BEAVERHILL LAKE

Important Bird Area Conservation Plan

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Alberta Important Bird Areas Program

EXECUTIVE SUMMARY

Beaverhill Lake was designated as an Important Bird Area (IBA) in 1997. The IBA program is sponsored by Birdlife International and is spearheaded in Canada by its co-partners, the Canadian Nature Federation and Bird Studies Canada. Its goals are: to identify sites that are critical to the long term viability of bird populations with a focus on bird species that meet IBA criteria; to develop on-the-ground conservation plans through partnerships with local stakeholders; and to maintain ongoing local involvement in the protection and monitoring of the species and sites.

Located 8 km east of the Town of Tofield, Beaverhill Lake is a large shallow alkaline lake. The IBA includes Dekker and Pelican Islands, the Beaverhill Lake Natural Area, and the lake itself. This IBA is used as a spring and fall migration staging area for globally significant populations (greater than 1% of the global population) of Greater White-fronted Geese, Snow Geese, Pectoral Sandpipers, Black-bellied Sandpipers, and Dowitcher species. Nationally significant populations (greater than 1% of the national population) of American Avocets breed at Beaverhill Lake. Many species of songbirds also use the IBA and surrounding habitats as a migratory stopover site and breeding area. The endangered Piping Plover has bred on the shore of the lake in previous years. Peregrine Falcons are a commonly seen and deer, moose, and many small mammals can be found around the lake.

The public land adjacent to the lake is used primarily to graze cattle under lease dispositions. Cultivation of crops occurs further away from the shore on private land. Low impact recreation and research activities are conducted within the Natural Area.

Beaverhill Lake has been recognized by many organizations and has received designations to protect species and habitats, and to increase local, national and international recognition. Designations include Special Places, Western Hemisphere Shorebird Reserve Network, Ramsar Site, Natural Area, and a National Nature Viewpoint. Migrating geese have been protected through a Seasonal Sanctuary regulation, and colonial bird nesting sites on the islands are protected under a Restricted Wildlife Area regulation.

The Beaverhill Lake Stakeholders Committee provided input for this conservation plan. Members involved in the planning meeting include: local lease holders, the Town of Tofield, the County of Beaver, Alberta Public Lands, Canadian Wildlife Service, Ducks Unlimited, Tofield Nature Center, the Edmonton Bird Club, and the Beaverhill Bird Observatory.

The conservation of Beaverhill Lake will not only maintain a staging area for bird populations, it will allow for the continued and cooperative research to further understand the bird species and their relationships with their habitats. The lake provides an excellent opportunity for educating the public on the natural history of the region and the importance of maintaining habitats. Tourism provides economic benefits for the local community. Hunting opportunities within the region will remain with healthy waterfowl populations.

Eight conservation issues were identified that can affect the IBA species and the habitats they use:

1) Fluctuating water levels allows cattle and mammalian predators to access both Dekker and Pelican Islands, which disrupts nesting of colonial birds. Low water levels may increase the concentration of salts found in the water, to the point of being toxic to some species.

2) High concentrations of waterfowl and shorebirds congregate on the lake, increasing the chance of spreading disease. Botulism outbreaks have occurred in previous years killing thousands of ducks, geese, and shorebirds.

3) Grazing the shoreline vegetation may limit the nesting and feeding opportunities for some bird species. Trampled soils provide ideal conditions for weedy plants to grow.

4) Aspen and willow groves are dominant within the Natural Area. Some clearing has been conducted that may have effects on feeding and nesting opportunities of some species of birds, benefiting some but to the detriment of others.

5) The grasslands and sedge meadows along the shoreline have become very dense in the Natural Area. This may affect the grassland species composition and poses a fire risk.

6) Ecotourism is a concern to private landowners and their property. At times, visitors go off trails, trample the vegetation, and leave gates open.

7) Exotic species are a concern to the ecological integrity of natural areas. The extent of any exotic species near the lake are unknown,

but they have the potential to change the ecology of the area.

8) Cultivation of lands adjacent to the lake may increase the risk of wind and water erosion. Agricultural chemicals may be affecting the water quality of the lake.

This conservation plan includes action plans that will contribute to the maintenance and health of the lake and the populations of bird species that use it. Conservation of the Beaverhill Lake IBA and the IBA species are listed in four main categories: 1) research and monitoring on the migrating populations and habitat use; 2) management of the habitats around the lake with local activities; 3) enforcement of existing hunting and nest site protection regulations; and 4) education of the public on the species, habitats, and proper ethics when visiting the lake. Each action item within these categories focus on a specific issue and is prioritized based on the importance it has to the IBA species at the lake, and stakeholder activities. These action plans are flexible and can be revised to accommodate the dynamic changes that may occur to the IBA species, lake habitats, and the views of the stakeholders.

