MANAGEMENT OF MIGRATORY BIRD SANCTUARIES IN THE INUVIALUIT SETTLEMENT REGION

ANDERSON RIVER DELTA BIRD SANCTUARY

BANKS ISLAND BIRD SANCTUARY NO. 1

BANKS ISLAND BIRD SANCTUARY NO. 2

CAPE PARRY BIRD SANCTUARY

KENDALL ISLAND BIRD SANCTUARY

Environment Canada
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Environnement Canada
Service canadien de la faune

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Environment Canada
Canadian Wildlife Service
Western and Northern Region
Northern Conservation Branch
Yellowknife, Northwest Territories

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PART A

INTRODUCTION

Under the Migratory Birds Convention Act, the Canadian Wildlife Service (CWS) is responsible for conserving and managing populations of migratory birds that occur within Canada. Under this Act, CWS administers the Migratory Bird Regulations, which address the harvest and possession of migratory birds, and the Migratory Bird Sanctuary Regulations, which provide for the establishment and management of Migratory Bird Sanctuaries. General regulations pertaining to the management of Migratory Bird Sanctuaries are listed in Appendix A-1.

Migratory Bird Sanctuaries are established to provide long-term protection to migratory bird populations and their key habitats. At the present time (December 1992) there are 17 Migratory Bird Sanctuaries in the Northwest Territories (NWT), five of which occur within the Inuvialuit Settlement Region: Anderson River Delta Bird Sanctuary, Banks Island Bird Sanctuary No. 1, Banks Island Bird Sanctuary No. 2, Cape Parry Bird Sanctuary, and Kendall Island Bird Sanctuary.

The establishment of Migratory Bird Sanctuaries is consistent with the principles of the Inuvialuit Final Agreement (1985), specifically, "to protect and preserve the Arctic wildlife, environment and biological productivity" (p. 1). CWS will endeavour to ensure that the management of Migratory Bird Sanctuaries is consistent with the Inuvialuit Final Agreement and its underlying conservation principles.

The purpose of this document is to outline the approach used by CWS in managing Migratory Bird Sanctuaries in the Inuvialuit Settlement Region, in particular, and in the NWT generally. Development of a management plan is consistent with Environment Canada's policy on public consultation and is intended to promote dialogue between Environment Canada staff and the public. Open

communication between CWS and interest groups contributes to the formulation of effective policies and programs for Migratory Bird Sanctuaries. Preparation of management plans also addresses a recommendation of the Conservation Advisory Committee (Northern Mineral Policy). In its final report (1990), the Committee recommended "that the Canadian Wildlife Service complete and distribute to interested parties, management plans for the northern sanctuaries" (p. 7).

The following plan is divided into 6 major parts:

Part A describes the general management goals, objectives and policies for Migratory Bird Sanctuaries in the Inuvialuit Settlement Region. Unless otherwise stated, information in Part A applies to all Migratory Bird Sanctuaries within this Region.

Parts B-F present specific information on the natural resources within each of the 5 Migratory Bird Sanctuaries, as follows:

Part B	Anderson River Delta Bird Sanctuary;
Part C	Banks Island Bird Sanctuary No. 1;
Part D	Banks Island Bird Sanctuary No. 2;
Part E	Cape Parry Bird Sanctuary;
Part F	Kendall Island Bird Sanctuary.

Natural resource descriptions provide a context for the management policies presented in Part A, and provide area-specific background information for researchers, naturalists and other prospective visitors.

All inquiries regarding Migratory Bird Sanctuaries in the NWT should be directed to:

Northern Conservation Branch
Canadian Wildlife Service
P.O. Box 637
Yellowknife, Northwest Territories
XIA 2N5

MANAGEMENT GOAL OF MIGRATORY BIRD SANCTUARIES

The management goal of Migratory Bird Sanctuaries is to ensure the long-term protection of migratory bird populations and their key habitats. Management practices focus on preventing disturbance to migratory birds, with special emphasis on rare and endangered species, and maintaining the ecological integrity of their habitats.

MANAGEMENT OBJECTIVES OF MIGRATORY BIRD SANCTUARIES

The management objectives of a Migratory Bird Sanctuary are:

1. To manage and conserve migratory bird populations and their natural habitats in a manner consistent with the Migratory Birds Convention Act and the Migratory Bird Sanctuary Regulations;
2. To manage the Sanctuary according to sound ecological principles; and,
3. To encourage public awareness of and appreciation for the natural environment of the Sanctuary.

MANAGEMENT POLICIES FOR MIGRATORY BIRD SANCTUARIES

Management Authority

The Management Authority for Migratory Bird Sanctuaries is the Minister of the Environment, represented by the Regional Director, CWS, Western and Northern Region, Edmonton. Migratory Bird Sanctuaries that overlap with Inuvialuit (private) lands (Anderson River Delta, Banks Island No. 1 and Cape Parry) will be managed in consultation with the Land Administrator of the Inuvialuit Land Administration, in accordance with the Inuvialuit Final Agreement. The reader should consult the metes and bounds contained in the Inuvialuit Final Agreement for the exact locations of privately owned lands.

Sanctuaries located on federal Crown lands (Kendall Island and Banks Island No. 2) will be managed in consultation with the Minister of Indian and Northern Affairs, in accordance with the Territorial Lands Act.

Wildlife Management

Migratory birds (as defined in Appendix A-2) are managed by the Canadian Wildlife Service. Other wildlife is managed by the Government of the Northwest Territories (Department of Renewable Resources), pursuant to the NWT Wildlife Act, or the Canada Department of Fisheries and Oceans, pursuant to the Fisheries Act, as appropriate. CWS will manage migratory bird populations in consultation with the Wildlife Management Advisory Council (NWT).

Management responsibility for rare and endangered wildlife in the NWT is shared by CWS (pursuant to the Canada Wildlife Act) and the Government of the Northwest Territories. Protection of rare, vulnerable, threatened and endangered species, as defined by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), is a management priority. CWS will endeavour to ensure that any initiatives regarding these species are consistent with those of the Territorial Government.

Land Use

The primary purpose of a Migratory Bird Sanctuary is the protection of migratory birds and their habitats. Other land uses are acceptable provided that they are compatible with the conservation of migratory birds, and that activities are conducted in accordance with the appropriate permits. Guidelines used to determine the acceptability of secondary land uses include the type of land-use activity, its potential for causing disturbance to nesting birds and/or damage to important habitats, and the seasons during which the activities will be carried out. Land-use operators should contact the Canadian Wildlife Service in Yellowknife if they have questions concerning the compatability of

their proposed land-use activities with the conservation of migratory birds. Proposed activities within sanctuaries in the Inuvialuit Settlement Region may also be subject to the environmental screening and review processes specified in the Inuvialuit Final Agreement.

Permits

A Sanctuary Permit is required by all persons or parties who wish to carry out any activity within a Migratory Bird Sanctuary. Permits are available from:

Enforcement Coordinator
Canadian Wildlife Service
P.O. Box 637
Yellowknife, Northwest Territories
X1A 2N5

Additional permits may be required from other agencies, depending upon the nature of the proposed activities (Appendix A-3).

Subsistence Hunting and Trapping

Under the Migratory Bird Sanctuary Regulations, any person who is the holder of, or eligible for, a General Hunting Licence for the Northwest Territories may take fur-bearing animals, big game, or marine mammals within a Migratory Bird Sanctuary, in accordance with that licence. Ancillary activities associated with subsistence hunting must not have negative impacts on migratory bird populations or habitats. Provisions in the Inuvialuit Final Agreement concerning the harvesting rights of the Inuvialuit in the Inuvialuit Settlement Region apply equally to Migratory Bird Sanctuaries within the Region.

Recreational Hunting

The guiding of sport hunters for the purpose of taking marine or terrestrial mammals may be a significant source of income for Inuvialuit communities. Such activities are acceptable within Migratory Bird Sanctuaries provided that there are no negative

impacts on migratory birds or their habitats. All sport hunters must obtain a Sanctuary Permit from CWS in order to carry firearms within a Migratory Bird Sanctuary.

Research

Research that will promote a greater understanding of the natural resources of Migratory Bird Sanctuaries is encouraged. All research proposals will be screened by the Management Authority to ensure compatability with conservation objectives and other ongoing research. Appropriate permits are required to conduct research in Migratory Bird Sanctuaries (Appendix A-3).

Recreation

CWS recognizes that recreational activities associated with wildlife viewing and appreciation are a legitimate land use. Their acceptability, however, is a function of the season, location, nature and intensity of such pursuits. Recreational activities will be monitored by CWS and, if necessary, restrictions may be imposed on visitor access.

Restricted Areas

Some migratory birds are particularly sensitive to disturbance at certain times of the year. Thus, it may be necessary to prohibit access to a portion of a Migratory Bird Sanctuary for a specified time, or to place special conditions on Sanctuary Permits to safeguard bird populations. Land-use activities within the following "restricted areas" may be prohibited or strictly controlled:

Anderson River Delta: A portion of the outer Anderson River delta is a restricted area between 20 May and 25 August to protect nesting and moulting Lesser Snow Geese.

Banks Island No. 1: An area near the Egg and Big rivers is a

restricted area between 20 May and 25 August to protect nesting and moulting Lesser Snow Geese.

Banks Island No. 2: The Thomsen River is a restricted area between 15 June and 25 August to protect moulting Lesser Snow Geese.

Cape Parry: The northwest portion of Cape Parry is a restricted area between 1 June and 15 September to protect nesting Thick-billed Murres.

Kendall Island: An area south of Kendall Island is a restricted area between 20 May and 25 August to protect nesting and moulting Lesser Snow Geese.

Significant Natural Features

CWS recognizes that Migratory Bird Sanctuaries may contain significant natural features in addition to those that comprise important habitats for migratory birds (e.g., plant communities, geological formations or topographic features). CWS will assist in protecting such natural features from land-use activities by cooperating with the appropriate management authorities.

Archaeological Sites

Archaeological sites within Migratory Bird Sanctuaries are protected by the Territorial Lands Act and Regulations, and the Archaeological Sites Regulations of the Northwest Territories Act. CWS will endeavour to ensure that all activities within Sanctuaries adhere to these regulations.

Public Consultation

The management of Migratory Bird Sanctuaries involves consultation with all interested parties. Public input is a fundamental step in the development and subsequent review of

management plans. Comments are welcome at any time, and should be forwarded to:

Northern Conservation Branch
Canadian Wildlife Service
P.O. Box 637
Yellowknife, Northwest Territories
X1A 2N5

Review of Management Plan

The Management Authority, in consultation with interested parties, will review the Management Plan after five years initially and at ten-year intervals thereafter, and will amend the Plan as required.

Appendix A-1. Regulations respecting the management of Migratory Bird Sanctuaries, pursuant to the Migratory Birds Convention Act.

NOTE: THIS APPENDIX IS PREPARED FOR PURPOSES OF CONVENIENCE ONLY. THE ORIGINAL ACT AND AMENDMENTS THERETO SHOULD BE CONSULTED FOR ALL PURPOSES OF INTERPRETATION AND APPLYING THE LAW.

General Prohibitions

3. (1) The areas set out in the schedule are hereby prescribed as migratory bird sanctuaries.

(2) No person shall, in a migratory bird sanctuary,
(a) hunt migratory birds,
(b) disturb, destroy or take the nests of migratory birds, or
(c) have in his possession a live migratory bird, or a carcass, skin, nest or egg of a migratory bird,
except under authority of a permit therefor.

(3) Notwithstanding paragraph (1)(c), a resident of or a person domiciled in a migratory bird sanctuary may have in his possession migratory game birds lawfully killed outside a migratory bird sanctuary.

4. (1) No person shall have in his possession in a migratory bird sanctuary
(a) any firearm; or
(b) any hunting appliance except as otherwise provided in these Regulations.

(2) Subsection (1) does not apply to any resident or person actually domiciled in a migratory bird sanctuary while that resident or person is in his residence or transporting any firearms or a hunting appliance to or from his residence.

(3) Subject to the Act and the Migratory Birds Regulations, the Minister may issue a permit authorizing any person to have firearms in his possession and to shoot and have in his possession migratory game birds in such portion of a migratory bird sanctuary and during such time as are specified in the permit.

5. (1) No person who owns a dog or cat shall permit the dog or cat to run at large in a migratory bird sanctuary.

(2) A game officer may destroy any dog or cat found chasing or molesting migratory birds in a migratory bird sanctuary.

Permits

9. (1) The Minister may issue, or authorize any person to issue, any permit referred to in these Regulations.

(2) Every person who applies for a permit shall, if requested by the Minister, furnish such information in respect of the purpose for which the permit is requested as the Minister may require.

(3) Every permit shall be subject to such conditions as in the opinion of the Minister are necessary to protect migratory birds or the eggs, nests or habitat of migratory birds within a migratory bird sanctuary.

(4) The Minister may
(a) refuse to issue a permit to any person, or
(b) cancel any permit that has been issued to any person,
if, in his opinion, that person has failed to comply with the conditions set out in the permit or the activities being carried on by that person are likely to be harmful to migratory birds or the eggs, nests or habitat of migratory birds within a migratory bird sanctuary.

