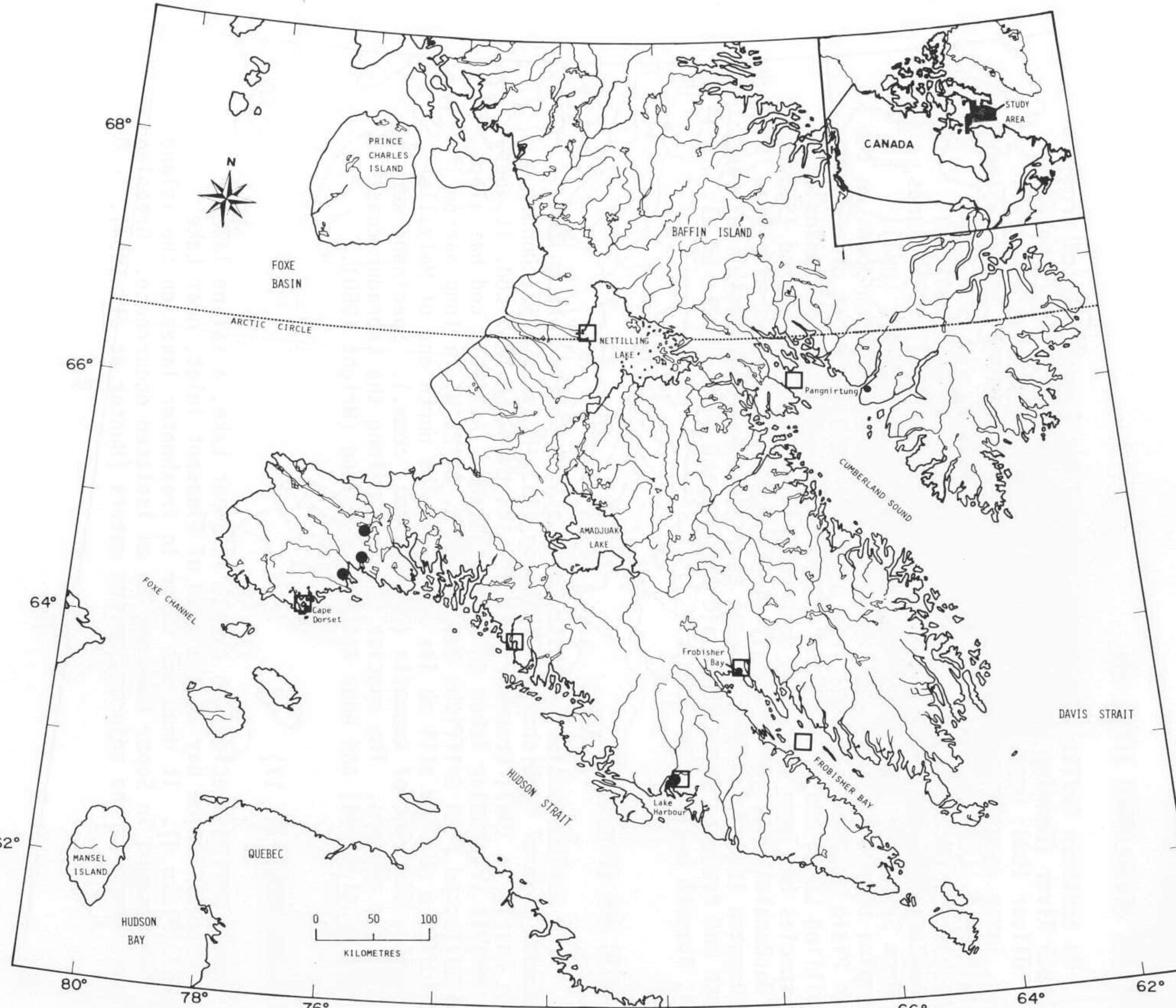

Figure 18. Distribution of threespine stickleback <u>Gasterosteus aculeatus</u>.

near Lake Harbour. Threespine stickleback are common in lakes along the northern coasts of Labrador, Quebec and Hudson Bay coasts, and have been collected from Rowley Island in northern Foxe Basin (Scott and Crossman 1973; MacDonald and Fudge 1979; Hagen and Moodie 1982; Hunter et al. 1984). The species has not been reported from northern Baffin Island.

NINESPINE STICKLEBACK (Fig. 19)

On southern Baffin Island this species has been collected from the Hantzsch River (Manning 1942), Nettilling Lake (Thomson 1957; McPhail 1963; Oliver 1964; Coad 1973; Dick and Belosevic 1981; Hunter et al. 1984), lakes near the communities of Cape Dorset (McPhail 1963; Labine pers. comm.), Lake Harbour (McPhail 1963; Hunter et al. 1984), and Frobisher Bay (McPhail 1963; Curtis 1979; Hunter et al. 1984), on Nottingham (Johansen 1927a) and Resolution (Lee et al. 1980) islands, and from Frobisher Bay and Cumberland Sound (Hunter et al. 1984). Ninespine stickleback were collected during the survey from ponds on the Great Plain of the Koukdjuak, from a shallow lake southwest of Nettilling Lake, and from a lake on the south coast of Foxe Peninsula. The species has been collected near Pond Inlet on Baffin Island (Stewart and MacDonald 1981) and is widely distributed in lakes and rivers on Southampton Island and the adjacent territorial and provincial mainland (Scott and Crossman 1973; MacDonald and Stewart 1980; Hunter et al. 1984; Stewart and Bernier 1984).

ATLANTIC COD (Fig. 17)

This marine species inhabits Ogac Lake, a saline lake on the southwest side of Frobisher Bay (Kennedy 1953; McLaren 1957; Dunbar 1958; Patriquin 1967; Bruemmer 1972). Like the Greenland cod, it does not inhabit freshwater lakes on Baffin Island. Atlantic cod has also been collected from Griffiths Bay (69°40'N, 83°25'W), a long narrow fiord with a shallow sill at its mouth, on the north end of Melville Peninsula, District of Keewatin (Dahlke pers. comm.). Specimens were seen by the authors. The species is common along the Labrador coast (Hunter et al. 1984) and near Resolution Island (Wright 1950).

GREENLAND COD (Fig. 17)

This marine species was caught in Soper Lake, a saline lake or semi-isolated marine bay at the head of Pleasant Inlet, near Lake Harbour (Plate 4). It does not occur in freshwater lakes on the island and its presence in Soper Lake may be an isolated occurrence. Greenland cod are common in the adjacent marine waters (Hunter et al. 1984).

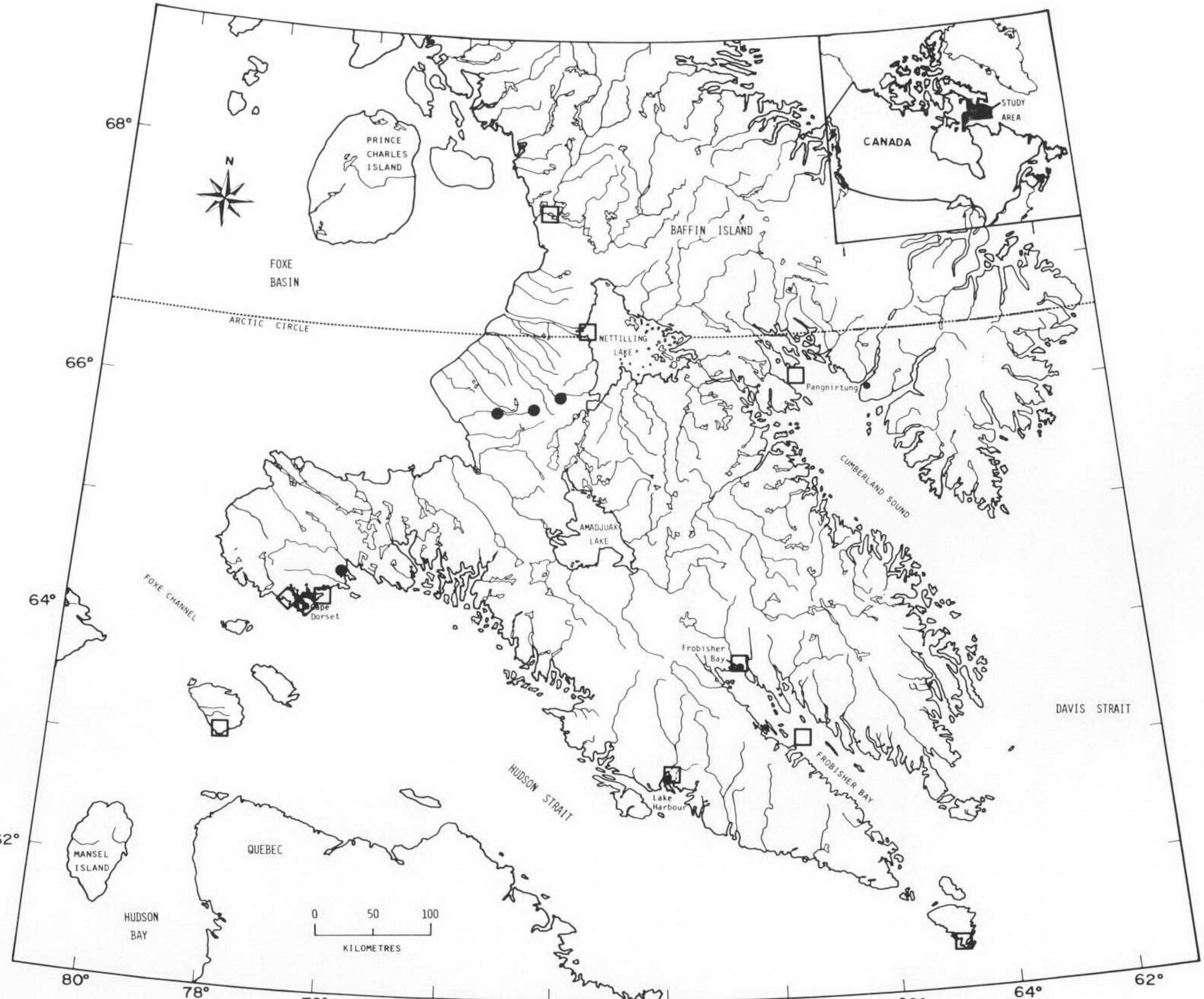

Figure 19. Distribution of ninespine stickleback <u>Pungitius</u> <u>pungitius</u>.