The Beaverhill Lake IBA conservation plan was completed while the Special Places management plan for Beaverhill Lake was in its early development stages. The IBA conservation plan was developed from the perspective of the birding community, and therefore recommends actions to maintain the bird communities at Beaverhill Lake. To represent the views of the birding community as part of the stakeholders group at Beaverhill Lake, this IBA plan was submitted to the Special Places Planners for their consideration to include in the Beaverhill Special Places Plan.

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1 Introduction

Conservation and preservation of natural systems is a very important issue. Increased development and expansion of human activities are encroaching on many habitats used by wildlife. Central Alberta is intensively used by migrating waterfowl, shorebirds, and songbirds. These birds travel thousands of kilometers to reach their northern breeding grounds. Along the way, they use various lakes as staging areas to feed and rest before the next leg of their long journey. Conservation of staging areas is only one factor to ensure the breeding continues and populations are maintained.

Beaverhill Lake, approximately 8 kilometers east of the Town of Tofield, is used as a staging area by thousands of migrating Snow Geese, Greater White-fronted Geese, and a large number of shorebirds. The significance of Beaverhill Lake as a staging area has been recognized by many agencies and individuals. Beaverhill Lake was designated as an Important Bird Area (IBA) in 1997.

The Beaverhill Lake Stakeholder Committee consists of local landowners, community groups, various organizations, and government groups. This group is a key contributor to the conservation health of Beaverhill Lake as a staging area and as an Important Bird Area.

This conservation plan highlights the bird conservation issues of Beaverhill Lake. These issues were presented at a meeting of the Stakeholder Committee, and possible goals and objectives for the plan were discussed. Actions to achieve the goals and objectives incorporate local activities to maintain the natural integrity of Beaverhill Lake. This conservation plan is a guide to aid in achieving the goals and objectives.

2 IBA Program

The Canadian Important Bird Area (IBA) Program, together with parallel efforts in the United States and Mexico, is part of a co-operative continental program designed to ensure the conservation of North American bird populations and the critical habitats that sustain these populations. As an international initiative sponsored by Birdlife International, the IBA Program has achieved significant on-the-ground conservation successes in other regions of the world. The Canadian IBA program is spearheaded by the Canadian Nature Federation and Bird Studies Canada, the Birdlife International co-partners in Canada.

The goals of the Canadian IBA Program are to:

- identify a network of sites that conserve the natural diversity of Canadian bird species and are critical to the long-term viability of naturally occurring bird populations;
- determine the type of protection or stewardship required for each site, and ensure the conservation of sites through partnerships of local stakeholders who develop and implement appropriate on-the-ground conservation plans;
- establish ongoing local involvement in site protection and monitoring.

IBAs are identified by the presence of birds falling under one or more of the following internationally agreed categories:

1. Sites regularly holding significant numbers of an endangered, threatened, or vulnerable species.
2. Sites regularly holding an endemic species, or species with restricted ranges.
3. Sites regularly holding an assemblage of species largely restricted to a biome.
4. Sites where birds concentrate in significant numbers when breeding, in winter, or during migration.

The success of the Canadian IBA Program is strongly dependent on the development of cooperative and effective partnerships. Regional and local stakeholders working together are best placed to secure the future of Canada's wild bird populations by developing and applying practical and appropriate conservation action plans for individual sites. Conservation organizations, naturalists clubs, landowners, wildlife agencies, the federal and provincial governments, professional ornithologists, First Nations, and interested individuals together have a vital role to play in determining and applying the most appropriate conservation measures for Canadian bird populations through the IBA program.

The "globally significant" Beaverhill Lake was Alberta's first Important Bird Area. The Beaverhill Lake IBA was selected as the pilot site for the development of the first site conservation plan for a Canadian IBA (Chute 1997).

3 IBA Site Information

SITE: Beaverhill Lake
Location: 53°30'N, 113°30'W

Total Area: About 18,050 hectares (including both aquatic and terrestrial areas)
Actual Location: Located within the County of Beaver (#9) and County of Lamont (#30)
Populated Centers: Near the town of Tofield

Location

Beaverhill Lake is located about 60 km east of Edmonton, north of Highway 14 and south of Highway 16. The nearest town is Tofield, which is just west of the lake on Highway 14. The area of Beaverhill Lake IBA varies due to water level fluctuations but covers about 13,900 hectares of water on the lake and approximately 410 hectares of terrestrial land. Dekker Islands in the northern portion of the lake, Pelican Island in the east-centre, and the Natural Area located in the southeast combine for the total terrestrial area (Appendix F).