(5) Every permit expires on the expiry date set out therein or, where the permit does not contain an expiry date, on December 31 next following the day on which it was issued.

10. (1) No person shall, in a migratory bird sanctuary, carry on any activity that is harmful to migratory birds or the eggs, nests or habitat of migratory birds, except under authority of a permit.

(2) A permit referred to in subsection (1), may be issued,
(a) by the Minister, where the sanctuary is situated on land owned by Her Majesty in right of Canada; or
(b) by the chief game officer of a province, where the sanctuary is situated on land owned by Her Majesty in right of the province.

(3) For the purposes of subsection (2), "chief game officer of a province" means the chief or director of an agency of the province concerned with the administration of a wildlife Act of the province.

11. Notwithstanding anything in these regulations
(d) any person who is the holder of, or eligible for, a general hunting licence for the Northwest

Territories may carry a firearm within any migratory bird sanctuary lying north of the 60th parallel of north latitude for the purpose of taking fur-bearing animals, big game or sea mammals in accordance with that licence;

(e) any person herding reindeer may use dogs for the purpose of retrieving any reindeer that stray into the Kendall Island Bird Sanctuary or the Anderson River Delta Bird Sanctuary; or

(f) any person herding reindeer may allow those reindeer to pass through the Anderson River Delta Bird Sanctuary to and from the Nicholson Peninsula at 65°55′ north latitude and 129° west longitude.

Appendix A-2. Migratory birds, as defined by the Migratory Birds Convention Act.

NOTE: THIS APPENDIX IS PREPARED FOR PURPOSES OF CONVENIENCE ONLY. THE ORIGINAL ACT AND AMENDMENTS THERETO SHOULD BE CONSULTED FOR ALL PURPOSES OF INTERPRETATION AND APPLYING THE LAW.

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1. Migratory Game Birds:
(a) Anatidae or waterfowl, including brant, wild ducks, geese, and swans;
(b) Gruidae or cranes, including little brown, sandhill, and whooping cranes;
(c) Rallidae or rails, including coots, gallinules and sora and other rails;
(d) Limicolae or shorebirds, including avocets, curlew, dowitchers, godwits, knots, oyster catchers, phalaropes, plovers, sandpipers, snipe, stilts, surf birds, turnstones, willet, woodcock, and yellowlegs;
(e) Columbidae or pigeons, including doves and wild pigeons.

2. Migratory Insectivorous Birds: Bobolinks, catbirds, chickadees, cuckoos, flickers, flycatchers, grosbeaks, hummingbirds, kinglets, martins, meadowlarks, nighthawks or bull bats, nuthatches, orioles, robins, shrikes, swallows, swifts, tanagers, titmice, thrushes, vireos, warblers, waxwings, whippoorwills, woodpeckers, and wrens, and all other perching birds which feed entirely or chiefly on insects.

3. Other Migratory Nongame Birds: Auks, auklets, bitterns, fulmars, gannets, grebes, guillemots, gulls, herons, jaegers, loons, murres, petrels, puffins, shearwaters, and terns.

Appendix A-3. Permits relating to Migratory Bird Sanctuaries in the Inuvialuit Settlement Region.

Permit	Activity covered by Permit	Applicable Legislation	Contact for Permit and Application Procedures
Sanctuary Permit	Applicable to all persons or parties who wish to enter the Migratory Bird Sanctuary for any purpose.	Migratory Bird Sanctuary Regulations of the Migratory Birds Convention Act.	Enforcement Coordinator Canadian Wildlife Service, Box 637, Yellowknife, N.W.T., X1A 2N5 (403) 920-8551
Wildlife Research Permit	For all activities directly related to wildlife research.	Wildlife Licences and Permits Regulations of the NWT Wildlife Act.	Director, Wildlife Management Division, Department of Renewable Resources, Government of the Northwest Territories Yellowknife, N.W.T. X1A 2L9 (403) 873-7411
Archaeologist's Permit	For all archaeological work.	Northwest Territories Archaeological Sites Regulations of the Northwest Territories Act.	Senior Archaeologist, Prince of Wales Northern Heritage Centre Department of Culture and and Communications Government of the Northwest Territories Yellowknife, N.W.T. X1A 2I9 (403) 920-8839
Scientific Research Licence	For all scientific research, excluding wildlife research and archaeological work.	Scientists Act.	Science Administrator Science Institute of the Northwest Territories P.O. Box 1617, Yellowknife, N.W.T. X1A 219 (403) 873-7592
Land Use Permit (Federal)	For activities on Federal crown lands where vehicles, explosives, fuel, drilling equipment, earth moving and clearing equipment, hydraulic prospecting, campsites, or the preparation of lines, trails or rights-of-way are required.	Territorial Land Use Regulations of the Territorial Lands Act.	District Manager, Inuvik District Indian and Northern Affairs Canada P.O. Box 2100, Inuvik, N.W.T. X0E 0T0 (403) 979-3361
Inuvialuit Land Use Licence or Permit	For all activities on Inuvialuit lands.	Western Arctic (Inuvialuit) Claims Settlement Act.	Land Administrator Inuvialuit Land Administration Box 290, Tuktoyaktuk, N.W.T. X0E 1C0 (403) 977-2202
Fisheries Collection Permit	For all activities relating to the collection of fishes or marine mammals.	Fisheries Act.	Area Manager Department of Fisheries & Oceans Box 1871, Inuvik, N.W.T. X0E 0T0 (403) 979-3314

Notes: This is not a complete list. Additional permits may be required for specific purposes (e.g., collecting of wildlife specimens, removal of wildlife specimens from the NWT, water licences). Please consult the appropriate regulations for further information.

PART B

ANDERSON RIVER DELTA BIRD SANCTUARY

Historical Perspective

The earliest accounts of the Anderson River area were made by Dr. John Richardson as captain of the Franklin Polar Expeditions. Between 1857 and 1865, R.M. MacFarlane and J. Anderson explored the river and collected specimens and information on the birds of the area. Their work documented the Anderson River delta as having significant populations of waterfowl and other migratory birds. In 1949, an aerial investigation of the delta was made to determine its suitability as a bird sanctuary, and in 1951 the establishment of a sanctuary was recommended. Later work by T.W. Barry confirmed the delta's importance to nesting geese.

In 1961, the Anderson River Delta Bird Sanctuary was created (Order-in-Council P.C. 1961-1617) to protect nesting areas of geese, notably Brant and Lesser Snow Geese. The Sanctuary encompasses approximately 1083 km^2 (Figure B-1, Appendix B-1). In 1984, the Inuvialuit were granted surface rights to all lands within the Sanctuary.

In the past, the Anderson River area was used extensively by native peoples. In 1865, an estimated 600 Inuit and Indians lived in the area. By the mid-1950s only one trapper remained. Presently, one family from Tuktoyaktuk maintains an outpost camp roughly 10 km northeast of the Sanctuary. Arctic fox, marten, wolverine, and wolf are the principal species trapped in the Sanctuary and adjacent areas.

Natural Setting

Climate and Weather

The Sanctuary falls within the region of continuous permafrost. Cold, dry winters and short, cool summmers are characteristic. The mean annual temperature is approximately

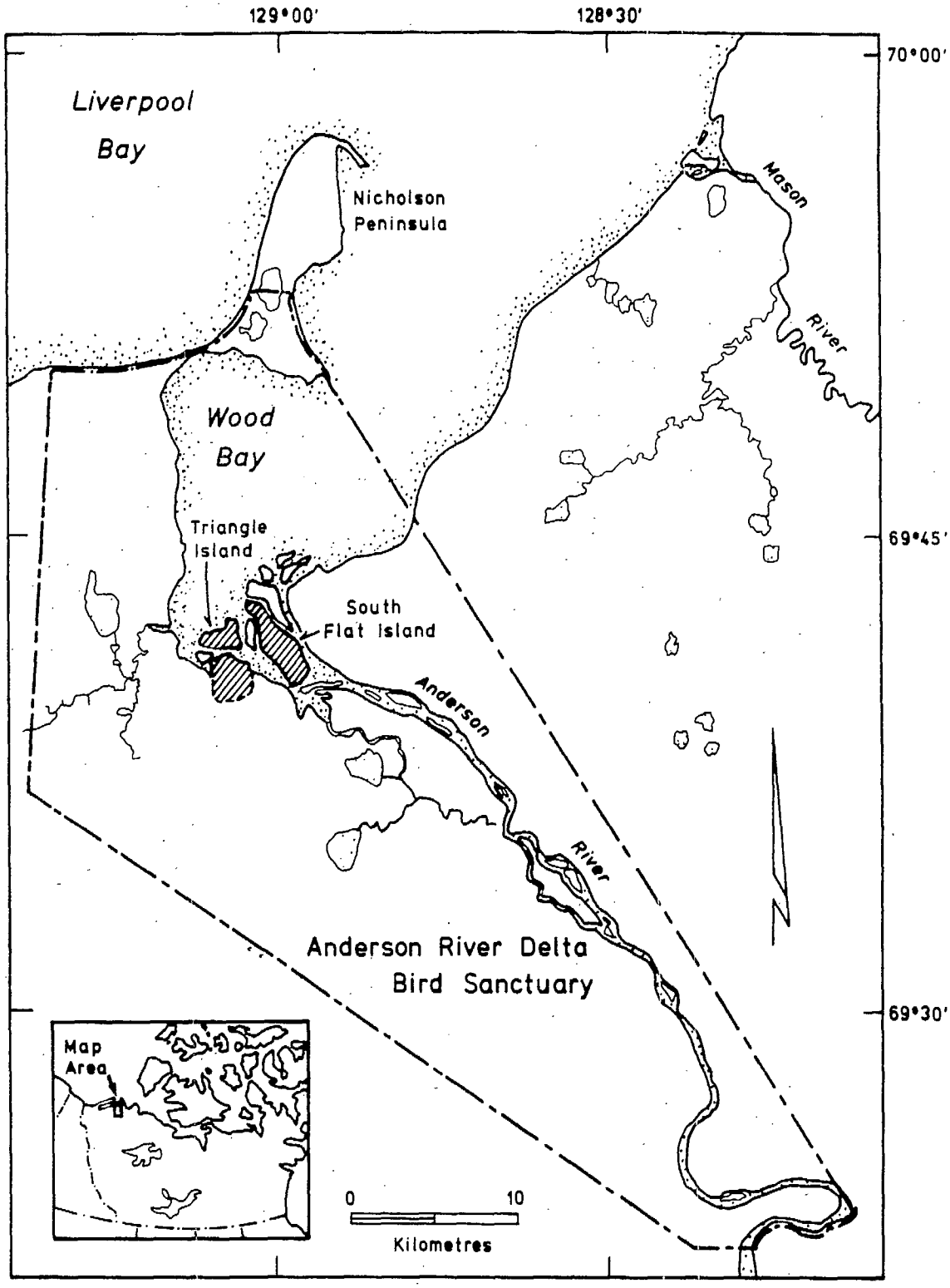

Figure B-1. Location of Anderson River Delta Bird Sanctuary. (The hatched areas show the locations of the main nesting areas for Lesser Snow Geese. Access to these areas may be restricted from 20 May to 25 August to protect nesting and moulting Lesser Snow Geese.)

-12°C with annual extremes of -48°C to 30°C. June through September are the only months with mean temperatures above freezing. The average annual precipitation is low (11.3 centimetres), most of which falls as rain (65%). Spring breakup of the Anderson River delta occurs between May 21 and June 15. Freeze-up begins in late September or early October.

Geography

The Sanctuary is part of the Arctic Coastal Plain and for the most part is characterized by low relief. Much of the coastal area consists of patterned ground with well defined ice-wedge polygons associated with wet tundra. Pingos occur on Nicholson Island and bluffs occur at various places along the Anderson River.

The surficial materials of the Sanctuary are generally stone-free. The floodplain of the Anderson River contains fine clay to clay-loam alluvial soils, whereas areas outside the floodplain are dominated by tills. Much of the land surface is covered by a layer of peat one to three metres thick. Permafrost is usually within one metre of the surface.

The Sanctuary is characterized by arctic tundra and boreal-tundra transition vegetation. Sedges and low shrubs (up to 50 cm high) are common. Upland sites contain low birch and willow along with a variety of other small shrubs, heath plants, mosses and lichens. On the poorly drained lowland sites, cotton grass, sedges and mosses are common. Tall willows occur on alluvial and poorly drained soils, particularly along channels and tributaries of the Anderson River.

Significant Natural Features

The fossil beds along the lower Anderson River are unique in Canada. Fossils of Cretaceous fish, birds, and reptiles occur in the Mason River and Smoking Hills geological formations.

Birds

The wide range of habitats encompassed by the Anderson River Delta Bird Sanctuary attracts a high diversity of breeding birds. Approximately 100 species, including 64 breeding species, have been recorded within the Sanctuary (Appendix B-2).

Near the turn of the century, the Eskimo Curlew was an abundant breeder near the Anderson River. Today, the Eskimo Curlew is classified as an endangered species, and the world population may be fewer than 20 individuals. Few sightings have been made in recent years, but there is a possibility that a small breeding population may persist in the Sanctuary.