APPENDIX 3 FISH DATA

EXPLANATION OF TABLES 13 TO 15

Symbols used in the tables:

* Water chemistry and zooplankton taken at this site.

[1] Specimens deposited with the Ichthyology Section of the National Museum of Natural Sciences, Ottawa.

[2] Sexual maturity was assessed through gonad examinations and coded according to the following scale:

Male	Female	Development
1	7	immature
2	8	mature
3	9	near ripe
4	10	ripe
5	11	ripe and running
6	12	spent
0		sex indistinguishable

[3] Fish diet was classified according to the following scale:

points allotted	fullness of stomachs (apparent)
0	0 (empty)
<1	
1	
2	
4	1/4
8	1/2
16	3/4
20	1 (full)

Miscellaneous food items category for Table 13 includes:

Item	Sample Site (Fig. 4)	Contribution to Diet
Diptera adults	11	4
Tipulidae larvae	12	8
Ostracoda	6	2, 1, and 7 fish with <1
Ostracoda	8	<1
Ostracoda	9	<1
Ostracoda	10	2 fish with <1
Ostracoda	11	4, and 5 fish with <1
Ostracoda	12	2, <1
Acari	7	3 fish with <1
Acari	10	2 fish with <1
Acari	11	<1
Mermithidae	12	2 fish with <1
digested remains	11	16, 4
plant material	9	1
rocks	7	8

4 Parasite intensity was indexed according to the following scale:

Number	Number of parasites/fish
1	1 - 25
2	26 - 50
3	51 - 100
4	101 - 200
5	201 - 500
6	501 - 1000
7	1001 - 2000
8	>2000

Miscellaneous metazoan parasites not listed in Table 13.

Host	Parasite	Site	Fish	Infection Level
Arctic charr	Neoechinorhynchus rutili	7	24+	1
	" "	10	51	1
	" "	10	53	1
	" "	12	39	1
	Schistocephalus solidus	7	7	1
	" "	7	8	1
	" "	7	10	1

+ i.e. N. rutili infected the 24th Arctic charr listed at site 7 (Tessik Lake) on Baffin Island.

5 Parasite numbers for Tables 14 and 15 are total counts except where indicated.

- Not examined.

Table 13. Data for Arctic charr (Salvelinus alpinus) caught in 1984 on southern Baffin Island, NWT.

						Stomach Contents[3]												Parasites[4]								
Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	fullness	Chironomidae	Trichoptera	Notostraca	Amphipoda	Cladocera	Copepoda	Sphaeriidae	fish eggs	fish remains	algae balls	miscellaneous	Diphyllobothrium spp.	Eubothrium salvelini	Proteocephalus sp.	Cyathocephalus truncatus	Crepidostomum farionis	Philonema agubernaculum	Echinorhynchus sp.	Salmincola carpionis	Salmincola edwardsii
1[*1]	unnamed lake	123	16.6	7	7	¼	4																			
	66°03'N,71°55'W	109	11.2	1	3	1	20						<1									1				
	18-19/8/84, 15h	121	17.9	8	6	1	16		4				<1			<1										
	gillnets (BI 1,2)	103	10.2	1	3	1	20															1				
		113	15.4	7	5	1	20															1				
		102	9.6	1	3	1	20									<1										
		413	600	2	12	½	2		4					2				1								
		400	535	8	9	¼			2					2				2	1	1			1			
		389	480	8	16	¼	2		2									2	1				1			
		455	915	5	20	¼			1						4			2	1							
		392	540	2	11	¼			4																	1
		270	170	8	9	¼			4																	1
		415	620	2	11	½								8					1							1
		327	260	2	10	½			8									1	1							
2[*]	unnamed lake	no fish caught																								
	65°56.5'N,72°20'W																									
	18-19/8/84, 13.5h																									
	gillnets (BI 3,4)																									
4[*]	unnamed lake	no fish caught																								
	65°57.5'N,73°25'W																									
	24-25/8/84, 24.5h																									
	gillnets (BI 5,6)																									
5[*]	unnamed lake	no fish caught																								
	65°51.5'N,73°37'W																									
	24-25/8/84, 24h																									
	gillnets (BI 7,8)																									
6[*1]	unnamed lake	542	1742	6	19	1									20			7							1	
	65°05'N,76°06'W	345	360	8	16	1							20					1	1					1		
	28-29/8/84, 20h	485	1150	2	17	1									20			7	2					1		
	gillnets (BI 17,18)	577	1920	2	25	0												8	1	1				1		
		603	2250	2	24	0												7	3				1	2	1	
		412	750	2	19	½			2	2	<1		4						1						1	
		327	500	2	13	1							20					1								
		439	750	12	20	0												6	1						1	1
		553	1180	2	20	0												7	1					1	1	
		575	2025	2	22	1									20			8	2						1	
		355	400	2	17	½			8									1								
		322	300	7	8	0																				
		385	480	2	16	½							8											1		
		345	360	7	12	1							20					2								1
		263	162	1	17	¼							4					1	1					1		
		220	110	1	7	0												1						1		
		240	128	1	7	0																				1
		197	75	7	4	0																		1		
		205	88	7	6	½							8						1							
		192	65	7	5	0												1								
		203	78	1	6	¼							4					1						1		
		166	50	8	8	¼	4											1								
		520	2630	8	16	0												6	3	1				1	1	
		375	500	8	16	0												5	1	2				1		1
		380	460	8	14	1							16			4							1			
		365	370	2	15	¼							4					3								1
		510	1240	2	14	0												6	2					2	1	
		410	600	8	16	0												6	1					1		
		385	560	2	13	¼				2	<1		2					1	1					1		1
		448	810	8	12	0												6		1				1	1	
		371	425	2	20	1							20			<1		6	1					1	1	
		260	164	1	6	0												1						1		
		282	230	8	9	3/4			8				8								1					
		207	90	1	5	¼							4					1	1					1		
		223	105	7	6	0												1	1							

Table 13. Cont'd.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	Stomach Contents[3]												Parasites[4]								
						fullness	Chironomidae	Trichoptera	Notostraca	Amphipoda	Cladocera	Copepoda	Sphaeriidae	fish eggs	fish remains	algae balls	miscellaneous	*Diphyllobothrium* spp.	*Eubothrium salvelini*	*Proteocephalus* sp.	*Cyathocephalus truncatus*	*Crepidostomum farionis*	*Philonema agubernaculum*	*Echinorhynchus* sp.	*Salmincola carpionis*	*Salmincola edwardsii*
6 (continued)		210	85	1	6	0												1						1		
		210	88	1	6	0												2						1		
		213	90	7	5	¼				2			2					1	1							
		200	70	1	5	0												2	1							
		212	85	1	6	0												1			1			1		
		201	75	1	5	1							20													
		162	45	4	7	½	8											1								
		252	140	7	8	0												1								
		210	95	7	5	0												1						1		
		225	110	1	7	0												1	1							
		217	115	1	6	¼							4											1		
		220	102	7	6	½							8													
		198	78	7	5	¼				2			2					1						1		1
		181	52	12	17	¼	4																			
		181	55	1	4	0												1						1		
		174	55	1	4	0																		1		
		172	45	1	4	¼	4																			
		98	7.9	7	2	¼	2										2									
		98	8.4	7	2	0																				
		114	11.3	1	3	0												1	1				1			
		116	13.5	1	3	0																				
		131	20.1	1	4	¼	4									<1			1							
		157	38.3	7	4	¼	4									<1		1		1			1			
		132	16.4	1	3	¼	1		2			<1	1				<1									1
		111	11.8	1	3	1	20									<1	<1			1						
		131	18.0	7	3	3/4	<1		16								<1							1		
		115	11.9	1	3	¼	2					1					1		1	1						
		111	11.4	1	3	0																				
		131	18.2	2	4	¼	4										<1	1				1	1	1		
		118	16.0	3	4	¼	4																			
		106	9.3	7	3	¼	1				2		1					1		1		1				
		136	21.6	7	3	¼	4									<1	<1									
		109	12.3	1	4	¼	4																			
		116	12.5	1	3	½	8									<1						1				
		107	11.0	1	2	½	8									<1	<1									
		107	10.3	7	3	¼	4									<1							1			
		108	10.1	7	3	¼	4				<1					<1										
		100	8.8	7	2	½	8				<1						<1							1		
		110	11.3	7	3	0																				
7[1]	Tessik Lake	603	1850	2	22	0												6	1				1		1	
	64°50'N,75°25'W	534	1650	8	23	½											8	6	1	2						1
	27-28/8/84, 19h	346	400	4	14	0																				
	gillnets (BI 13,14)	367	450	4	18	0																			1	1
		345	375	9	10	0												1		1						
		343	330	4	17	3/4			16									1								
		630	2000	12	29	¼									4			7	2	2					1	1
		615	2400	2	15	¼									4			8	1					1		
		530	1400	2	14	1									20			6	1							
		510	1600	8	13	½									8			5	1	2				1		1
		505	1325	8	21	¼									4			8	3					2	1	
		282	220	8	14	0															1			1		
		340	360	2	14	½							4			4		2								
		332	330	2	17	0												1								
		305	275	3	15	½			8							1		1			1					
		184	54	7	10	0															1			2		
		251	140	1	10	0												1								
		220	104	1	17	0															1			1		
		264	150	7	6	0																				
		184	64	7	8	½				8											1			1		1
		171	48	7	10	½				8											1			1		
		182	58	7	4	0																				
		195	68	7	5	0																				
		99	9.4	1	2	3/4									16											1
		118	14.3	7	3	½										8		1				1				
		101	8.2	1	4	0																				
		111	12.3	2	4	¼	<1		4								<1					1				
		122	16.7	7	3	½					<1		8					1				1				
		94	8.0	1	3	½	<1				8											1				
		95	8.8	7	4	¼	4															1				