Physical Features

Beaverhill Lake is a shallow alkaline lake, two to three meters deep. The depth fluctuates yearly with the amount of precipitation and spring runoff. Water fluctuations create a highly variable shoreline consisting of mudflats, narrow sandy beaches and dense emergent vegetation of primarily cattails and bulrushes (Chute 1997).

Beaverhill Lake is located on the east side of the Beaverhill/Cooking Lake moraine watershed created from the Keewatin glacier (Saley 1994). The glacier deposited hummocky till of debris and boulders which formed the knob and kettle topography of Beaver Hills west of Beaverhill Lake. These hills are 60 to 120 meters higher than the surrounding country. Beaverhill Lake is a collection basin for the spring runoff from the snow collected on the higher elevations (Saley 1994).

The moraine beneath Beaverhill Lake has poor drainage. Historically, a creek on the north side of the lake made a connection to the North Saskatchewan River. With recent low water levels, the lake has no outlet (Saley 1994).

Numerous creeks feed into Beaverhill Lake. Hastings, Wakinagan, Ross, and Norris Creeks flow into the west side of the lake. Amisk and Katchemut Creeks flow into the south. A manmade drainage system, the Kropielnicki Drainage, flows into the southeast (Coopers and Lybrand 1989).

The soils within the Beaverhill Lake basin are relatively young and develop slowly along the beach (Griffiths *et al.* 1996). The soil on the west side of the lake is classified as gleyosolic. To the east and south sides of the lake the soil is regosolic with some regosolic-sandy phases (Alberta Energy and Natural Resources 1981). Regosols dry out easily and are low in fertility. The soils adjacent to Beaverhill Lake are only capable of producing forage crops, and flooding limits all agricultural use (Coopers and Lybrand 1989).

Climate

The continental climate is typical of central Alberta with hot summers and cold winters. The area receives an average 572 mm of precipitation annually. The majority of the precipitation falls as rain during the summer months. The average annual snowfall is 142.6 cm. Freeze-up begins in November and spring break-up begins the third week in April (Coopers and Lybrand 1989).

Shoreline Habitats

The shoreline around the lake varies from straight and narrow sandy beaches in the south to muddy and deeply indented reed-choked bays and rock strewn points in the north (Saley 1994). The fluctuating lake levels help create marsh and exposed mud shorelines that are important habitats for waterfowl, shorebirds and other land birds (Saley 1994). During dry periods the shoreline vegetative zones advance with the receding shoreline (Saley 1994). Advancing vegetation provides nesting opportunities for different species of waterfowl and shorebirds (Griffiths *et al.* 1996). During extended wet periods, rising lake levels cause the vegetation to die back and change in composition (Saley 1994). When the water recedes the resulting mudflats attract large numbers of shorebirds because of the increased feeding opportunities (Griffiths *et al.* 1996).

Terrestrial Habitats

The gradient of vegetation types from the shore is emergent vegetation, mudflats, sedge meadows, willow community, and aspen uplands (Saley 1994). The shoreline consists of the emergent bulrushes and cattails. A transition zone into sedges and northern reedgrass occurs further from the shore. Grass and encroaching willows occur further away from the shoreline. Mature trembling aspen and balsam poplar dominate the forested areas (Coopers and Lybrand 1989). The forest stands are of recent origin. Heavy flooding in the 1920's killed most of the trees, so the forest is about 75 years old. The forest is still in transi-

tion from willow shrubbery to mature balsam poplar forest and has not yet developed a typical forest understory (Griffiths *et al.*1996).

Habitats Outside IBA

Bilyk *et al.* (1998) outlined 19 different bird-habitat associations surrounding Beaverhill Lake (Appendix B). Beaverhill Lake and the surrounding habitats studied encompasses about 466 square kilometers. These bird-habitat associations include both those in natural settings and those linked with land use practices.

Significance of Habitats to IBA Species

Three major migratory flyways converge on Beaverhill Lake: the Mississippi, the Pacific, and the Central (Coopers and Lybrand 1989). The long broad shorelines provide good visibility, ideal as a staging area for migrating waterfowl and shorebirds (Coopers and Lybrand 1989). Many agricultural fields in the area provide food sources for the geese. Mudflats attract shorebirds and the rocky shorelines attract plovers. Shallow temporary wetlands around the lake are very important to migrating birds during spring when the lake is still ice covered (Saley 1994).