The Anderson River delta is a very important area for breeding, moulting and migrating waterfowl. Numbers of breeding birds vary annually, but Tundra Swans, Greater White-fronted Geese, Lesser Snow Geese, Canada Geese and Brant consistently use the area. The outer delta provides nesting habitat for up to 2,500 Brant, which represents nearly 6% of the Canadian population of this species. Oldsquaw, scaup and scoters use the shores of Wood Bay for nesting and moulting. Many species of shorebirds use the tidal flats for feeding and staging during their migrations.

Peregrine Falcons, Gyrfalcons, and Golden Eagles have all been recorded as breeding within the Sanctuary.

Lesser Snow Goose

The north coast of the eastern Beaufort Sea is an important feeding and staging area for a major portion of the Western Canadian Arctic population of Snow Geese (up to 400,000 birds). Geese from the western Arctic winter in California where they mix with birds from the central Arctic and from the Wrangel Island population of the USSR.

In spring, the Sanctuary is used for staging by an estimated 20,000 birds prior to their migration to Banks Island. The number of breeders using the area depends on spring weather conditions and the timing of snowmelt. From 3,000 to 8,000 Lesser Snow Geese nest within the Sanctuary. The islands of the middle Anderson River

delta are the favoured nesting locations, including Triangle Island and South Flat Island (Figure B-1).

The Anderson River Snow Geese arrive on the nesting grounds between late May and early June, and generally leave the area by late September or early October.

Brant

Brant breed in loose colonies on the Arctic coast of both western North America and eastern Siberia. Arriving in late May to mid-June, the number of birds that nest in the Sanctuary depends greatly on the habitat conditions. Up to 2,500 Brant have nested on the low-lying, muddy islands of the outer Anderson River delta and tributary streams of the Anderson River.

The fall migration begins in late August, with the majority of the birds retracing their spring migration route along the Pacific coast to wintering grounds in California and Mexico.

Greater White-fronted Goose

An estimated 300,000 Greater White-fronted Geese nest in Alaska and along the western Arctic coast of Canada. Approximately 25,000 breeding and non-breeding birds use the Sanctuary and surrounding areas (e.g., Liverpool Bay). The geese migrate north from their wintering areas in Texas, Louisiana and Mexico, through the Prairie Provinces and the Peace and Mackenzie river valleys, to reach their breeding grounds along the Beaufort Sea in mid-May to early June. Some southward movement begins in early August when non-breeders regain flight. The major fall migration is well under way by mid-September.

Mammals

Thirty-eight species have been recorded within and near the Anderson River Delta Bird Sanctuary (Appendix B-3). Boreal forest species, such as beaver, lynx and moose, occasionally wander as far north as the Sanctuary. Polar bears are occasionally found in the area. Bearded and ringed seals are common in the Beaufort Sea, and are occasionally found within the Sanctuary. Bowhead whales, white whales and killer whales have all been observed in or at the mouth of Liverpool Bay.

Barren-ground caribou within the Sanctuary belong to the Bluenose Herd, which occupies a range of 290,000 square kilometres between the Mackenzie and Coppermine rivers, and between Great Bear Lake and the Arctic coast. The Sanctuary serves primarily as summer range. Caribou are common on the delta and beach areas of the Sanctuary after mid-June, and in October and November they move southwards along the east side of the Anderson River to wintering areas.

The barren-ground grizzly bear is common in the delta area, along the main channels of the Anderson River, and along the south shore of Liverpool Bay. Grizzlies can cause extensive damage to nesting colonies of geese. During the 1985 nesting season, 2,500 Lesser Snow Goose and 500 Brant nests were destroyed by bears.

Fishes

There is little information on fish populations within the Sanctuary. The checklist of species (Appendix B-4) is based on range maps published in general accounts of Arctic fishes.

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Appendix B-1. Metes and bounds of Anderson River Delta Bird Sanctuary (Order-in-Council P.C. 1961-1617).

The Anderson River Delta Bird Sanctuary is described in the Migratory Bird Sanctuary Regulations as being:

"In the Northwest Territories, in the District of Mackenzie, in the vicinity of the Anderson River; all that tract more particularly described as follows:

Commencing at the southwestern end of certain high bluffs on the southeasterly shore of Wood Bay at latitude 69°46′, longitude 128°48′, approximately, thence northwesterly in a straight line to the southeasternnmost point in the shore of Nicholson Peninsula;

thence northerly along the easterly shore of said peninsula to the westernmost point in said easterly shore;

thence west to the west shore of said peninsula;

thence southwesterly and westerly along the west shore of said peninsula and the southeasterly shore of Liverpool Bay to longitude 129°20′;

thence southerly in a straight line to the westernmost extremity of an unnamed lake at latitude 69°38′,longitude 129°20′, approximately;

thence southeasterly in a straight line to the southernmost extremity of an unnamed lake at latitude 69°24′, longitude 128°22′, approximately;

thence east to the right bank of Anderson River;

thence northeasterly along said right bank to the easternmost point in the right bank of said River at Husky Bend, at latitude 69°25′, longitude 128°10′, approximately;

thence northwesterly in a straight line to the point of commencement;

said tract being described with reference to the latest available edition of sheet 107 SW and 107 SE of the National Topographic Series, scale 8 miles to 1 inch, and containing 418 square miles, approximately. (Migratory Bird Sanctuary Regulations SOR/DOR/74-514)."

From its southernmost extent at Husky Bend to Liverpool Bay the Sanctuary measures approximately 69 kilometres and contains approximately 1,083 square kilometers.

Appendix B-2. Checklist of birds of Anderson River Delta Bird Sanctuary.

Common Name	Scientific Name
Red-throated Loon	Gavia stellata
Pacific Loon	Gavia pacifica
Common Loon	Gavia immer
Yellow-billed Loon	Gavia adamsii
Tundra Swan	Cygnus columbianus
Greater White-fronted Goose	Anser albifrons
Snow Goose	Anser caerulescens
Ross's Goose	Anser rossii
Brant	Branta bernicla nigricans
Canada Goose	Branta canadensis
Green-winged Teal	Anas crecca
Mallard	Anas platyrhynchos
Northern Pintail	Anas acuta
American Widgeon	Anas americana
Canvasback	Aythya valisineria
Greater Scaup	Aythya marila
Lesser Scaup	Aythya affinis
Common Eider	Somateria mollissima
King Eider	Somateria spectabilis
Oldsquaw	Clangula hyemalis
Black Scoter	Melanitta nigra
Surf Scoter	Melanitta perspicillata
White-winged Scoter	Melanitta fusca
Common Goldeneye	Bucephala clangula
Red-breasted Merganser	Mergus serrator
Bald Eagle	Haliaeetus leucocephalus
Northern Harrier	Circus cyaneus
Rough-legged Hawk	Buteo lagopus
Golden Eagle	Aquila chrysaetos
American Kestrel	Falco sparverius
Merlin	Falco columbarius
Peregrine Falcon	Falco peregrinus
Gyrfalcon	Falco rusticolus
Willow Ptarmigan	Lagopus lagopus
Rock Ptarmigan	Lagopus mutus
Sandhill Crane	Grus canadensis
Black-bellied Plover	Pluvialis squatarola
Lesser Golden-Plover	Pluvialis dominica
Semipalmated Plover	Charadrius semipalmatus
Killdeer	Charadrius vociferus
Greater Yellowlegs	Tringa melanoleuca
Lesser Yellowlegs	Tringa flavipes
Spotted Sandpiper	Actitis macularia
Eskimo Curlew	Numenius borealis
Whimbrel	Numenius phaeopus
Hudsonian Godwit	Limosa haemastica

Appendix B-2 (Cont'd).

Ruddy Turnstone	Arenaria interpres
Sanderling	Calidris alba
Semipalmated Sandpiper	Calidris pusilla
Western Sandpiper	Calidris mauri
Least Sandpiper	Calidris minutilla
White-rumped Sandpiper	Calidris fuscicollis
Baird's Sandpiper	Calidris bairdii
Pectoral Sandpiper	Calidris melanotos
Stilt Sandpiper	Calidris himantopus
Buff-breasted Sandpiper	Tryngites subruficollis
Long-billed Dowitcher	Limnodromus scolopaceus
Common Snipe	Gallinago gallinago
Red-necked Phalarope	Phalaropus lobatus
Red Phalarope	Phalaropus fulicarius
Pomarine Jaeger	Stercorarius pomarinus
Parasitic Jaeger	Stercorarius parasiticus
Long-tailed Jaeger	Stercorarius longicaudus
Bonaparte's Gull	Larus philadelphia
Mew Gull	Larus canus
Thayer's Gull	Larus glaucoides thayeri
Glaucous Gull	Larus hyperboreus
Sabine's Gull	Xema sabini
Arctic Tern	Sterna paradisaea
Snowy Owl	Nyctea scandiaca
Northern Hawk-Owl	Surnia ulula
Short-eared Owl	Asio flammeus
Hairy Woodpecker	Picoides villosus
Northern Flicker	Colaptes auratus
Say's Phoebe	Sayornis saya
Horned Lark	Eremophila alpestris
Cliff Swallow	Hirundo pyrrhonota
Barn Swallow	Hirundo rustica
Gray Jay	Perisoreus canadensis
Common Raven	Corvus corax
Gray-cheeked Thrush	Catharus minimus
American Robin	Turdus migratorius
Northern Wheatear	Oenanthe oenanthe
Water Pipit	Anthus spinoletta
Bohemian Waxwing	Bombycilla garrulus
European Starling	Sturnus vulgaris
Yellow warbler	Dendroica petechia
Blackpoll Warbler	Dendroica striata
American Tree Sparrow	Spizella arborea
Savannah Sparrow	Passerculus sandwichensis
Fox Sparrow	Passerella iliaca
White-crowned Sparrow	Zonotrichia leucophrys
Harris's Sparrow	Zonotrichia querula
Dark-eyed Junco	Junco hyemalis
Lapland Longspur	Calcarius lapponicus
Snow Bunting	Plectrophenax nivalis
Rusty Blackbird	Euphagus carolinus

Appendix B-2 (Cont'd).

Common Redpoll	*Carduelis flammea*
Hoary Redpoll	*Carduelis hornemanni*

Appendix B-3. Checklist of mammals of Anderson River Delta Bird Sanctuary.

Common Name	Scientific Name
Terrestrial Mammals:	
Arctic shrew	Sorex arcticus
Masked shrew	Sorex cinereus
Snowshoe hare	Lepus americanus
Arctic hare	Lepus arcticus
Arctic ground squirrel	Spermophilus parryi
Red squirrel	Tamiasciurus hudsonicus
Beaver	Castor canadensis
Northern red-backed vole	Clethrionomys rutilus
Brown lemming	Lemmus sibiricus
Collared lemming	Dicrostonyx torquatus
Muskrat	Ondatra zibethicus
Meadow vole	Microtus pennsylvanicus
Tundra vole	Microtus oeconomus
Chestnut-cheeked vole	Microtus xanthognathus
Porcupine	Erethizon dorsatum
Wolf	Canis lupus
Arctic fox	Alopex lagopus
Red fox	Vulpes vulpes
Black bear	Ursus americanus
Grizzly bear	Ursus arctos
Polar bear	Ursus maritimus
Marten	Martes americana
Ermine	Mustela erminea
Least weasel	Mustela nivalis
Mink	Mustela vison
Wolverine	Gulo gulo
River otter	Lontra canadensis
Lynx	Lynx lynx
Barren-ground caribou	Rangifer tarandus
Moose	Alces alces
Muskox	Ovibos moschatus
Marine Mammals:	
White Whale	Delphinapterus leucas
Narwhal	Monodon monoceros
Killer Whale	Orcinus orca

Appendix B-3 (Cont'd)

Bowhead Whale	Balaena mysticetus
Walrus	Odobenus rosmarus
Bearded Seal	Erignathus barbatus
Ringed Seal	Phoca hispida

Appendix B-4. Provisional checklist of fishes of Anderson River Delta Bird Sanctuary.

Common Name	Scientific Name
Arctic Char	Salvelinus alpinus
Arctic Lamprey	Lampetra japonica
Arctic Cisco	Coregonus autumnalis
Arctic Grayling	Liopsetta glacialis
Boreal Smelt	Osmerus eperlanus
Broad Whitefish	Coregonus nasus
Humpback Whitefish	Coregonus clupeaformis
Inconnu	Stenodus leucichthys nelma
Lake Trout	Salvelinus namaycush
Least Cisco	Coregonus sardinella
Longnose Sucker	Catostomatus catostomatus
Northern Pike	Esox lucius
Nine-spine Stickleback	Pungitius pungitius
Round Whitefish	Prosopium cylindraceum
Chum Salmon	Oncorhynchus keta
Lake Chub	Couesius plumbeus
Saffron Cod	Eleginus navaga
Arctic Cod	Boreogadus saida
Burbot	Lota lota
Slimy Sculpin	Cottus cognatus
Arctic Flounder	Liopsetta glacialis
Starry Flounder	Platichthys stellatus

PART C

BANKS ISLAND BIRD SANCTUARY NO. 1

Historical Perspective

Several archaeological sites within Banks Island Bird Sanctuary No. 1 suggest that the area has been occupied for centuries. Thule house ruins in several places on Banks Island indicate that occupation was as recent as 500 years ago. The first exploration of the coast of Banks Island by Europeans was conducted in 1851 by James M'Clure. In 1914, Stefannson spent the summer in the vicinity of the Bernard River, where remnants of his camp have been found. He also maintained a base camp at Cape Kellett until 1917. Recent occupation did not begin until 1929 when Mackenzie Delta Inuvialuit families founded the settlement of Sachs Harbour.