Table 13. Cont'd.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	Stomach Contents[3]												Parasites[4]								
						fullness	Chironomidae	Trichoptera	Notostraca	Amphipoda	Cladocera	Copepoda	Sphaeriidae	fish eggs	fish remains	algae balls	miscellaneous	*Diphyllobothrium* spp.	*Eubothrium salvelini*	*Proteocephalus* sp.	*Cyathocephalus truncatus*	*Crepidostomum farionis*	*Philonema agubernaculum*	*Echinorhynchus* sp.	*Salmincola carpionis*	*Salmincola edwardsii*
7 (continued)		131	19.8	3	7	0															1	1				
		116	13.1	1	5	¼	1		4													1		1		
		108	12.3	7	5	0																		1		
		102	9.3	2	4	½	1	1							8				1	1		1		1		
		100	10.3	1	5	½	1		4		4											1				
		97	8.5	7	4	½		8									1					1		1		
		96	8.0	7	4	0																1				
		110	12.1	3	4	0																1				
		106	11.2	1	4	¼	2									2						1				
		107	11.2	3	4	0																1				
		104	9.9	1	3	¼			4								1									
		102	8.9	1	4	0																1				
		111	11.7	2	4	0																				
		96	8.2	1	3	¼	4															1				
		101	9.0	1	3	0																1				
		106	10.1	1	4	½	4				4					1										
8[*1]	Scarp Lake 64°51'N76°41'W 28/8-1/9/84, 91.5h gillnets (BI 19,20)	222	96	7	7	0												3								
		218	90	7	6	0												3	1							
		143	28	8	10	0																				
		164	45	8	14	1	20																			1
		200	70	7	11	0																				
		171	54	8	10	1	20																			
		177	54	3	10	1	20																			
		200	72	8	14	3/4	16													1						
		104	12	0	3	1	20																			
		96	10	0	3	¼	4																			
		114	16	1	4	1	20																			
		128	22	8	9	1	20												1							1
		100	12	1	4	1	20																			
		107	15	1	4	1	20																			
		102	12	0	4	0																				
		106	12	1	4	½	8																			
		375	410	2	17	¼									4			2	1							
		310	245	2	14	3/4	16											2	1							
		322	250	2	16	0												2	1							
		382	475	2	-	0												1	1						1	
		480	1975	2	20	¼			4									5	1						1	
		500	1130	2	24	1									20			6	1							
		420	700	9	24	3/4			16									6	1	1						
		264	158	7	10	0												3								
		482	1075	2	20	1									20			2	1						1	
		507	1300	4	28	0												6	1						1	
		485	950	2	24	0												1	1						1	1
		464	750	2	25	3/4									16			1	1						1	1
		273	170	7	10	0												3	1							
		471	990	12	26	1									20			7	1				1		1	1
		96	10	0	5	1	20																			
		110	14	1	4	0																				
		98	10	0	4	-												-								
		169	48	8	8	1	20											1								
		200	75	1	7	0												2								
		167	45	8	9	3/4	16																			
		183	60	8	9	3/4	16																			1
		165	42	7	4	0												1								1
		197	72	3	8	0												2	1							1
		205	78	1	5	0												1								
		173	55	7	8	1	20																			
		300	220	2	12	0												5	1							1
		315	260	2	16	0												2								
		370	350	12	20	0												5	1							1
		209	94	8	9	0												2								1
		313	260	7	15	0												4	1							
		325	280	2	12	¼			4									2		1						
		421	670	-	22	¼			4									6	1							
		340	325	2	18	½									8			5	1	1					1	
		382	450	2	19	0												6	1	4						
		155	38	11	20	0															1					
		128	20	7	4	0												1								
		100	16	1	3	1	20																			
		101	14	0	3	-												-								
		97	8	0	2	1	20																			

Table 13. Cont'd.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex	Age (y)	Stomach Contents[3] fullness	Chironomidae	Trichoptera	Notostraca	Amphipoda	Cladocera	Copepoda	Sphaeriidae	fish eggs	fish remains	algae balls	miscellaneous	Parasites[4] Diphyllobothrium spp.	Eubothrium salvelini	Proteocephalus sp.	Cyathocephalus truncatus	Crepidostomum farionis	Philonema agubernaculum	Echinorhynchus sp.	Salmincola carpionis	Salmincola edwardsii
8 (continued)		512	1500	2	31	½	8											6	1	2						1
		480	1070	2	34	½			8						<1			7	1	1					1	
		478	960	2	29	3/4			8						8			6	1	1					1	
		496	1040	2	27	¼			4									7	1							
		511	1280	2	25	¼									4			7	1						1	1
		508	1270	2	29	0												7	2						1	
		475	1000	2	23	0												6	1						1	
		102	8.9	7	3	¼												1								
		111	11.4	1	3	3/4	16										<1					1				
		131	20.7	7	4	½	8															1				1
		119	13.4	7	4	3/4	16															1				
		112	11.4	7	3	1	20															1				
		117	17.0	1	3	1	20															1				
		110	11.3	7	3	3/4	16															1				
		119	14.2	7	4	1	20											1		1			1			
		103	11.0	1	3	¼	4															1				
		113	11.1	7	3	0												1								
		113	10.5	8	5	¼	2		2													1				
		110	12.2	7	3	1	20						1					1								
		102	10.2	3	4	0												1				1				
		100	8.7	1	3	½	8																			
		109	11.1	1	3	3/4	16																			
		103	9.5	1	3	3/4	16													1						
		98	8.0	1	2	0																				
		128	18.7	7	4	3/4	16															1				
		110	11.5	1	4	½	8											1				1	1			
		118	15.2	7	3	0												1				1				
		107	11.3	1	3	½	8															1				
		111	11.5	1	3	3/4	<1		16									1				1				
		102	8.9	1	3	¼		4													1					
		113	13.2	7	3	3/4	16																			
		107	9.7	2	4	0												1								
	stream 64°52.5'N,76°45'W 28-29/8/84, 20h traps (BIT-6)	71	3.3	1	-	-												-								
9[*!]	unnamed lake 64°26'N,77°45'W 29/8-1/9/84, 95h gillnet (BI 21)	634	2500	4	22	½									8			7	1	2					1	1
		558	1400	9	22	0												6	1						1	1
		165	40	7	5	0												1								
		209	80	12	19	½								8												
		105	12	0	4	-												-								
		182	64	11	8	0												1								
		174	45	12	13	0												1					1			
		155	35	1	5	1									20			1								
		111	16	1	3	0																				
		116	16	0	4	1	20																			
		107	16	0	4	½	4									4										
		273	210	7	12	½			8									1								
		595	1925	9	22	0												6	1	5					1	1
		648	2500	5	20	0												7	1	3					1	1
		536	1680	5	21	0												6	1						1	1
		619	2275	5	20	0												7	1	1					1	1
		551	2710	9	24	1									20			7	1						1	
		568	1575	9	23	0												6	1	3						
		345	375	9	12	½			4							4		1								
		345	330	2	-	0												1								
		470	1900	9	15	0												6					1	1	1	1
		163	42	10	7	0																				
		388	475	3	15	0												5	1	1						1
		344	360	2	16	0												1		1						1
		475	1000	2	13	0												6	1	1				1		
		346	350	7	12	½									8			5	1	1					1	
		320	250	1	17	½	4									1		1		1						
		595	2210	5	25	0												7	1	3					1	1
		198	60	1	7	½			8									1								
		101	8.4	1	3	0														1						
		120	11.1	7	4	¼	1							4				1	1			1				