Scientific investigations were first conducted in 1906 when Harrison, while exploring for a "polar continent", documented some of the flora and fauna of the western coast of Banks Island. The surveys by T.W. Barry in 1960 documented the importance of western Banks Island as nesting habitat for a variety of Arctic birds, particularly Lesser Snow Geese and King Eiders.

Plans for extensive oil exploration on Banks Island, scheduled for the summer of 1961, prompted CWS to establish the Sanctuary (Order-in-Council P.C. 1961-1617) to protect the largest colony of nesting Lesser Snow Geese in the western Canadian Arctic (Figure C-1). The Sanctuary encompasses approximately 20 517 km^2 (Appendix C-1). In 1984, the Inuvialuit were granted surface rights to much of the land around and within Banks Island Bird Sanctuary No. 1, and subsurface rights to a small area in the southwest corner of the Sanctuary. (For exact locations of Inuvialuit lands, please consult the metes and bounds in the Inuvialuit Final Agreement.)

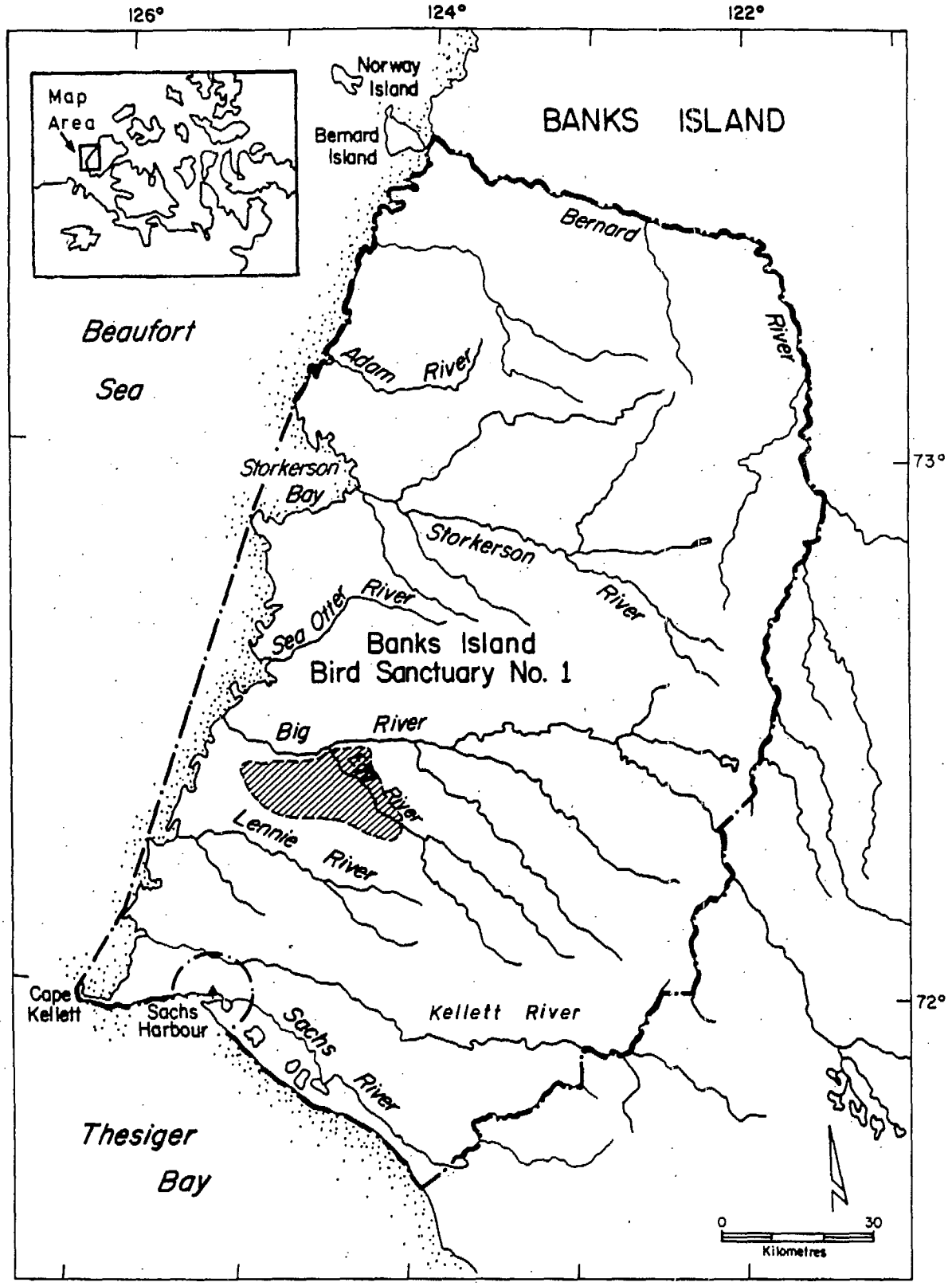

Figure C-1. Location of Banks Island Bird Sanctuary No. 1. (The hatched area shows the location of the main nesting area for Lesser Snow Geese. Access to this area may be restricted from 20 May to 25 August to protect nesting and moulting Lesser Snow Geese.)

Natural Setting

Climate and Weather

The climate of Banks Island Bird Sanctuary No. 1 is characterized by short, cool summers, and long, dry winters. The mean annual temperature is around -14°C. June, July, and August are the only months with mean temperatures above freezing. January and February are the coldest months of the year with average temperatures around -30°C. The average annual precipitation in the Sanctuary is low (125-150 mm). Water courses begin to thaw in June. Freeze-up begins in mid-September and rivers are completely ice-covered by the first week in November.

Geography

Most of Banks Island Bird Sanctuary No. 1 lies within the Arctic Coastal Plain. The Sanctuary is drained by a series of westward-flowing rivers, which originate in uplands in the eastern part of Banks Island. As the rivers approach the west coast, they become greatly braided with gravel and pebble beds, and they enter the sea through broad, shallow, marshy deltas. Several kilometres inland, the land is characterized by gently rolling moraine topography, which gives way to an interior plain farther inland.

In general, the vegetation of Banks Island is characterized by polar desert and polar semi-desert with localized areas of lush plant cover. Low-lying, level areas along the river valleys are well vegetated with grasses and sedges. They grow in abundance in depressional areas where soil moisture is high. Plant cover diminishes upslope, and the tops of hills are generally barren with scattered clumps of dwarf shrubs, cushion plants and lichens.

Birds

Fifty-six species of birds, including 37 breeding species, have been recorded in Banks Island Bird Sanctuary No. 1 (Appendix C-2). As many as 100,000 King Eiders nest around the lakes and ponds in inland areas, and an estimated 500 Common Eiders nest near coastal areas. Up to 9,000 Brant nest along the river deltas and

inland marshy lakes of the Egg River. Other breeding species include Tundra Swans, Ross's Geese, Oldsquaw and Sandhill Cranes. Many additional species are known to stage in the Sanctuary en route to their breeding grounds.

Lesser Snow Goose

Banks Island Bird Sanctuary No. 1 provides habitat for the western Arctic's largest Lesser Snow Goose colony, representing up to 95% of the western Arctic population, and 15% of the North American population. Numbers have fluctuated between 50,000 in 1958 and 198,200 in 1981. Virtually all of the geese are white-phase birds. The major breeding ground fluctuates in size from 26 to 31 km^2 and is located about 25 km inland at the junction of the Egg and Big rivers (Figure C-1).

Breeding birds arrive at the Sanctuary between late May and mid-June. If snow melt is exceptionally late, they may nest in the Sachs and Massik river valleys. Following nesting, they disperse to major river valleys to feed and moult. From mid-August to mid-September, the geese travel to fall staging areas along the Yukon and Alaska north slope before continuing their migration to wintering areas in California.

Peregrine Falcon

The Peregrine Falcon (subspecies tundrius) is a regular summer resident of the Sanctuary. This subspecies is listed as threatened by COSEWIC. In 1956 the Sanctuary population was estimated at 600 birds; recent population estimates are not available.

Mammals

Eighteen species have been observed within Banks Island Bird Sanctuary No. 1 (Appendix C-3).

Ice leads off the west coast of Banks Island provide open water for bowhead and white whales during spring migration (the bowhead whale is listed as endangered by COSEWIC). Adult ringed seals occupy this area during the winter, and from late March to

early April the region provides excellent habitat for the rearing of seal pups. Haul-outs of ringed seals are found on Banks Island's south and west coasts.

Polar bears concentrate in areas offshore from the Sanctuary. Pregnant females use the west coast of Banks Island for denning from late October to mid-April. From late March to mid-May bears from the eastern Beaufort Sea population concentrate in coastal regions of Banks Island.

The western lowlands of Banks Island harbour one of the highest populations of arctic fox in the Canadian Arctic. Approximately two-thirds of all dens on Banks Island are found in the Sanctuary. Sandy, well-drained, vegetated areas (e.g., stream banks and valley sides) are common denning sites.

Banks Island caribou are considered to be an intergrade of Peary caribou (Rangifer tarandus pearyi) and barren-ground caribou (R. t. groenlandicus). Throughout the 1980s caribou numbers on Banks Island have been dwindling. Recent (1989) estimates place the population at about 2500 animals.

Muskoxen on Banks Island have been increasing in numbers over the past few decades. Surveys in 1989 estimated a population of approximately 34 000 animals.

Fishes

There is little information on fish populations within the Sanctuary. The checklist of species (Appendix C-4) is based on range maps published in general accounts of Arctic fishes. There are small spring and fall Arctic Char runs in the Sachs River, and Lake Trout is found in the Kellett River system.

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Appendix C-1. Metes and bounds of Banks Island Bird Sanctuary No. 1.

Banks Island Bird Sanctuary No. 1 is situated on the southwest side of Banks Island, and is described in the Migratory Bird Sanctuary Regulations as being:

> "In the Northwest Territories, in the District of Franklin and the waters of Beaufort Sea, the whole of Banks Island Bird Sanctuary No. 1 according to an explanatory plan prepared in the office of the Surveyor General of Canada Lands and of record number 50810 in the Canada Lands Surveys Records at Ottawa, the bearings of said plan being referred to the meridian 124°00′ West; said Sanctuary containing about 7922 square miles (20,517 square kilometres)."

Appendix C-2. Checklist of birds of Banks Island Bird Sanctuary No 1.

Common Name	Scientific Name
Red-throated Loon	Gavia stellata
Pacific Loon	Gavia pacifica
Common Loon	Gavia immer
Yellow-billed Loon	Gavia adamsii
Northern Fulmar	Fulmaris glacialis
Tundra Swan	Cygnus columbianus
Greater White-fronted Goose	Anser albifrons
Lesser Snow Goose	Anser caerulescens caerulescens
Ross's Goose	Anser rossii
Brant	Branta bernicla nigricans
Canada Goose	Branta canadensis
Northern Pintail	Anas acuta
American Widgeon	Anas americana
Pacific Common Eider	Somateria mollissima v. nigra
King Eider	Somateria spectabilis
Oldsquaw	Clangula hyemalis
Rough-legged Hawk	Buteo lagopus
Peregrine Falcon	Falco peregrinus
Gyrfalcon	Falco rusticolus
Willow Ptarmigan	Lagopus lagopus
Rock Ptarmigan	Lagopus mutus
Sandhill Crane	Grus canadensis
Black-bellied Plover	Pluvialis squatarola
Lesser Golden-Plover	Pluvialis dominica
Semipalmated Plover	Charadrius semipalmatus
Whimbrel	Numenius phaeopus
Ruddy Turnstone	Arenaria interpres
Sanderling	Calidris alba
Semipalmated Sandpiper	Calidris pusilla
White-rumped Sandpiper	Calidris fuscicollis
Baird's Sandpiper	Calidris bairdii
Pectoral Sandpiper	Calidris melanotos
Buff-breasted Sandpiper	Tryngites subruficollis
Long-billed Dowitcher	Limnodromus scolopaceus
Red Phalarope	Phalaropus fulicarius
Pomarine Jaeger	Stercorarius pomarinus
Parasitic Jaeger	Stercorarius parasiticus
Long-tailed Jaeger	Stercorarius longicaudus
Thayer's Gull	Larus glaucoides thayeri
Glaucous Gull	Larus hyperboreus
Black-legged Kittiwake	Rissa tridactyla
Sabine's Gull	Xema sabini
Ivory gull	Pagophila eburnea
Arctic Tern	Sterna paradisaea
Thick-billed Murre	Uria lomvia
Snowy Owl	Nyctea scandiaca
Short-eared Owl	Asio flammeus

Appendix C-2 (Cont'd).

Horned Lark	*Eremophila alpestris*
Barn Swallow	*Hirundo rustica*
Common Raven	*Corvus corax*
Water Pipit	*Anthus spinoletta*
American Tree Sparrow	*Spizella arborea*
White-crowned Sparrow	*Zonotrichia leucophrys*
Dark-eyed Junco	*Junco hyemalis*
Lapland Longspur	*Calcarius lapponicus*
Snow Bunting	*Plectrophenax nivalis*

Appendix C-3. Checklist of mammals of Banks Island Bird Sanctuary No. 1.

Common Name	Scientific Name
Terrestrial Mammals:	
Arctic Hare	Lepus arcticus
Brown Lemming	Lemmus sibiricus
Collared Lemming	Dicrostonyx torquatus
Wolf	Canis lupus
Arctic Fox	Alopex lagopus
Red Fox	Vulpes vulpes
Grizzly Bear	Ursus arctos
Polar Bear	Ursus maritimus
Ermine	Mustela erminea
Wolverine	Gulo gulo
Caribou	Rangifer tarandus groenlandicus x pearyi
Muskox	Ovibos moschatus
Marine Mammals:	
White Whale	Delphinapterus leucas
Bowhead Whale	Balaena mysticetus
Walrus	Odobenus rosmarus
Northern Fur Seal	Callorhinus ursinus
Bearded Seal	Erignathus barbatus
Ringed Seal	Phoca hispida

Appendix C-4. Provisional checklist of fishes of Banks Island Bird Sanctuary No. 1.

Common Name	Scientific Name
Arctic Char	Salvelinus alpinus
Lake Trout	Salveninus namaycush
Longjaw Cisco	Coregonus alpanae
Least Cisco	Coregonus sardinella
Broad Whitefish	Coregonus nasus
Ninespine Stickleback	Pungitius pungitius

PART D

BANKS ISLAND BIRD SANCTUARY NO. 2

Historical Perspective

Archaeological sites on northern Banks Island include two Pre-Dorset sites near the Sanctuary. Evidence at these sites suggest that northern Banks Island was used primarily for muskox hunting. By the 19th century Banks Island may not have had any permanent residents, but the island was within the hunting territory of the Copper Inuit from Victoria Island.

The first exploration of the coast of Banks Island by Europeans was conducted in 1851 by James M'Clure. In 1914, Stefansson spent the summer in the vicinity of the Bernard River, where remnants of his camp have been found. He also maintained a base camp at Cape Kellett until 1917. Recent occupation did not begin until 1929 when Mackenzie Delta Inuvialuit families founded the settlement of Sachs Harbour.

Scientific investigations were first conducted in 1906 when Harrison, while exploring for a "polar continent", documented some of the flora and fauna of the western coast of Banks Island. The surveys by T.W. Barry in 1960 documented the importance of western and northern Banks Island as nesting and moulting habitat for Lesser Snow Geese and other waterfowl.

Plans for extensive oil exploration on Banks Island, scheduled for the summer of 1961, prompted CWS to establish two Migratory Bird Sanctuaries on Banks Island. Banks Island Bird Sanctuary No. 2 was established in 1961 (Order-in-Council P.C. 1961-1617) to protect moulting concentrations of Lesser Snow Geese along the Thomsen River valley and adjacent wetlands (Figure D-1). The Sanctuary encompasses approximately 142 km^2 (Appendix D-1).

In 1992 an agreement to establish a National Park on north-central Banks Island was signed by the Inuvialuit and the Federal

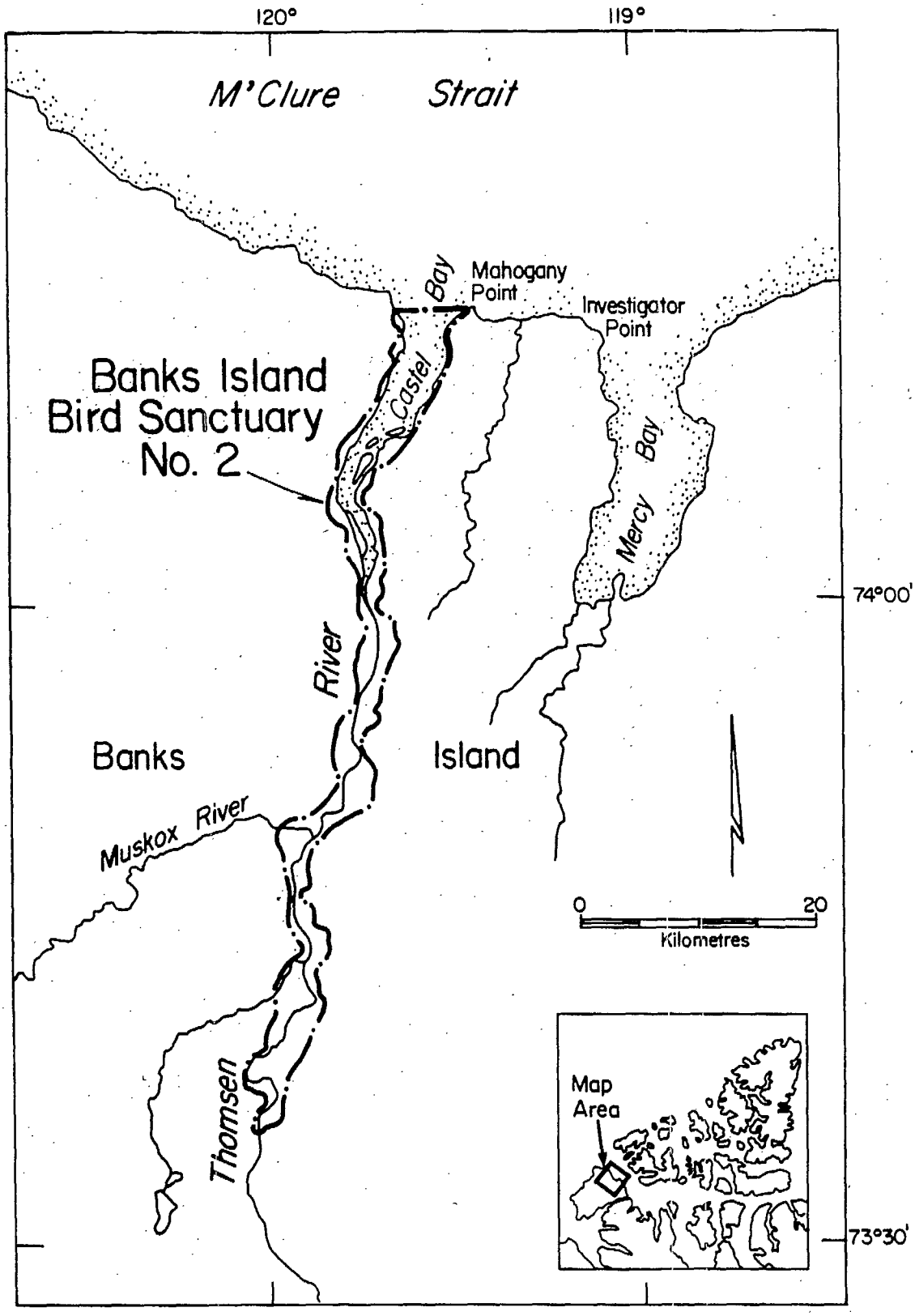

Figure D-1. Location of Banks Island Bird Sanctuary No. 2.

and Territorial governments. When established, Aulavik National Park will encompass the Bird Sanctuary and will necessitate changes in the administration and management of the Sanctuary in order to be consistent with the National Parks Act. The Canadian Wildlife Service, in consultation with the Canadian Parks Service, will prepare a revised management plan for Banks Island Bird Sanctuary No. 2 once the National Park has been created.

Natural Setting

Climate and Weather

The climate of northern Banks Island is characterized by short, cool summers, and long, dry winters. The mean annual temperature is around -16°C. June, July, and August are the only months with mean temperatures above freezing. January and February are the coldest months of the year with average temperatures around -32°C. The average annual precipitation in the Sanctuary is low (87-102 mm). The Thomsen River begins to break up in June and by mid-September is frozen until the following spring.

Geography

The north end of Banks Island Bird Sanctuary No.2 is an area of high to moderate relief with elevations rising from sea level to 350 metres. Along the Thomsen River valley the topography is characterized by undulating lowlands, gently rolling hills and a diversity of wetlands, including wet sedge meadows, tundra lakes and ponds, and ice-wedge polygons. A rugged plateau with steep-sided ravines and scarps occurs east of the river valley. The influence of permafrost on the land's surface is evident throughout the area, with vast expanses of patterned ground and other periglacial features.

The flora of the Sanctuary is a mixture of High and Low Arctic species. Polar semi-desert and desert communities are dominant, with localized areas of arctic tundra. The general vegetation pattern comprises lush graminoid meadows in wetlands and other lowland sites, sparsely vegetated communities (dwarf shrubs,

cushion plants and lichens) on uplands, and intermediate communities on the intervening slopes.

Birds

Most of the Sanctuary's 43 regularly occurring species (Appendix D-2) have an affinity for wetland habitats. The many lakes and ponds along the Thomsen River valley provide nesting or feeding habitat for Pacific and Yellow-billed Loons, Glaucous Gulls, Long-tailed Jaegers, Red Phalaropes and other shorebirds. Peregrine Falcons and Rough-legged Hawks nest along the scattered cliff faces overlooking the Thomsen and Muskox rivers. Upland species are present in low numbers and include Lapland Longspur, Horned Lark, Snow Bunting, Baird's Sandpiper, Buff-breasted Sandpiper and Black-bellied Plover.

Lesser Snow Goose

When the Sanctuary was established, up to 25 000 Lesser Snow Geese were reported to have used the Thomsen River valley and Castel Bay area for moulting. Surveys are needed to determine the current importance of these areas to moulting geese. Incidental observations by wildlife researchers suggest that, during the late 1980s, the Thomsen River valley was not used by Lesser Snow Geese during the moulting period. Geese did not appear in the Thomsen River area until the second half of August, where they used the wet sedge meadow habitats for feeding. Presumably, these birds were from nesting areas within Banks Island Bird Sanctuary No. 1.

Brant

The Sanctuary provides habitat for moulting Brant (subspecies nigricans) from Banks Island, islands north of Banks Island, and the NWT mainland. The moulting birds concentrate at the lower end of the Thomsen River and in Castel Bay. The number of Brant varies from year to year; up to 5,000 birds have been recorded. Departure from the Sanctuary begins in early to mid-August.

Peregrine Falcon

Peregrine Falcons (subspecies tundrius) have been observed along the Thomsen and Muskox rivers, and two eyries have been reported along the Thomsen River. The tundrius subspecies is listed as threatened by COSEWIC. Further field work is required to determine the importance of the Sanctuary to this species.

Mammals

Fourteen species have been recorded within Banks Island Bird Sanctuary No. 2 (Appendix D-3).

The Thomsen and Muskox river valleys provide excellent habitat for muskoxen. Aerial surveys show that the Thomsen River area consistently supports high densities of muskoxen and is among the most important year-round habitats for muskoxen on Banks Island. The Banks Island population has been increasing in numbers over the past few decades. Surveys in 1989 estimated a population of approximately 34 000 animals.

Caribou have been infrequently observed in the Sanctuary in recent years, owing to the general decline of the Banks Island population in the last decade. Recent (1989) estimates place the population at about 2500 animals. Banks Island caribou are considered to be an intergrade of Peary caribou (Rangifer tarandus pearyi) and barren-ground caribou (R. t. groenlandicus).

Fishes

There is little information on fish populations within the Sanctuary. The checklist of species (Appendix D-4) is derived from range maps published in general accounts of Arctic fishes.

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Appendix D-1. Metes and bounds of Banks Island Bird Sanctuary No. 2.

Banks Island Bird Sanctuary No. 2 is situated at the north end of Banks Island, and is described in the Migratory Bird Sanctuary Regulations as being:

> "In the Northwest Territories, in the District of Franklin and the waters of M'Clure Strait, the whole of Banks Island Bird Sanctuary No. 2 more particularly described as follows:
>
> all that part of the valley of the Thomsen River lying northerly of the widening of said River at approximate latitude 73°36'North and all that part of Castel Bay lying southerly of the northerly extremity of Mahogany Point, all according to map sheets 98 N.E., 88 N.W. and 88 N.E. dated 1956 and 88 S.W. and 88 S.E. dated 1957, of the National Topographic Series, scale 8 miles to 1 inch, and map sheet 98 S.W. and 98 S.E. dated 1957, of said Series, scale 1:500,000; said Sanctuary containing about 35,200 acres (14,245 hectares)."

Appendix D-2. Checklist of birds of Banks Island Bird Sanctuary No 2.