Table 13. Cont'd.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	Stomach Contents[3]												Parasites[4]								
						fullness	Chironomidae	Trichoptera	Notostraca	Amphipoda	Cladocera	Copepoda	Sphaeriidae	fish eggs	fish remains	algae balls	miscellaneous	Diphyllobothrium spp.	Eubothrium salvelini	Proteocephalus sp.	Cyathocephalus truncatus	Crepidostomum farionis	Philonema agubernaculum	Echinorhynchus sp.	Salmincola carpionis	Salmincola edwardsii
9 (continued)		138	19.9	2	4	½			8									1		1						
		104	8.9	7	3	1	20													1						
		103	8.7	7	4	¼	1	1	2			<1					<1	1								
		113	11.4	7	3	3/4			16			<1						1				1				
		106	9.8	1	4	¼	<1		4																	
		111	12.8	7	4	½	8															1				
		97	7.7	1	3	½	8											1								
		113	10.5	1	4	3/4			16																	
		123	17.2	2	4	¼	4																			
		109	10.9	2	4	1		2	16							1	1					1				
		138	20.9	2	6	3/4			16							<1		1								
		128	19.0	7	4	3/4	8		8							<1										1
		112	12.8	1	4	½			8																	
		137	21.6	8	5	¼	4																			
		118	13.0	7	4	½			8			<1						1					1			1
		96	6.5	7	4	½	8													1		1				
		105	9.0	7	4	0												2		1			1			
		95	7.5	1	2	½		4	4									3		1			1			
10[i]	unnamed lake	493	1210	2	22	1									20			2	1	1					1	
	64°36'N,76°03'W	398	550	2	17	0												4	1	1						1
	27-28/8/84, 16h	407	400	8	24	0												4	1	1					1	
	gillnets (BI 15,16)	415	720	9	17	0												1							1	
		458	875	2	16	3/4									16			5	1							
		471	800	2	20	0												1	1							1
		500	1075	2	20	¼									4			1	1						1	1
		198	70	9	17	0																				
		285	220	3	14	0												1	1							1
		422	660	2	17	½									4			4	1							
		511	1030	2	24	3/4									16			5	1	1					1	
		355	400	3	18	0												4	1					1		1
		207	84	8	11	¼												1			1			1		
		420	630	2	19	0												5	1							
		535	1280	2	19	0												4	1					1	1	1
		505	1250	3	20	1									20			4	1	1					1	1
		432	725	2	14	¼									4			4	1	1						
		438	625	2	20	0												1			1			1	1	1
		142	32	1	4	0												1								
		300	225	8	11	½		4							4			3		1						
		176	52	11	11	0																				
		458	825	2	20	¼									4			4	1							
		605	2150	5	20	0												3	1							
		164	42	11	9	0																				
		385	450	2	19	¼		4											1							
		425	625	2	20	¼			4									1								1
		451	740	9	23	0												4		1				1	1	1
		244	158	5	13	¼		2								2										1
		422	650	2	22	½									8			4								1
		490	1370	5	20	3/4									16			3	1	1			1			1
		405	625	2	18	¼									4			4	1						1	
		470	875	2	19	¼									4			3	1	1					1	
		210	78	8	8	0													1							
		446	730	2	19	0												1	1	1						
		450	620	2	21	0												3	1	1					1	1
		382	420	8	19	0												1	1	1				1		
		267	194	5	14	0																		1		1
		187	62	5	8	0																				
		180	52	8	11	½			4							4					1			1		
		160	42	7	6	½	8									<1					1					
		141	24.1	2	6	0																1				
		125	16.7	3	5	0																1				
		119	15.7	3	4	0																1				
		102	10.5	7	3	½			8							<1	<1	1	1		1	2				
		102	9.6	7	4	½	8			<1																1
		124	17.8	1	4	¼	2			2			<1								1	1		1		
		130	20.5	7	4	½	8									<1						2				
		100	9.4	7	3	3/4	16									<1	<1					1				
		152	30.2	2	7	¼	4											1				1				
		105	9.5	7	3	0															1	1				
		127	15.1	1	3	¼			4									1		1		1				

Table 13. Cont'd.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	Stomach Contents[3]												Parasites[4]								
						fullness	Chironomidae	Trichoptera	Notostraca	Amphipoda	Cladocera	Copepoda	Sphaeriidae	fish eggs	fish remains	algae balls	miscellaneous	*Diphyllobothrium* spp.	*Eubothrium salvelini*	*Proteocephalus* sp.	*Cyathocephalus truncatus*	*Crepidostomum farionis*	*Philonema agubernaculum*	*Echinorhynchus* sp.	*Salmincola carpionis*	*Salmincola edwardsii*
10 (continued)		105	11.2	1	4	¼	4						<1									1				
		111	11.5	7	5	1	20									<1						1				
		151	30.4	10	6	0																1				
		138	22.2	7	5	3/4	16									<1						1				
		103	10.3	7	3	0																				
		107	9.0	7	4	3/4	16																			
		141	27.3	3	5	0													1			1				
		100	9.1	2	4	¼	1	4										1				1				
		101	9.7	1	4	¼		1								4	<1	1			1	4		1		
		110	11.8	2	4	0													1			1				
		102	9.1	1	4	½	8									<1	<1					1				
11*	Kinguk Lake	579	1820	2	18	0												3	1	1			1	2	1	1
	64°40'N,75°30'W	345	270	2	10	0												4						1		
	25-27/8/84, 46h	330	250	2	11	0												4		2				1		
	gillnets (BI 11,12)	336	290	3	18	0												2	1							
		309	180	2	14	¼									4			1						1		
		321	240	8	20	0												2		1					1	
		513	1925	8	20	0												7		1						
		383	430	2	15	3/4									16			7	1	1				1		1
		510	1175	2	18	0												4	1				1	1		
		542	1575	2	18	0												6						2		
		274	150	1	9	0												1	1	1						
		293	160	3	12	0												1								
		190	60	3	8	0																				
		308	260	2	13	0																		1		
		277	160	2	14	0												1						3		
		310	230	9	15	3/4			16									1								
		340	260	2	21	3/4											16	5		1						
		454	810	2	15	½									8			5	1	1						
		467	860	8	15	¼									4			5	1					1	1	
		444	540	2	20	0												5	1	1				1	1	
		283	196	8	8	0												1	1	1				1		
		293	230	2	13	0														1						
		478	640	2	21	0												7	1					1		1
		480	840	2	18	0												7	1	1					1	
		475	900	8	18	0												7	1	1					1	
		505	840	8	22	0												5	1				1	1	1	
		420	580	2	16	0												4	1	1				1		1
		347	340	9	18	0												2	1	1						
		411	460	2	18	0												4		1				1		
		157	34	1	5	0																				
		218	72	0	7	0												1								
		595	2225	2	19	¼									4			5	1				1			
		568	1675	2	22	½									8			6						1	1	
		322	275	3	14	¼											4	1		1						1
		378	440	2	14	0													1					1		
		667	2950	2	26	1									20			7	2	1				1	1	
		273	180	2	11	¼						4						2								
		374	430	3	18	½			4							4		2		1	1			1		
		570	1700	4	20	0												7	1					1	1	
		329	260	2	17	¼			4									1								
		297	230	2	11	½			8									1		1						
		439	1780	2	15	0												4	1	1						
		494	1175	8	13	0												4	1					1	1	
		558	1850	8	20	0												7	1	2						1
		270	170	8	9	¼						4								1	1					
		164	38	1	6	3/4	16																			
		112	11.6	1	3	½					8															
		107	9.4	7	3	¼	4																			
		107	8.8	7	3	0																				
		110	10.5	2	4	½		<1			8											1				
		105	10.0	7	4	3/4	4		8		4									1		1				
		120	13.2	7	4	¼		2			2							1		1						
		110	10.5	1	3	½		<1			8						<1	1				1				
		111	10.4	1	4	¼	4	<1														1				
		105	9.2	7	4	½					8											1				
		104	10.4	1	4	0												1				1				
		103	9.0	1	3	3/4	<1		8		8						<1									
		113	11.0	1	3	0														1						
		111	10.4	7	3	¼	<1	4												1						
		93	7.2	7	3	1		20																		