Common Name	Scientific Name
Red-throated Loon	Gavia stellata
Pacific Loon	Gavia pacifica
Yellow-billed Loon	Gavia adamsii
Lesser Snow Goose	Anser caerulescens caerulescens
Brant	Branta bernicla nigricans
Canada Goose	Branta canadensis
Northern Pintail	Anas acuta
King Eider	Somateria spectabilis
Oldsquaw	Clangula hyemalis
Rough-legged Hawk	Buteo lagopus
Peregrine Falcon	Falco peregrinus
Gyrfalcon	Falco rusticolus
Willow Ptarmigan	Lagopus lagopus
Rock Ptarmigan	Lagopus mutus
Sandhill Crane	Grus canadensis
Black-bellied Plover	Pluvialis squatarola
Lesser Golden-Plover	Pluvialis dominica
Semipalmated Plover	Charadrius semipalmatus
Whimbrel	Numenius phaeopus
Ruddy Turnstone	Arenaria interpres
Sanderling	Calidris alba
Semipalmated Sandpiper	Calidris pusilla
White-rumped Sandpiper	Calidris fuscicollis
Baird's Sandpiper	Calidris bairdii
Pectoral Sandpiper	Calidris melanotos
Buff-breasted Sandpiper	Tryngites subruficollis
Red Phalarope	Phalaropus fulicarius
Pomarine Jaeger	Stercorarius pomarinus
Parasitic Jaeger	Stercorarius parasiticus
Long-tailed Jaeger	Stercorarius longicaudus
Thayer's Gull	Larus glaucoides thayeri
Glaucous Gull	Larus hyperboreus
Sabine's Gull	Xema sabini
Arctic Tern	Sterna paradisaea
Snowy Owl	Nyctea scandiaca
Horned Lark	Eremophila alpestris
Common Raven	Corvus corax
Water Pipit	Anthus spinoletta
Lapland Longspur	Calcarius lapponicus
Snow Bunting	Plectrophenax nivalis

Appendix D-3. Checklist of mammals of Banks Island Bird Sanctuary No. 2.

Common Name	Scientific Name
Terrestrial Mammals:	
Arctic Hare	Lepus arcticus
Brown Lemming	Lemmus sibiricus
Collared Lemming	Dicrostonyx torquatus
Wolf	Canis lupus
Arctic Fox	Alopex lagopus
Polar Bear	Ursus maritimus
Ermine	Mustela erminea
Wolverine	Gulo gulo
Caribou	Rangifer tarandus groenlandicus x pearyi
Muskox	Ovibos moschatus
Marine Mammals:	
White Whale	Delphinapterus leucas
Bowhead Whale	Balaena mysticetus
Bearded Seal	Erignathus barbatus
Ringed Seal	Phoca hispida

Appendix D-4. Provisional checklist of fishes of Banks Island Bird Sanctuary No. 2.

Common Name	Scientific Name
Arctic Char	Salvelinus alpinus
Lake Trout	Salveninus namaycush
Lake Herring	Coregonus artedii
Least Cisco	Coregonus sardinella
Ninespine Stickleback	Pungitius pungitius
Deepwater Sculpin	Myoxocephalus quadricornis

PART E

CAPE PARRY BIRD SANCTUARY

Historical Perspective

Numerous Thule sites suggest that Cape Parry has been an active cultural region. Six archaeological sites are situated on the north end of the Parry Peninsula; three are within the Sanctuary.

The Thick-billed Murres at Cape Parry were first reported in 1942, and evidence of breeding was first obtained in 1953, when an estimated 200 nesting birds were observed on the limestone cliffs. This is the only Thick-billed Murre colony in the western Canadian Arctic. The nearest colonies are located 1200 kilometres to the east at Prince Leopold Island and 1500 kilometres to the west at Cape Lisburn, Alaska.

In 1955, a Distant Early Warning (DEW) radar site was built near Police Point (Figure E-1). The buildings were 1.5 kilometres from the nesting cliffs at Police Point, and the landing beach, where supplies were unloaded, was only 0.6 kilometres from the murre colony.

In 1958, CWS estimated that 250 birds were present at the colony. When CWS surveyed the colony in 1960, only 125 murres were recorded. By then, heavy equipment was in use near the murre cliffs and garbage was being dumped over the edge of the cliffs. In response to the marked decline in murre numbers and in an effort to protect the colony, CWS established the Cape Parry Bird Sanctuary in 1961 (Order-in-Council P.C. 1961-1617). The Sanctuary encompasses about 232 hectares and comprises three separate nesting areas at Police Point (also known as West Point), Devon Point (also called Central Point) and East Point (Figure E-1, Appendix E-1). Since that time, the number of nesting birds has recovered, from 134 birds in 1964 to over 800 in 1980.

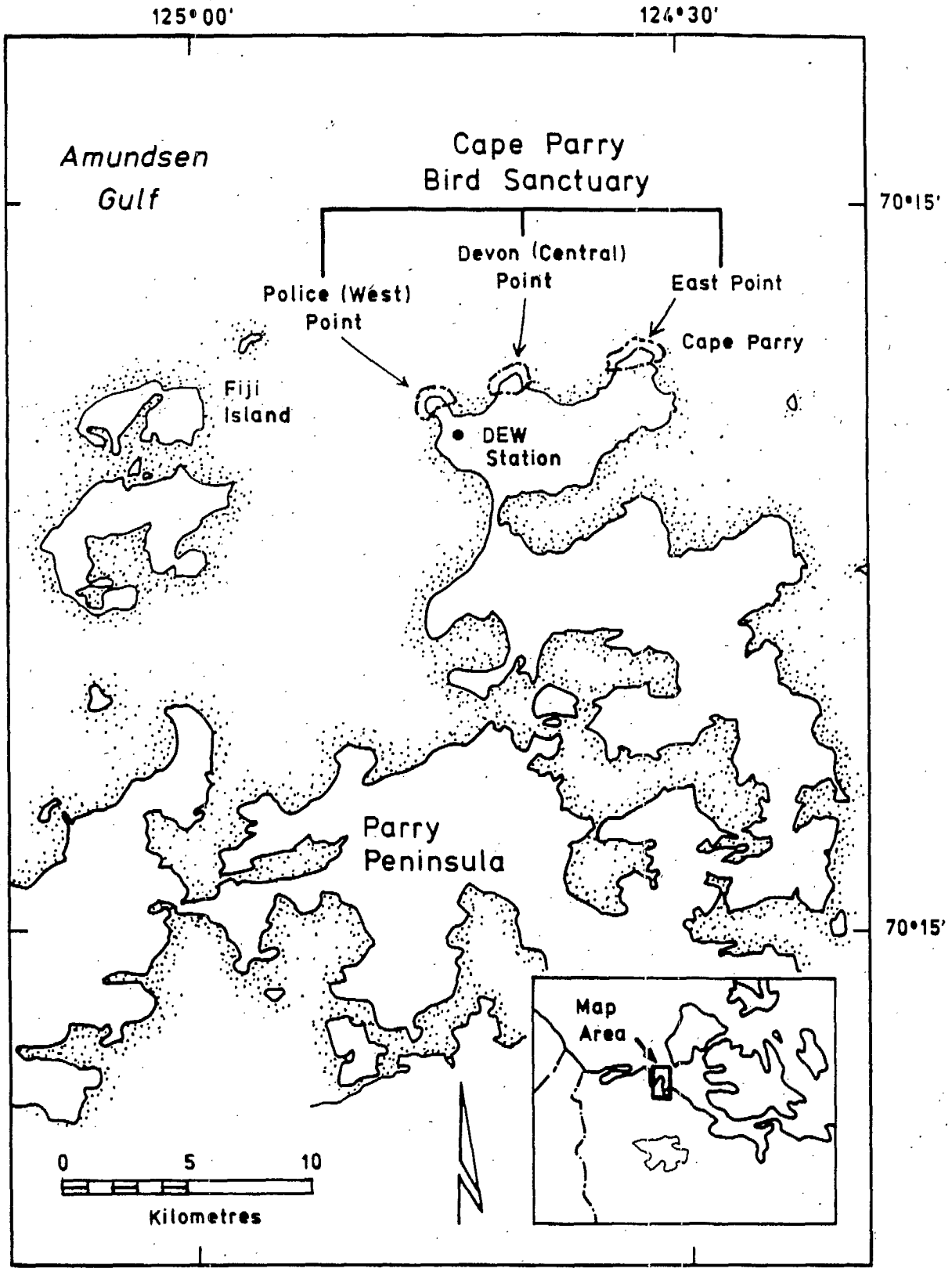

Figure E-1. Location of Cape Parry Bird Sanctuary.

In 1984, the Inuvialuit were granted surface rights to the Parry Peninsula, including lands within the Sanctuary.

Natural Setting

Climate and Weather

The three coldest months (January to March) average -29°C; the three warmest months (June to August) have average daily temperatures between 2°C and 6°C. June is the first month in which the average daily temperature rises above freezing, and October is the first month in which the average daily temperature falls below freezing. Precipitation is low, with about 40% falling as rain in the summer. In summer, the primary climatic influences are maritime air masses that move into the Mackenzie River valley and southern Beaufort Sea from the west. Moderate and persistent winds are often associated with these air masses.

Geography

The Parry Peninsula is composed primarily of two geological formations: the Parry Peninsula Moraine and the Franklin Mountain Formation. The moraine straddles the peninsula and divides the Franklin Mountain Formation into southern and northern sections.

The northern section includes the Cape Parry Bird Sanctuary. The Palaeozoic bedrock, of Silurian and Ordovician origin, mainly comprises dolomite with chert and quartz. Most of the area has thin till cover, but bedrock is frequently exposed.

The peninsula is characterized by low relief, rarely exceeding 60 metres in elevation. Numerous ponds and lakes dot the landscape. Sand and gravel beaches occur along the coastline, which is indented by numerous bays and small inlets. The limestone cliffs on which the murre colony is located are about 15 metres above sea level.

Vegetation consists of polar semi-desert types, and is dominated by dwarf shrubs that seldom exceed 10 centimetres in height. Two plant communities are common to the area, one dominated by mountain avens and a second dominated by mountain

avens, bilberry, mountain cranberry, Labrador tea, and bear berry. Forbs, grasses, sedges and lichens are major components of both communities. Mosses are present but are restricted to poorly drained areas. Much of the area has less than 25 percent plant cover, due to the highly calcareous nature of many of the soils.

Significant Natural Features

Open water occurs in most winters in western Amundsen Gulf, usually in the vicinity of Cape Bathurst, Cape Parry and Cape Kellet (Banks Island). The polynya is caused by upwelling currents, which provide a rich marine environment in the vicinity of Cape Parry. Amundsen Gulf is covered with 'first-year' ice from October to May. By mid-December, a characteristic pattern of cracks and leads starts to develop along the fast-ice boundary, which follows the continental shelf. Open water usually appears just north of Cape Parry in January. With the advance of spring break-up in late May and June, the ice disintegrates and open water expands into Amundsen Gulf. Landfast ice remains at the bases of Devon Point and Cape Parry three to four weeks longer than at Police Point. Freeze-up in the coastal areas usually begins in late September and continues through October.

Birds

Twenty-three species of birds, including 17 breeding species, have been recorded within Cape Parry Bird Sanctuary (Appendix E-2). The Cape Parry area is an important staging area for migrating waterfowl.

The Sanctuary protects one of two known Black Guillemot colonies in the western Canadian Arctic. The other colony is at Herschel Island, Yukon Territory, approximately 550 kilometres to the west. Twenty-nine Black Guillemots were observed around Cape Parry in 1978, mostly at Devon Point. In 1979, 37 indviduals were recorded: 16 birds were observed at Police Point and 21 were seen at Fiji Island (Devon Point was not surveyed).

Thick-billed Murre

Thick-billed Murres nest in coastal marine colonies throughout the arctic and subarctic regions of Eurasia and North America. Two races occur in North America: birds found in the eastern Arctic, east of Hudson Bay and south to Newfoundland, are Uria lomvia lomvia; birds found off western Alaska are U. l. arra. The Thick-billed Murres at Cape Parry probably belong to the western race.

The number of murres nesting at Police Point appears to have increased during recent years (Table E-1). Devon Point and East Point are not always used, perhaps due in part to the persistence of land-fast ice in spring at the bases of these points.

The Sanctuary's murre colony has never been intensively studied, but the general breeding biology of murres has been documented in other locations. Paired birds probably arrive in the Cape Parry region in mid-June. A single egg is laid in late June and it hatches about one month later. By mid-August, the young leave the nest site before they can fly and join their parents on the sea, where the adults undergo their moult.

Thick-billed Murres are sensitive to disturbance during their nesting period. Human activity near their nesting cliffs and close-approaching aircraft may result in eggs and chicks being knocked off the narrow nesting ledges, and may expose unattended eggs and chicks to predation by gulls.

Mammals

Twelve mammalian species have been observed within the Cape Parry Bird Sanctuary (Appendix E-3). The Parry Peninsula is an important Arctic fox trapping area for the residents of Paulatuk, and their largest harvest of polar bears takes place off the shores of Cape Parry. Bowhead whales, which are an endangered species, are common in Amundsen Gulf in spring and early summer.

Table E-1. Historical population estimates of Thick-billed Murres in Cape Parry Bird Sanctuary.

Date	Population Size
13 August 1953	200 adults
-- 1958	250 adults
27 July 1960	125 adults
10 August 1964	67 nests
-- 1974	no apparent nesting
09 July 1975	500 adults
14 July 1978	436 adults
01-02 August 1979	770 adults, 84-196 nesting pairs
-- 1980	800 adults

Fishes

The Sanctuary boundaries extend 183 metres from shore. A provisional checklist of marine fishes is given in Appendix E-4.

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Appendix E-1. Metes and bounds of Cape Parry Bird Sanctuary.

The Cape Parry Bird Sanctuary boundary is described in the Migratory Bird Sanctuary Regulations as being:

> "In the Northwest Territories, in the District of Mackenzie and the waters of Amundsen Gulf, the whole of the Cape Parry Bird Sanctuary, designated East Point, Central Point and West Point, according to an explanatory plan prepared in the office of the Surveyor General of Canada Lands and of record number 50646 in the Canada Lands Surveys Records at Ottawa, the bearings of said plan being referred to the meridian 124°40′ West, said Sanctuary containing together about 574 acres (232 hectares)."

Appendix E-2. Checklist of birds of Cape Parry Bird Sanctuary.

Common Name	Scientific Name
Red-throated Loon	Gavia stellata
Pacific Loon	Gavia pacifica
Yellow-billed Loon	Gavia adamsii
Tundra Swan	Cygnus columbianis
Greater White-fronted Goose	Anser albifrons
Snow Goose	Anser caerulescens
Brant	Branta bernicla
Canada Goose	Branta canadensis
Northern Pintail	Anas acuta
Common Eider	Somateria mollissima
King Eider	Somateria spectabilis
Oldsquaw	Clangula hyemalis
White-winged Scoter	Melanitta fusca
Red-breasted Merganser	Mergus serrator
Rough-legged Hawk	Buteo lagopus
Golden Eagle	Aquila chrysaetos
Peregrine Falcon	Falco peregrinus
Gyrfalcon	Falco rusticolus
Willow Ptarmigan	Lagopus lagopus
Rock Ptarmigan	Lagopus mutus
Black-bellied Plover	Pluvialis squatarola
Lesser Golden-Plover	Pluvialis dominica
Semipalmated Plover	Charadrius semipalmatus
Whimbrel	Numenius phaeopus
Ruddy Turnstone	Arenaria interpres
Sanderling	Calidris alba
Semipalmated Sandpiper	Calidris pusilla
Least Sandpiper	Calidris minutilla
White-rumped Sandpiper	Calidris fuscicollis
Baird's Sandpiper	Calidris bairdii
Pectoral Sandpiper	Calidris melanotos
Dunlin	Calidris alpina
Stilt Sandpiper	Calidris himantopus
Buff-breasted Sandpiper	Tryngites subruficollis
Long-billed Dowitcher	Limnodromus scolopaceus
Red-necked Phalarope	Phalaropus lobatus
Red Phalarope	Phalaropus fulicaria
Pomarine Jaeger	Stercorarius pomarinus
Parasitic Jaeger	Stercorarius parasiticus
Long-tailed Jaeger	Stercorarius longicaudus
Herring Gull	Larus argentatus
Thayer's Gull	Larus glaucoides thayeri
Glaucous Gull	Larus hyperboreus
Sabine's Gull	Xema sabini
Arctic Tern	Sterna paradisaea

Appendix E-2 (Cont'd).

Common Murre	Uria aalge
Thick-billed Murre	Uria lomvia
Black Guillemot	Cepphus grylle
Snowy Owl	Nyctea scandiaca
Short-eared Owl	Asio flammeus
Horned Lark	Eremophila alpestris
Common Raven	Corvus corax
American Robin	Turdus migratorius
Water Pipit	Anthus spinoletta
American Tree Sparrow	Spizella arborea
Savannah Sparrow	Passerculus sandwichensis
Fox Sparrow	Passerella iliaca
White-crowned Sparrow	Zonotrichia leucophrys
Lapland Longspur	Calcarius lapponicus
Smith's Longspur	Calcarius pictus
Snow Bunting	Plectrophenax nivalis
Common Redpoll	Carduelis flammea
Hoary Redpoll	Carduelis hornemanni

Appendix E-3. Checklist of mammals of Cape Parry Bird Sanctuary.

Common Name	Scientific Name
Terrestrial Mammals:	
Masked shrew	Sorex cinereus
Arctic hare	Lepus arcticus
Arctic ground squirrel	Spermophilus parryi
Northern red-backed vole	Clethrionomys rutilus
Brown lemming	Lemmus sibiricus
Collared lemming	Dicrostonyx torquatus
Tundra vole	Microtus oeconomus
Wolf	Canis lupus
Arctic fox	Alopex lagopus
Red fox	Vulpes vulpes
Grizzly bear	Ursus arctos
Polar bear	Ursus maritimus
Ermine	Mustela erminea
Wolverine	Gulo gulo
Barren-ground caribou	Rangifer tarandus
Marine Mammals:	
White whale	Delphinapterus leucas
Bowhead whale	Balaena mysticetus
Bearded seal	Erignathus barbatus
Ringed seal	Phoca hispida

Appendix E-4. Provisional checklist of fishes of Cape Parry Bird Sanctuary.

Common Name	Scientific Name
Pacific Herring	Clupea harengus
Arctic Cisco	Coregonus autumnalis
Arctic Char	Salvelinus alpinus
Toothed Cod	Arctogadus borisovi
Polar Cod	Arctogadus glacialis
Arctic Cod	Boreogadus saida
Saffron Cod	Eleginus gracilis
Ogac	Gadus ogac
Fish Doctor	Gymnelus viridis
Pale Eelpout	Lycodes pallidus
Saddled Eelpout	Lycodes mucosus
Polar Eelpout	Lycodes polaris
Arctic Eelpout	Lycodes reticulatus
Threespot	Lycodes rossi
Fourline Snakeblenny	Eumesogrammus praecisus
Arctic Shanny	Stichaeus punctatus
Daubed Shanny	Leptoclinus maculatus
Stout Eelblenny	Anisarchus medius
Slender Eelblenny	Lumpenus fabricii
Rough Hookear	Artediellus scaber
Arctic Staghorn Sculpin	Gymnocanthus tricuspis
Twohorn Sculpin	Icelus bicornis
Fourhorn Sculpin	Myoxocephalus quadricornis
Spatulate Sculpin	Icelus spatula
Arctic Sculpin	Myoxocephalus scorpioides
Shorthorn Sculpin	Myoxocephalus scorpius
Bigeye Sculpin	Triglops nybeline
Moustache Sculpin	Triglops murrayi
Ribben Sculpin	Triglops pingleli
Arctic Alligatorfish	Aspidophoroides olriki
Atlantic Poacher	Leptagonus decagonus
Leatherfin Lumpsucker	Eumicrotremus derjugini
Altantic Spiny Lumpsucker	Eumicrotremus spinosus
Gelatinous Snailfish	Liparis fabricii
Kelp Snailfish	Liparis tunicatus
Dusky Snailfish	Liparis gibbus
Ninespine Stickleback	Pungitius pungitius
Arctic Flounder	Liopsetta glacialis

PART F

KENDALL ISLAND BIRD SANCTUARY

Historical Perspective

In the early 1900s the Mackenzie River delta was explored by biologists such as Raine, MacFarlane, Maur and Anderson. From 1927 to 1935, Porsild worked in the delta and took numerous notes on the Lesser Snow Goose colony. Between 1935 and 1941, the goose colony was visited annually by L. Gillham and once by J. Lynch. This was followed by Soper's visits in 1949 and 1951, who proposed that the area be given Migratory Bird Sanctuary status.

CWS established Kendall Island Bird Sanctuary in 1961 (Order-in-Council P.C. 1961/1617). It encompasses approximately 606 km^2 (Figure F-1, Appendix F-1). The purpose of this designation was to provide long-term protection to the colony of Lesser Snow Geese. In 1990 CWS began a study of the distribution and abundance of migratory birds (primarily waterbirds) in the Sanctuary and adjacent area to determine if the Sanctuary should be increased in size.

Approximately 4000 Inuit once inhabited the Mackenzie River delta. During the late 1800s to early 1900s, European whalers often visited the delta. Three Inuvialuit whaling camps are located in the Kendall Island Bird Sanctuary, and are active during July and August. At the present time, whales are taken in the shallow waters off Kendall Island and in Mackenzie Bay.

Extensive exploration programs for hydrocarbons have been undertaken in the Mackenzie River delta, including the Kendall Island Bird Sanctuary. To date there are approximately 20 well sites within the Sanctuary. In 1971 a significant natural gas field was discovered at Taglu. As and when Mackenzie Delta gas becomes economically marketable, the Taglu field would be the cornerstone for development, along with smaller fields at Niglintak and Parsons and the associated gas field at Amauligak.

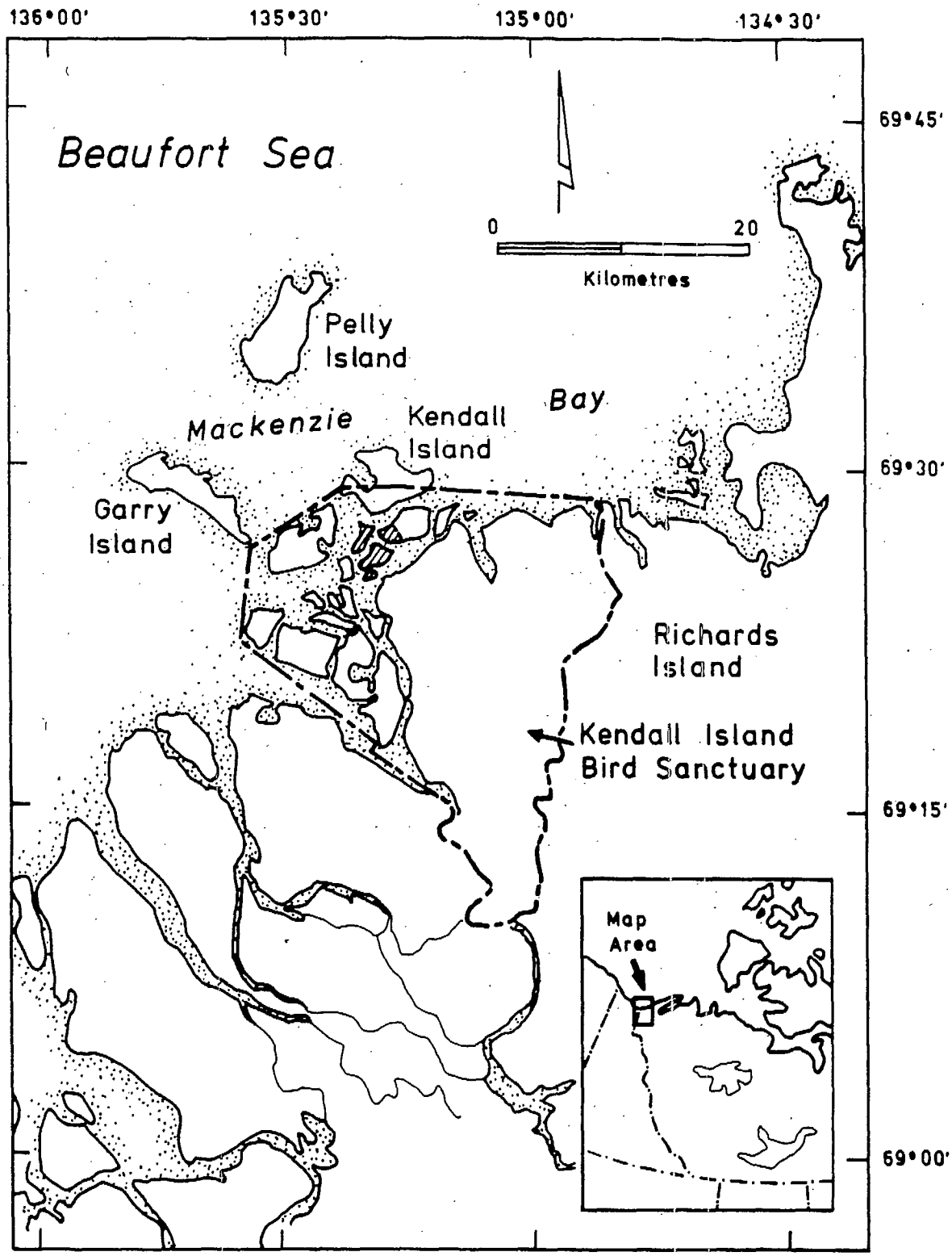

Figure F-1. Location of Kendall Island Bird Sanctuary. (The hatched area shows the locations of the main nesting areas for Lesser Snow Geese. Access to these areas may be restricted between 20 May and 25 August to protect nesting and moulting Lesser Snow Geese.)

The Beaufort Region Environmental Assessment and Monitoring study, an ongoing project financed by the Northern Oil and Gas Action Program, includes a gas development scenario that examines the potential impacts of development on migratory birds in the vicinity of the gas fields.

Natural Setting

Climate and Weather

Kendall Island Bird Sanctuary lies within the Marine Tundra Climatic Region. The area receives less than 12.5 centimetres of annual precipitation; rainfall during the short summer season constitutes 55 percent of the annual precipitation. The area is subject to freezing temperatures for two-thirds of the year. The lowest mean temperatures occur in February although the coldest winter month may occur from December to March. The average daily temperature is above freezing from June to September.