Table 13. Cont'd.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	Stomach Contents[3]												Parasites[4]								
						fullness	Chironomidae	Trichoptera	Notostraca	Amphipoda	Cladocera	Copepoda	Sphaeriidae	fish eggs	fish remains	algae balls	miscellaneous	Diphyllobothrium spp.	Eubothrium salvelini	Proteocephalus sp.	Cyathocephalus truncatus	Crepidostomum farionis	Philonema agubernaculum	Echinorhynchus sp.	Salmincola carpionis	Salmincola edwardsii
11 (continued)		106	8.6	1	4	1/4					4									1		1				
		103	8.8	7	3	1/2		8												1						
		111	9.8	1	4	1/4	4																			
		105	8.6	7	3	0														1		1				
		100	8.3	7	4	0																				
		110	12.1	2	5	1	2	2			16							1								
		105	9.4	1	3	1/2		8									<1			1			1			1
		93	6.9	1	3	0															1			1		
		111	12.2	7	4	1/2	1				8															
		132	22.1	1	4	1/4	2				2							1	1	1						
		108	10.2	1	4	0																	1			1
		97	8.1	7	4	1	1				20															
		101	8.1	1	3	1					20															
		97	7.5	1	4	1/2	4				4															
		103	8.7	7	4	1					20							1						1		
		101	9.2	1	4	1/2		4			4					<1		1				1				
		111	9.1	1	3	0																				
		106	10.2	7	6	1/4	2	1			1							1			1					
		123	16.1	1	3	3/4		<1			16								1	3		1	1			
		94	8.0	1	4	1/2		8														1		1		
		112	10.3	1	3	0												1								
		112	11.7	1	3	1/4					4						<1			1						
		105	8.5	7	3	0																1				
		130	18.1	1	5	0														1						
		116	12.0	7	3	0														1		1				
		112	11.5	1	3	1/2		4									4			1		1				
		105	9.3	1	3	1/2					8									1						
		99	8.4	1	4	0																				
		103	10.2	1	4	1/2		1			8								1							
		98	8.8	7	4	1/4	1	4														1				
		108	8.9	1	4	1					20						<1					1				
		90	7.0	1	4	1/2	4										4			1	1			1		
		114	10.3	7	3	1/4					4							1								
		107	11.0	1	4	1	1	4			16															
		99	8.2	1	3	1/2	8				8											1				
		100	8.3	7	3	0																1				
		91	7.1	1	3	3/4	8	8									<1									
12*1	Neakok Lake	320	275	5	14	0														1						
	64°35'N,75°21'W	342	280	9	21	1			20									1								
	25-27/8/84, 45.5h	282	206	9	14	0												1								
	gillnets (BI 9,10)	237	142	1	5	1/2			8																	
		310	244	8	19	1/2			8									1								
		305	250	9	14	1/2			8									1			1					
		184	54	1	9	0																				
		340	350	4	14	1/2	8											2								
		474	920	8	17	0												6	1					1	1	
		443	550	12	15	0												6	1	1						
		325	325	11	18	1/2			8									1								
		305	242	2	18	0																				
		352	380	4	14	3/4		8	8											1						
		467	950	5	20	0												1	1							
		328	280	2	19	0																				
		338	310	2	14	1/2		8																		
		291	250	9	15	0														1						
		231	105	7	6	1/2									8				1							
		313	260	8	15	1/2		8											1					1		
		342	325	8	19	0												3								
		337	280	2	15	0												1		1						
		320	250	4	15	0												1	1					1		
		261	150	7	10	0												5	1	1						
		211	85	7	5	0												5	1				1			
		105	10.0	1	4	0																				
		97	8.2	7	4	3/4	8	4	4			<1										1				
		106	9.8	1	3	1/4	4													1		1				1
		112	12.1	2	5	1/4	4																			
		111	11.0	1	4	3/4			16								<1					1				
		105	10.2	7	3	0														1		1				
		111	12.0	7	4	1/2	4		4											1						

Table 13. Cont'd.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	Stomach Contents[3]													Parasites[4]								
						fullness	Chironomidae	Trichoptera	Notostraca	Amphipoda	Cladocera	Copepoda	Sphaeriidae	fish eggs	fish remains	algae balls	miscellaneous		Diphyllobothrium spp.	Eubothrium salvelini	Proteocephalus sp.	Cyathocephalus truncatus	Crepidostomum farionis	Philonema agubernaculum	Echinorhynchus sp.	Salmincola carpionis	Salmincola edwardsii
12 (continued)		124	15.4	2	6	3/4	16					<1							1				1				
		137	22.0	9	7	1	20										<1				1		1				
		106	9.4	7	4	½	8																1				
		102	9.0	7	4	½		4											1				2				
		112	11.8	2	5	3/4	16															1	1		1		
		100	9.3	2	4	3/4	8	8											1				1				
		98	8.3	7	3	1	20																1				
		112	11.6	7	3	½											8		1		1	1	1		1		
		104	9.5	2	4	3/4	16			<1							<1										1
		99	8.5	7	4	½	8												1	1			1				
		119	16.3	8	5	3/4	16														1		1	1			
		103	9.0	1	4	¼	4																				
		101	8.5	1	4	1	16		4														1				
		109	11.2	7	3	3/4			8		8										1		1				
		94	7.2	7	3	1	<1		20														1				
		100	7.7	7	4	3/4			16																		
		111	11.0	7	5	½	8												1				1	1			
		100	7.8	7	4	3/4	8	8									<1						1				
		122	17.2	7	5	¼	4																1				1
		106	9.9	3	4	0																	1				
		100	8.9	7	4	¼	2		2														1				
		121	15.2	2	4	3/4	8		8											1	1	1	1				
		95	8.0	7	5	3/4	<1		16														1		1		1
		100	8.2	7	3	¼						2					2		1		3						
		97	8.4	7	4	¼	2		2												1		1				
		108	10.0	7	4	3/4	16					<1											1				
		108	10.6	1	3	1			20												1		1				
		104	9.8	2	4	¼	2		2													1	1				
		94	7.4	1	3	½		8															1				1

* water chemistry and zooplankton taken at this site.
[1] specimens deposited with the Ichthyology Section of the National Museum of Natural Sciences, Ottawa.
[2] see start of Appendix III for coding of sexual maturity.
[3] see start of Appendix III for classification of fish diet.
[4] see start of Appendix III for index to parasite levels of infection.
\- not examined.

Table 14. Data for threespine stickleback (*Gasterosteus aculeatus*) and ninespine stickleback (*Pungitius pungitius*) collected in 1984 on southern Baffin Island, NWT.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	Stomach contents[3]													Parasites[5]					
						fullness	Chironomidae	Diptera	*Gammarus lacustris*	*Eurycercus* sp.	*Bosmina longirostris*	*Chydorus sphaericus*	Cladocera	Copepoda	Ostracoda	*Sphaerium* sp.	Oligochaeta	algae balls	*Diphyllobothrium ditremum*	*Schistocephalus solidus*	*Eubothrium salvelini*	*Proteocephalus* sp.	*Crepidostomum farionis*	**Neoechinorhynchus rutili**
threespine stickleback																								
7	Tessik Lake	61	1.70	8	2	1/2	4					<1			1	2		1						
	64°50'N, 75°25'W	59	1.83	2	2	1/2	8	<1							<1				1					
	28/8/84	62	1.77	8	2	1/2	8								<1									
	from charr stomach	57	1.36	8	-	1	16						2	<1	2					1				
	(BI 13, 14)																							
10[1]	unnamed lake	62	2.00	8	-	1	8	2		2				4	4					1				
	64°36'N, 76°03'W	64	1.94	8	-	1		4						<1	<1		16			1	1		2	
	28/8/84	47	1.03	8	-	1/4	2			1		<1		1	<1					1				
	seine and dip net	47	1.02	7	-	1/4	2							2						3				1
	(BI 15, 16)	52	1.34	7	-	1/4				<1	<1	<1		2	2					2			2	2
		43	0.65	7	-	1								8	8					1				1
		46	0.77	1	-	1/2	<1			<1				8						1				2
		49	0.93	7	-	1/2	2					1		4	1					1				7
		43	0.56	7	-	1/2	2	<1				<1		2	4					2				5
		2 small specimens also preserved																						
11[1]	Kinguk Lake	62	2.09	2	-	1/4				4					<1									
	64°40'N, 75°30'W	60	1.66	2	-	1	4							16										
	27/8/84																							
	from charr stomach																							
	(BI 11, 12)																							
15[1]	unnamed lake	55	1.67	8	-	1	1	16					<1	1	2				7	1				
	62°51.2'N, 69°52'W																							
	6/9/84																							
	dip net																							
ninespine stickleback																								
1[1]	stream	48	0.87	7	1	0														1				1
	66°01'N, 71°54'W	54	1.10	7	1	0																		19
	18-19/8/84, 15h	52	1.22	1	1	3/4	16																	1
	minnow traps	46	0.63	1	1	1/4	4							<1					2					5
	(BIT-1)																							
2[1]	stream	66	2.33	7	1	0																2		
	65°56'N, 72°20'W																							
	18-19/8/84, 13.5h																							
	minnow traps																							
	(BIT-2)																							
3[1]	river	1 small specimen preserved																						
	65°55'N, 73°07'W																							
	21/8/84																							
	dip net (BIT-3)																							
4	stream	no fish caught																						
	65°57'N, 73°25'W																							
	24-25/8/84, 24.5h																							
	minnow traps																							
	(BIT-4)																							
10[1]	unnamed lake	6 small specimens preserved																						
	64°36'N, 76°03'W																							
	28/8/84																							
	seine and dip net																							
	(BI 15, 16)																							
	stream	54	0.83	7	-	0																		2
	64°36.5'N, 76°02'W																							
	27-28/8/84, 16.5h																							
	minnow traps																							
	(BIT-5)																							

[1] specimens deposited with the Ichthyology Section of the National Museum of Natural Sciences, Ottawa.
[2] see start of Appendix 3 for coding of sexual maturity.
[3] see start of Appendix 3 for classification of fish diet.
[5] total counts of parasites and all, except *N. rutili* , are larval forms.
- not examined.

Table 15. Data for marine fishes collected in 1984 on southern Baffin Island, NWT.