In general, Kendall Island Bird Sanctuary is completely ice bound from mid-November to late May. Water begins freezing along the shorelines before mid-September. Lakes begin to freeze-up during late September and early October and are ice-covered by mid-October. River freeze-up is usually near the end of October. River breakup begins in early May and continues into early June.

Geography

Kendall Island Bird Sanctuary lies within the Arctic Coastal Plain of the Mackenzie Sedimentary Basin. The area has very little relief and is characterized by low-lying muskeg, which is underlaid by deltaic and alluvial silts and fine sands, 70-150 metres thick. Elevation is low, with an average relief of about 15 metres above sea level. The general area contains numerous lakes and ponds. Water depth in the braided channels of the Mackenzie River delta is often less than one metre, and mud flats are abundant at low tide. Water action on the coastline has caused extensive coastal recession averaging 30-60 centimetres per year, although in some areas it has exceeded 4.6 metres per year.

The distribution of vegetation within the Sanctuary reflects the influence of both physiographic and climatic factors. The lower delta is north of the tree-line. Tall shrubs grow along the banks of some of the water courses. Areas of muskeg and wet meadow support buckbean, horsetail, sedges, and other graminoids. Elevated areas support sedge and willow species. Islands with very low relief (<30 centimetres above low tide level) are generally unvegetated.

Significant Natural Features

Pingos are conical, ice-cored hills, most of which were formed over a thousand years ago by the freezing of water-saturated sediments of old lake beds. Although common in the Mackenzie Delta and northern Yukon, they are rare elsewhere. Pingos are generally associated with flat, low-lying areas, former lake basins and flow channels with poor drainage. Seven pingos are located within the Sanctuary: six are near the eastern boundary and one is directly south of Kendall Island.

Smaller pingo hillocks and pingo ridges, that occur on the low, seaward islands, are of geomorphic interest because they resemble the Mississippi Delta mud lumps. Similar structures have not been reported elsewhere in the world.

Birds

Over 84 bird species have been recorded within Kendall Island Bird Sanctuary (Appendix F-2). The assemblage includes perching birds, waterfowl and shorebirds, most of which inhabit the Sanctuary from May through November.

Lesser Snow Geese, which use the area for nesting and occasionally for staging in the fall, constitute a large percentage of the waterfowl population in Kendall Island Bird Sanctuary. Tundra Swans, Brant and Greater White-fronted Geese are common nesters and moulters in and around the Sanctuary.

Hudsonian Godwits and Long-billed Dowitchers, two shorebirds of limited breeding distribution within Canada, nest in and around the

Sanctuary. Dowitchers also pass through the area during the fall migration. Six Eskimo Curlews (an endangered species) were seen within the Sanctuary in 1985. Thousands of other shorebirds nest and stage during migration throughout much of the Mackenzie Delta.

Lesser Snow Goose

The Sanctuary contains the nesting grounds of up to 8000 Lesser Snow Geese. The primary nesting area is shown in Figure F-1. In some years, the Sanctuary is also used for staging by as many as 150,000 geese. Its use as a spring staging area depends on habitat conditions on the nesting grounds of Banks Island.

The paired birds arrive in late May and begin nesting as soon as the snow melts. Incubation takes 22 to 23 days and hatching occurs from the last week of June to the first week of July. The adult geese begin moulting about 2.5 weeks after the young have hatched and the moult lasts about 3.5 weeks. Young take approximately 7 weeks to fledge and are strong enough to fly by August 10. The adults can fly about 5 days before the young. In late August, the geese disperse from the nesting and moulting grounds and move to fall staging grounds either on the Yukon or Alaska North Slope or within the Mackenzie Delta. As many as 500,000 Lesser Snow Geese concentrate in these areas for fall staging.

Geese from the western Arctic colonies winter in California where they mix with birds from the Wrangel Island population of the USSR.

Mammals

Twenty-one mammal species have been recorded within Kendall Island Bird Sanctuary (Appendix F-3). Grizzly bears are common within the Sanctuary and in the surrounding area. The Mackenzie River estuary is important to calving beluga whales.

Fishes

The Mackenzie River supplies the southern, eastern and central regions of Kendall Island Bird Sanctuary with tremendous volumes of freshwater, while the Beaufort Sea to the north introduces saltwater. This creates a diverse estuarine environment that is able to support populations of anadromous, marine, and freshwater fish. At least 26 species of fish are known to inhabit the waters surrounding the Mackenzie River delta (Appendix F-4).

Arctic and least cisco are the most prominent fish in the coastal waters, whereas whitefish and inconnu are most common in the streams and lakes.

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Appendix F-1. Metes and bounds of Kendall Island Bird Sanctuary.

The Kendall Island Bird Sanctuary boundary is described in the Migratory Bird Sanctuary Regulations as being:

"In the Northwest Territories, in the District of Mackenzie and in Mackenzie Bay, all those parts of the Mackenzie River delta and the waters of said Bay more particularly described as follows:

Commencing at the easternmost point in the shore of Kendall Island, thence in a straight line to the westernmost point in said shore;

thence in a straight line to the easternmost point in the shore of Garry Island;

thence in a straight line to the westernmost point in the shore of an island situated at latitude 69°22′, longitude 135°35′, approximately;

thence in a straight line to the southernmost point in the shore of an island situated at latitude 69°18′, longitude 135°19′, approximately;

thence south to the middle thread of that channel of the Mackenzie River containing the last aforesaid island;

thence generally southeasterly along said middle thread to its junction with the middle thread of a northeasterly channel of said River at latitude 69°11′, longitude 135°04′, approximately;

thence northeasterly and northerly along the last aforesaid middle thread to the middle thread of a channel at latitude 69°15′, longitude 134°59′, approximately;

thence northwesterly, easterly, and northerly along the last aforesaid middle thread to the divergence therefrom of the middle thread of a channel at latitude 69°22′, longitude 134°57′, approximately;

thence easterly and northeasterly along the last aforesaid middle thread to the divergence therefrom of the middle thread of a channel at latitude 69°24′30", longitude 134°50′, approximately;

thence northwesterly and northerly along the last aforesaid middle thread to the mouth of said channel at latitude 69°27′, longitude 134°52′30", approximately;

thence east to the easterly shore of the inlet of Mackenzie Bay entered by the last aforesaid channel;

thence northerly along said easterly shore to the northwesternmost point therein at latitude 69°29′, longitude 134°52′, approximately;
thence westerly in a straight line to the point of commencement;

as said islands, channels, latitudes and longitudes are shown on sheets 107C/6, 107C/7, 107C/9 and 107C/11 of a Provisional Map produced by the Army Survey Establishment in 1958, scale 1:50,000, said sanctuary containing 234 square miles (606 square kilometres), approximately."

Appendix F-2. Checklist of birds of Kendall Island Bird Sanctuary.

Common Name	Scientific Name
Red-throated Loon	Gavia stellata
Pacific Loon	Gavia pacifica
Tundra Swan	Cygnus columbianus
Greater White-fronted Goose	Anser albifrons
Lesser Snow Goose	Anser caerulescens caerulescens
Brant	Branta bernicla nigricans
Canada Goose	Branta canadensis
Green-winged Teal	Anas crecca
Mallard	Anas platyrhynchos
Northern Pintail	Anas acuta
Northern Shoveller	Anas clypeata
American Widgeon	Anas americana
Canvasback	Aythya valisineria
Greater Scaup	Aythya marila
Lesser Scaup	Aythya affinis
Common Eider	Somateria mollissima
King Eider	Somateria spectabilis
Oldsquaw	Clangula hyemalis
Black Scoter	Melanitta nigra
Surf Scoter	Melanitta perspicillata
White-winged Scoter	Melanitta fusca
Common Goldeneye	Bucephala clangula
Red-breasted Merganser	Mergus serrator
Bald Eagle	Haliaeetus leucocephalus
Northern Harrier	Circus cyaneus
Rough-legged Hawk	Buteo lagopus
Golden Eagle	Aquila chrysaetos
American Kestrel	Falco sparverius
Merlin	Falco columbarius
Gyrfalcon	Falco rusticolus
Willow Ptarmigan	Lagopus lagopus
Sandhill Crane	Grus canadensis
Lesser Golden-Plover	Pluvialis dominica
Semipalmated Plover	Charadrius semipalmatus
Lesser Yellowlegs	Tringa flavipes
Eskimo Curlew	Numenius borealis
Whimbrel	Numenius phaeopus
Hudsonian Godwit	Limosa haemastica
Semipalmated Sandpiper	Calidris pusilla
Least Sandpiper	Calidris minutilla
Baird's Sandpiper	Calidris bairdii
Pectoral Sandpiper	Calidris melanotos
Dunlin	Calidris alpina
Stilt Sandpiper	Calidris himantopus
Long-billed Dowitcher	Limnodromus scolopaceus
Common Snipe	Gallinago gallinago
Red-necked Phalarope	Phalaropus lobatus

Appendix F-2 (Cont'd).

Red Phalarope	Phalaropus fulicaria
Pomarine Jaeger	Stercorarius pomarinus
Parasitic Jaeger	Stercorarius parasiticus
Long-tailed Jaeger	Stercorarius longicaudus
Mew Gull	Larus canus
Herring Gull	Larus argentatus
Glaucous Gull	Larus hyperboreus
Sabine's Gull	Xema sabini
Arctic Tern	Sterna paradisaea
Snowy Owl	Nyctea scandiaca
Short-eared Owl	Asio flammeus
Northern Flicker	Colaptes auratus
Say's Phoebe	Sayornis saya
Horned Lark	Eremophila alpestris
Bank Swallow	Riparia riparia
Cliff Swallow	Hirundo pyrrhonota
Grey Jay	Perisoreus canadensis
Common Raven	Corvus corax
Boreal Chickadee	Parus hudsonicus
Grey-cheeked Thrush	Catharus minimus
American Robin	Turdus migratorius
Varied Thrush	Ixoreus naevius
Water Pipit	Anthus spinoletta
Yellow Warbler	Dendroica petechia
Yellow-rumped Warbler	Dendroica coronata
Blackpoll Warbler	Dendroica striata
Northern Waterthrush	Seiurus noveboracensis
American Tree Sparrow	Spizella arborea
Savannah Sparrow	Passerculus sandwichensis
Fox Sparrow	Passerella iliaca
White-crowned Sparrow	Zonotrichia leucophrys
Lapland Longspur	Calcarius lapponicus
Smith's Longspur	Calcarius pictus
Snow Bunting	Plectrophenax nivalis
Rusty Blackbird	Euphagus carolinus
Common Redpoll	Carduelis flammea
Hoary Redpoll	Carduelis hornemanni

Appendix F-3. Checklist of mammals of Kendall Island Bird Sanctuary.

Common Name	Scientific Name
Terrestrial Mammals:	
Tundra shrew	*Sorex tundrensis*
Snowshoe hare	*Lepus americanus*
Arctic ground squirrel	*Spermophilus parryii*
Northern red-backed vole	*Clethrionomys rutilus*
Brown lemming	*Lemmus sibiricus*
Collared lemming	*Dicrostonyx torquatus*
Muskrat	*Ondatra zibethicus*
Tundra vole	*Microtus oeconomus*
Arctic fox	*Alopex lagopus*
Red fox	*Vulpes vulpes*
Polar bear	*Ursus maritimus*
Grizzly bear	*Ursus arctos*
Ermine	*Mustela erminea*
Least weasel	*Mustela nivalis*
Mink	*Mustela vison*
Wolverine	*Gulo gulo*
European reindeer	*Rangifer tarandus tarandus*
Marine Mammals:	
White (Beluga) whale	*Delphinapterus leucas*
Bearded seal	*Erignathus barbatus*
Ringed seal	*Phoca hispida*

Appendix F-4. Provisional checklist of fishes of Kendall Island Bird Sanctuary.

Common Name	Scientific Name
Arctic Lamprey	Lampetra japonica
Herring	Clupea harengus
Northern Pike	Esox lucius
Arctic Cisco	Coregonis autumnalis
Lake Whitefish	Coregonis clupeaformis
Broad Whitefish	Coregonis nasus
Least Cisco	Coregonis sardinella
Round Whitefish	Prosopium cylindraceum
Inconnu	Stenodus leucichthys
Arctic Char	Salvelinus alpinus
Arctic Grayling	Thymallus arcticus
Pond Smelt	Hypomesus olidus
Rainbow Smelt	Osmerus mordax
Lake Chub	Couesius plumbeus
Flathead Chub	Platygobio gracilis
Longnose Sucker	Catostomus catostomus
Arctic Cod	Boreogadus saida
Saffron Cod	Eleginus gracilis
Burbot	Lota lota
Ninespine Stickleback	Pungitius pungitius
Spoonhead Sculpin	Cottus ricei
Gelatinous Seasnail	Liparis koefoedi
Stout Sand Lance	Ammodytes hexapterus
Arctic Flounder	Liopsetta glacialis
Starry Flounder	Platichthys stellatus

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