Site (Fig. 4)	Sampling location Date, Set time, Gear	Length (mm)	Weight (g)	Sex[2]	Age (y)	Stomach contents[3]: fullness	Isopoda	*Gammarus* sp.	*Gammaracanthus loricatus*	*Onisimus* sp.	*Mysis oculata*	Polychaeta	plant material	invertebrate egg cluster	digested material	Parasites[5]: *Pyramicocephalus phocarum*†	*Brachyphallus crenatus*	*Derogenes varicus*	*Contracaecum* sp. larvae	unident. nematode larva	*Echinorhynchus* sp.
fish doctor (*Gymmelis viridis*)																					
13[1]	Pleasant Inlet 62°49'N,69°59'W 3/9/84 collected on shore	1 specimen preserved																			
Greenland cod (*Gadus ogac*)																					
14[1]	Soper Lake 62°54'N,69°53'W mid-July, 1984 jigged with rod & reel	578	1921	1	11	¼	< 1	< 1				1	1	2		6	6	3	53		208
		602	1739	8	12	¼		< 1				2			2	8	52	16	76	1	150
		510	1499	8	7	¼									4	2			6		205
		492	1125	7	8	¼		< 1					4				1	1	5		248
		486	1011	1	11	¼					< 1				4	2			28		79
		529	1513	1	8	¼			< 1	< 1					4	2	1	11	2		233
Cottidae (*Myoxocephalus* spp.)																					
15[1]	Lake Harbour 62°51'N,69°53'W 6/9/84 dip net	35 fry preserved																			
16[1]	Frobisher Bay 63°44'N,68°31'W 11/8/84 dip net	2 specimens preserved																			

[1] specimens deposited with the Ichthyology Section of the National Museum of Natural Sciences, Ottawa.
[2] see start of Appendix III for coding of sexual maturity.
[3] see start of Appendix III for classification of fish diet.
[5] total counts of parasites except for *B. crenatus* and *D. varicus* from the 1st, 2nd, and 4th fish.
† provisional identification of plerocercoids after Wardle (1932).

APPENDIX 4 DISTRIBUTIONS OF INVERTEBRATES COLLECTED

Table 16. Distributions of invertebrates collected in the 1984 study area (Fig. 4).

Species	Sampling sites 1	2	3[1]	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Identifier
Phylum Porifera																				●		
Phylum Cnidaria																●						
Phylum Echinodermata																						
Cl. Ophiuroidea																						
F. Ophiacanthidae																						
Ophiacantha bidentata (Retzius)																●						P. Frank, NMNS
Phylum Rotifera	□	□			□	□		□	□		□	□										
Cl. Monogononta																						
O. Ploima																						
F. Asplanchnidae																						
Asplanchna sp.						□		□	□		□	□										K. & J. Patalas, FWI
Phylum Annelida																						
Cl. Oligochaeta																						
F. Lumbriculidae																						
Lumbriculus variegatus (Müller)			●														●					J. Madill, NMNS
Phylum Mollusca																						
Cl. Pelecypoda																						
O. Mytiloida																						
F. Mytilidae																						
Musculus discors (Linnaeus)																●						M.F.I. Smith, NMNS
Musculus niger (Gray)																				●		M.F.I. Smith
O. Veneroida																						
F. Astartidae																						
Astarte montagui (Dillwyn)																				●		M.F.I. Smith
F. Tellinidae																						
Macoma calcarea (Gmelin)																●						M.F.I. Smith
O. Eulamellibranchia																						
F. Sphaeriidae	○							○														
Pisidium sp.						■				■												L.M.J. Bernier, ABC
Sphaerium nitidum Clessin						■	■			■												L.M.J. Bernier
Cl. Gastropoda																						
O. Archaeogastropoda																						
F. Trichotropididae																						
Trichotropis borealis (Broderip and Sowerby)																				●		M.F.I. Smith
F. Littorinidae																						
Littorina saxatilis (Olivi)															●	●						M.F.I. Smith
O. Neogastropoda																						
F. Buccinidae																						
Buccinum cf *cyaneum* Bruguière																					●	M.F.I. Smith
Phylum Arthropoda																						
Cl. Arachnida																						
O. Araneae																						
F. Erigonidae																						
Erigone arctophylacis Crosby and Bishop			▲																			C.D. Dondale, BRI
Erigone sp.			▲																			C.D. Dondale
F. Lycosidae																						
Alopecosa hirtipes (Kulczynski)			▲																			C.D. Dondale
Pardosa sp.			▲																			C.D. Dondale
O. Acari																						
F. Ascidae																						
Platyseius nr *major* (Halbert)																			▲			K.W. Wu, BRI
F. Ceratozetidae																						
Diapterobates notatus (Thorell)			▲																			V. Behan-Pelletier, BRI
Fuscozetes sellnicki Hammer			▲																			V. Behan-Pelletier
Melanozetes longisetosus Hammer																			▲			V. Behan-Pelletier
Oromurcia lucens (L. Koch)				▲																		V. Behan-Pelletier
F. Hermanniidae																						
Hermannia reticulata Thorell																			▲			V. Behan-Pelletier
F. Hydrozetidae																						
Hydrozetes thienemanni Strenzke																			▲			V. Behan-Pelletier
F. Laelapidae																						
Haemogamasus ambulans (Thorell)			▲																			K.W. Wu
F. Lebertiidae																						
Lebertia sp.																						
F. Liacaridae																						
Procorynetes sp.																			▲			V. Behan-Pelletier
Cl. Crustacea																						
Subclass Branchiopoda																						
O. Anostraca																						
F. Branchinectidae																						
Artemiopsis stefanssoni Johansen			■	■	■																	L.M.J. Bernier
Branchinecta paludosa (Müller)			■	■	■													■				L.M.J. Bernier
O. Notostraca																						
F. Triopsidae																						
Lepidurus arcticus (Pallas)	○		■			■	○	○	○	○	○	○										L.M.J. Bernier
O. Cladocera																						
F. Bosminidae																						
Bosmina longirostris (Müller)						□	□	□	□	□	□	□										K. & J. Patalas

Table 16. Cont'd.

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	Identifier
F. Chydoridae																						
Alona sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	□	.	.	K. & J. Patalas
Chydorus sphaericus (Müller)	□	□	□	□	.	.	□	□	.	.	□	□	.	.	□	.	□	.	□	.	.	K. & J. Patalas
Eurycercus (Teretisfrons) sp.	.	.	△	△	.	△	○	.	.	△	△	.	.	.	.	.	.	.	△	.	.	B.J. Hann, UM
F. Daphnidae																						
Daphnia longiremis Sars	□	.	.	.	.	□	.	□	□	.	□	□	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Daphnia middendorffiana Fischer	.	□	□	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Daphnia middendorffiana x D. pulex	.	.	□	.	□	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Daphnia pulex Leydig emend. Richard	.	.	.	□	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Daphnia pulex x D. middendorffiana	.	.	.	□	.	.	.	.	.	.	.	.	.	.	.	.	.	.	□	.	.	K. & J. Patalas
F. Holopedidae																						
Holopedium gibberum Zaddach	.	.	.	.	.	□	.	.	.	.	□	.	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Subclass Ostracoda	.	■	.	■	.	○	○	○	○	○	○	○	.	.	■	.	■	.	■	.	.	
Subclass Copepoda																						
O. Calanoida																						
F. Diaptomidae																						
Diaptomus eiseni Lilljeborg	.	.	□	□	□	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Diaptomus minutus Lilljeborg	□	□	□	.	□	□	.	□	□	.	□	□	.	.	.	.	.	.	.	.	.	K. & J. Patalas
F. Temoridae																						
Eurytemora affinis (Poppe)	.	.	.	.	□	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	K. & J. Patalas
O. Cyclopoida																						
F. Cyclopidae																						
Cyclops capillatus Sars	.	.	□	□	□	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Cyclops magnus Marsh	.	.	□	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Cyclops scutifer Sars	□	□	.	□	.	□	.	□	□	.	□	□	.	.	.	.	.	.	.	.	.	K. & J. Patalas
Cyclops vernalis Fischer	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	□	.	.	K. & J. Patalas
O. Harpacticoida	.	.	□	□	.	.	.	.	.	.	.	.	.	.	□	.	.	.	.	.	.	K. & J. Patalas
Subclass Malacostraca																						
O. Mysidacea																						
F. Mysidae																						
Mysis litoralis (Banner)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	.	.	L.M.J. Bernier
Mysis oculata (Fabricius)	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	■	.	.	.	.	.	L.M.J. Bernier
O. Isopoda																						
F. Idotheidae																						
Mesidotea sabini (Krøyer)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	.	.	L.M.J. Bernier
F. Arcturidae																						
Arcturus baffini (Sabine)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	.	.	L.W. Dahlke, DFO
O. Amphipoda																						
F. Gammaridae																						
Gammaracanthus loricatus (Sabine)	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	■	.	.	.	.	.	L.M.J. Bernier
Gammarus lacustris Sars	.	.	.	.	.	■	○	.	.	■	.	■	.	.	.	.	■	.	.	.	.	L.M.J. Bernier
Gammarus setosus Dementieva	.	.	.	.	.	.	.	.	.	.	.	.	.	■	■	■	.	.	.	.	.	M.F. Curtis, FWI
F. Hyperiidae																						
Parathemisto libellula (Mandt)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	.	.	M.F. Curtis
F. Lysianassidae																						
Anonyx nugax (Phipps)	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	.	.	M.F. Curtis
Onisimus litoralis (Krøyer)	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	■	.	.	.	.	.	M.F. Curtis
O. Euphausiacea																						
F. Euphausiidae																						
Thysanoessa sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	.	.	L.W. Dahlke
O. Decapoda																						
Suborder Natantia	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	.	.	
Cl. Insecta																						
O. Coleoptera																						
F. Dytiscidae																						
Agabus moestus Curtis	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	.	.	A. Smetana, BRI
Colymbetes dolobratus Paykull	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	.	.	A. Smetana
Hydroporus lapponum Gyllenhal	.	.	▲	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A. Smetana
Hydroporus polaris Fall	.	.	▲	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	A. Smetana
Hydroporus sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	L. LeSage, BRI
F. Staphylinidae																						
Stenus (s.str.) labilis Erichson	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	A. Davies, BRI
O. Collembola	.	.	■	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	
O. Diptera																						
F. Chironomidae																						
Cladotanytarsus sp.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	M.E. Dillon, BRI
Corynocera sp.	.	.	.	.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	M.E. Dillon
Corynoneura sp.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	M.E. Dillon
Cricotopus sp.	.	.	.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	M.E. Dillon
Dicrotendipes sp.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	M.E. Dillon
Orthocladius (Pogonocladius) sp.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	M.E. Dillon
Paratanytarsus sp.	.	.	▲	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	M.E. Dillon
Phaenopsectra sp.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	M.E. Dillon
Procladius sp.	.	.	▲	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	M.E. Dillon
Psectrocladius sp.	.	.	▲	▲	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	M.E. Dillon
Pseudosmittia sp.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	M.E. Dillon
Tanytarsus sp.	.	.	.	.	.	▲	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	M.E. Dillon
Thienemannia cfr. sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	▲	.	.	M.E. Dillon
F. Dolichopodidae																						
Hydrophorus alpinus Wahlberg	.	.	■	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	B.M. Bissett, BRI
F. Musidae																						
Lispe sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	■	.	.	.	.	H.J. Teskey, BRI
F. Mycetophilidae																						
Exechia frigida (Holmgren)	.	.	■	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	J.R. Vockeroth, BRI
F. Tipulidae																						
Tipula (Arctotipula) sp.	.	.	■	.	.	.	.	.	.	.	.	.	.	.	.	.	■	.	.	.	.	H.J. Teskey
Tipula sp.	.	.	■	.	.	.	.	.	.	.	.	○	.	.	.	.	.	.	.	.	.	H.J. Teskey

Table 16. Cont'd.

Species	Sampling sites: 1	2	3[1]	4	5	6	7	8	9	10	11	12	13	14	15[3]	16	17	18	19	20	21[2]	Identifier[4]
O. Ephemeroptera																						
F. Baetidae																						
Baetis macani bundyae Lehmkuhl	.	.	■	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	D.G. Cobb, FWI
O. Hymenoptera																						
F. Ichneumonidae																						
Exochus mitratus atrocoxalis Cresson	.	.	■	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	J.R. Barron, BRI
O. Trichoptera																						
F. Limnephilidae																						
Apatania sp.	.	.	.	.	.	.	■	.	■	■	■	■	.	.	.	.	■	.	.	.	.	D.G. Cobb
Grensia praeterita (Walker)	.	.	.	.	.	■	.	.	.	■	.	.	.	.	■	.	.	.	.	.	.	D.G. Cobb
Grensia sp.	.	.	■	.	.	.	.	.	.	■	■	■	.	.	.	.	■	.	.	.	.	D.G. Cobb
Phylum Brachiopoda																						
O. Testicardines																						
F. Terebratulidae																						
Terebratulina sp.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	●	.	P. Frank

[1] this site covers three closely grouped tundra ponds and a nearby river.
[2] this site covers a small freshwater lake 0.5 km north of Lake Harbour and the marine tidal zone in Lake Harbour.
[3] entrance to Pangnirtung Fiord.
[4] Institution of affiliation appears with the first mention of the identifier.

ABC - Arctic Biological Consultants, Winnipeg, Manitoba.
BRI - Biosystematics Research Institute, Department of Agriculture, Ottawa, Ontario.
FWI - Freshwater Institute, Department of Fisheries and Oceans, Winnipeg, Manitoba.
DFO - Department of Fisheries and Oceans, Frobisher Bay, Northwest Territories.
NMNS - National Museum of Natural Sciences, Invertebrate Zoology Division, Ottawa, Ontario.
UM - University of Manitoba, Department of Zoology, Winnipeg, Manitoba.

■ In author's collection.
□ In collection of Dr. and Mrs. Patalas.
△ In collection of Dr. B. Hann.
▲ In BRI collections.
● In NMNS collections.
○ Species present but not retained.

APPENDIX 5 DISTRIBUTIONS OF CHIRONOMID SPECIES COLLECTED FROM IGLOOLIK ISLAND, MELVILLE PENINSULA, WALES ISLAND, AND THE NORTHEASTERN DISTRICT OF KEEWATIN IN 1983

Table 17. Distribution of Chironomidae (Diptera) collected from Igloolik Island, Melville Peninsula, Wales Island, and the northeastern District of Keewatin, NWT during the 1983 NLUIS survey (Fig. 20).

Species[1]	Igloolik Island	Melville Peninsula									Wales Island		Keewatin		
	10	1	5	9	12	14	18	30	35	36	26	27	39	41	43
Chaetocladius sp.							●								
Corynoneura sp.	●			●		●	●								
Cricotopus sp.			●												
Diamesa sp.	●														
Heterotrissocladius sp.								●					●		
Oliveridia tricornus (Oliver)								●							
Orthocladius (s.s.) *lapponicus* Goetghebuer								●							
Orthocladius (s.s.) sp.							●								
Orthocladius sp.					●	●									
Protanypus sp.									●				●	●	
Psectrocladius sp.							●								
Pseudodiamesa arctica (Malloch)									●			●	●		
Pseudokiefferiella sp.							●								●
Synorthocladius sp.								●							
Trichotanypus sp.							●								
Tvetenia sp.	●				●	●	●				●				
Zalutschia sp.								●							
Chironominae										●					
Orthocladiinae		●		●	●						●				
Tanytarsini														●	

[1] species identified by Dr. D.R. Oliver, Biosystematics Research Institute, Ottawa.
● species present.

APPENDIX 6 BIRD AND MAMMAL OBSERVATIONS

Table 18. Wildlife sightings in the study area during August and September, 1984.

Map No.[1]	Species	Number Adult	Number Young	Date	Coordinates
35 P	Arctic Hare	1	-	2/9/84	63°45' N, 72°47' W
36 B	Caribou	2	1	27/8/84	64°53' N, 75°35' W
	"	2	-	"	64°51' N, 75°36' W
	"	7	-	28/8/84	64°46' N, 75°41' W
	"	1	-	25/8/84	64°36' N, 75°21' W
36 C,D	Caribou	4	-	28/8/84	64°52' N, 76°43' W
	"	2	-	"	64°49' N, 76°46' W
	"	3	-	"	64°48' N, 76°51' W
	"	2	1	1/9/84	64°24' N, 77°53' W
	Glaucous Gull colony	~ 200		28/8/84	64°20' N, 76°18' W
36 E,F	Caribou	4	1	28/8/84	65°05' N, 76°04' W
	"	13	-	"	65°03' N, 76°03' W
	"	5	-	"	65°02' N, 76°07' W
36 H	Caribou	4	-	18/8/84	65°59' N, 72°36' W
	"	1	1	"	65°57' N, 72°29' W
	"	2	2	"	65°54' N, 72°38' W
	"	5	1	"	65°54' N, 72°58' W
	"	2	-	"	65°56' N, 73°17' W
	"	20	19	17-25/8/84	65°55' N, 73°07' W
	"	1	-	18/8/84	65°49' N, 73°54' W
	"	1	-	"	65°46' N, 73°37' W
	"	4	-	"	65°42' N, 73°33' W
	"	7	-	"	65°40' N, 73°39' W
	"	6	4	"	65°28' N, 73°27' W
	"	9	6	"	65°26' N, 73°28' W
	"	2	2	"	65°27' N, 73°30' W
	Polar Bear	1	2	25/8/84	65°37' N, 73°33' W
	Arctic Fox	3	-	17-25/8/84	65°55' N, 73°07' W
	"	1	-	18/8/84	65°26' N, 73°25' W*
	Atlantic Brant[2]	+	-	17-25/8/84	65°55' N, 73°07' W
	Snow Goose[2]	+		"	" "
	King Eider	+		"	" "
	Glaucous Gull	+		"	" "
	Herring Gull	+		"	" "
	Arctic Loon	+		"	" "
	Parasitic Jaeger	+		"	" "
	Pomerine Jaeger	+		"	" "
	White-rumped Sandpiper	+		"	" "

Table 18. Cont'd.

Map No.[1]	Species	Number Adult	Number Young		Coordinates
36 H (continued)	Golden Plover	+		17-25/8/84	65°55' N, 73°07' W
	Lapland Longspur	+		"	" "
	Snow Bunting	+		"	" "
	Oldsquaw	1	-	25/8/84	65°51' N, 73°37' W
36 I.J	Caribou	3	2	18/8/84	66°58' N, 72°46' W
	"	4	3	"	66°54' N, 72°49' W
	"	12	8	"	66°53' N, 72°51' W
	"	3	3	"	66°51' N, 72°51' W
	"	1	1	"	66°47' N, 72°56' W
	"	5	4	"	66°46' N, 72°57' W
	"	2	-	"	66°35' N, 73°20' W
	"	2	-	"	66°32' N, 73°20' W
	"	5	1	"	66°18' N, 73°54' W
	"	2	-	"	66°13' N, 74°10' W
	"	7	-	"	66°10' N, 74°20' W
	Polar Bear	1	-	"	66°41' N, 73°10' W
	Atlantic Brant[2]	+	+	17-25/8/84	66°05' N, 74°25' W
	Snow Goose[2]	+	+	"	" "
	Canada Goose[2]	+	+	"	" "
	Herring Gull	+		"	" "
	Glaucous Gull	+		"	" "
	White-rumped Sandpiper	+		"	" "
	Red-backed Sandpiper	+		"	" "
	Golden Plover	+		"	" "
	Arctic Tern	+		"	" "
	Lapland Longspur	+		"	" "
	Snow Bunting	+		"	" "
	Parasitic jaeger	+		"	" "
	Common Scoter	+		"	" "
36 P	Caribou	1	1	8/8/84	67°01' N, 72°48' W
	"	10	6	"	67°03' N, 72°41' W

[1] 1:250,000 scale topographical map.
[2] see Fig. 21 for distributions.
\+ not counted.
* camp on Great Plain of the Koukdjuak.

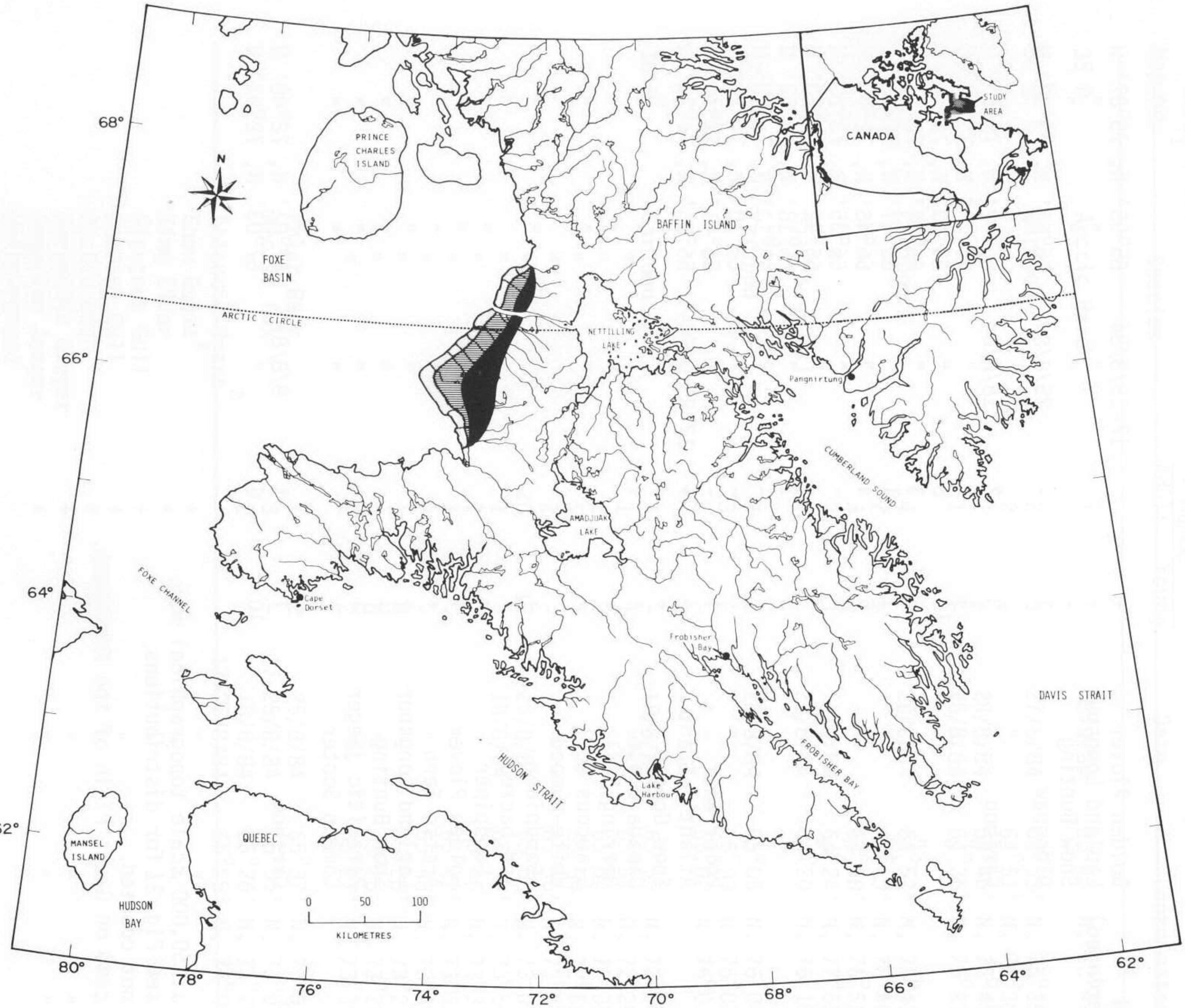

Figure 21. Distributions of Atlantic brant [legend symbol], Canada goose [legend symbol], and snow goose [legend symbol], on The Great Plain of the Koukdjuak, Baffin Island, during August 1984.

APPENDIX 7 NORTHERN LAND USE INFORMATION SERIES REPORTS

LAND USE INFORMATION SERIES REPORTS

Beaubier, P.H., and T. Pierce. 1974. Recreation-tourism evaluation. Land Use Information Series, Lands Directorate, Environment Canada, Ottawa. 35 p.

Elson, M. 1974. Catalogue of fish and stream resources of east central Yukon Territory. Env. Can. Fish. Mar. Serv. Tech. Rep. Series. PAC/T-74-4: 54 p.

Jacobson, R. 1979. Wildlife and wildlife habitat in the Great Slave and Great Bear Lake regions, 1974-1976. Department of Indian and Northern Affairs, Enviornmental Study 10: 134 p.

Lochead, K. (ed.) 1982. Land use issues in the Viscount Melville Sound region, N.W.T. Lands Directorate of Environment Canada and Northern Environment Directorate of Indian and Northern Affairs, Background Report No. 1: 111 p. + 1 map.

MacDonald, G., and R. Fudge. 1979. Arctic Land Use Research Program 1978: a survey of the fisheries resources of the Kazan Upland (District of Mackenzie, southern District of Keewatin, N.W.T.). Department of Indian Affairs and Northern Development, Environmental Studies No. 11: 161 p.

MacDonald, G., and D.B. Stewart. 1980. Arctic Land Use Research Program 1979: a survey of the aquatic resources of the central Keewatin Region of the Northwest Territories. Department of Indian Affairs and Northern Development, Environmental Studies No. 17: 111 p.

McLaughlin, M. 1982. Marine mammals of the Lancaster Sound region. Northern Affairs Program, Department of Indian and Northern Affairs, Environmental Studies No. 23: 73 p.

Schwartz, F.H. 1982. Native land use in the Lancaster Sound area. Northern Affairs Program, Northern Environmental Protection and Renewable Reources Branch, Department of Indian and Northern Development. Environmental Studies No. 27: 47 p.

Stewart, D.B., and L.M.J. Bernier. 1982. An aquatic resource survey of the islands bordering Viscount Melville Sound, District of Franklin, Northwest Territories. Lands Directorate of Environment Canada and Northern Environment Directorate of Indian and Northern Affairs, Northern Land Use Information Series, Background Report No. 2: 110 p.

Stewart, D.B., and L.M.J. Bernier. 1983. An aquatic resource survey of King William and Victoria islands, and the northeastern District of Keewatin, Northwest Territories. Lands Directorate of Environment Canada and Northern Environment Directorate of Indian and Northern Affairs, Background Report No. 3: 127 p.

Stewart, D.B., and L.M.J. Bernier. 1984. An aquatic resource survey of Melville Peninsula, Southampton Island and the northeastern District of Keewatin, Northwest Territories. Lands Directorate of Environment Canada and Northern Environmental Directorate of Indian and Northern affairs, Background Report No. 4: 144 p.

Stewart, D.B., and G. MacDonald. 1978. Arctic Land Use Research Program 1977: a survey of the fisheries of the central Northwest Territories. Department of Indian and Northern Affairs, Environmental Studies No. 8: 121 p.

Stewart, D.B., and G. MacDonald 1981. An aquatic resource survey of Devon, Cornwallis, Somerset and northern Baffin islands, District of Franklin, Northwest Territories, 1980. Department of Indian and Northern Affairs, Environmental Studies No. 20: 84 p.

Sutherland, B.G., and W.R. Golke. 1978. A summary of fisheries data collected for the Land Use Information Map Series. Department of Indian and Northern Affairs, Environmental Studies No. 5: 97 p.

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