4 IBA Species Information

4.1 IBA Species

Beaverhill Lake has been selected as an IBA because of the significant congregations of species (Table 1) that use the lake as a staging area during spring and fall migration. During spring migration, high concentrations of Greater White-fronted Geese and Snow Geese have been recorded. The congregations for both species is greater than 1% of the global population which qualifies them as globally significant under IBA category 4, sites where birds congregate in significant numbers.

Four species of arctic breeding shorebirds congregate at the lake during migration. The migration concentrations of Pectoral Sandpiper, Black-Bellied Plover, and the two Dowitcher species consist of greater than 1% of the global population. American Avocets breed on Beaverhill Lake in nationally significant concentrations (greater than 1% of the national population).

Species	Importance	Numbers Recorded	IBA Threshold[i]	Season
Greater White-fronted Goose *Anser albifrons*	Global	50,000-100,000	10,450	Fall and Winter Migration
Snow Goose *Chen caerulescens*	Global	50,000-75,000	20,000	Fall and Winter Migration
Pectoral Sandpiper *Calidris melanotos*	Global	10,000	500	Spring Migration
Black-bellied Plover *Pluvialis squatarola*	Global	7,800	1,400	Spring Migration
Dowitcher sp. *Limnodromus sp.*	Global	10,000	5,000	Spring Migration
American Avocet *Recurvirostra americana*	National	1,000	630	Breeding

Table 1: IBA Species Information

[1] From Canadian IBA Thresholds, March 2000

4.2 General Geese Information
(from Johnsgard 1979, unless otherwise noted)

Snow Geese and Greater White-fronted Geese have similar natural histories. Geese migrate north to the arctic during the spring migration through various flyways; though their migration routes are flexible in response to changes in habitat and weather within migratory pathways and stopover points. The flocks are highly concentrated during spring migration and more dispersed during the fall.

Spring migration begins in mid-April, timed so that the geese arrive at the breeding grounds as the snow melts. The geese have a short summer season in the arctic for laying eggs, hatching, and brood rearing. Staging areas are not only used to rest, but to build up fat reserves for breeding. Females have tremendous energy costs during incubation and may lose up to one quarter of their body weight since they rarely leave the nest. Geese create potentially life long pair bonds at two to three years of age.

Greater White-fronted Goose

Greater White-fronted Geese feed on winter grains, vegetative parts of grasses, and rootstocks of cattails and bulrushes on migration. This species has arrived as early as late March and remained in spring until June 2; in autumn they arrive as early as August 12 and stay as late as October 30 (Fairweather 1995). In 1999, the first recorded sighting at Beaverhill Lake for spring migration was on April 3 and the last sighting was on May 12. The first sighting for fall migration was August 19 and the last recorded day was on October 9 (Fairweather 1999).

They breed in coastal tundra habitats, edges of tundra lakes, flood plains and mouths of arctic streams, and other grassy tundra areas. The breeding range is on the arctic mainland from the interior of Alaska to the Melville Peninsula, Northwest Territories (Environment Canada 1999a). Nests are widespread and usually contain five eggs. The breeding season, from laying the eggs until the young are ready to migrate, lasts seven weeks. Adults go through a flightless moult stage during brood rearing.

Greater White-fronted Geese winter in California, along the Gulf Coast of Louisiana, Texas, and in Northern Mexico (Johnsgard 1975). The flocks during non-breeding are one of the smallest of all the geese. They tend to mix with Canada Geese during non-breeding periods and migration.

Snow Goose

Snow Geese migrate in very large flocks. Snow Geese have arrived as early as late March and stayed until May 25th ; then returned as early as August 15 and left as late as November 10 (Fairweather 1995). In 1999, the earliest spring migration sighting at Beaverhill Lake was on April 3 and the last was May 29. The highest migratory concentrations occur at the end of April. Fall migration sightings began on September 11 and ended on November 2 (Fairweather 1999).

Mating occurs during northern migration, mostly at stops just before their arrival on the breeding grounds (Bellrose 1976). These geese breed along the coast of Hudson Bay, on Southhampton Island, on southern Baffin Island, and on Banks Island (Environment Canada 1989). Snow Geese are colonial nesters. Nests are in the low grassy tundra near salt water, lakes, ponds or on river flood plains and contain four to five eggs. The entire breeding period is about eight to ten weeks. They are very successful nesters, with few nests completely failing (Bellrose 1976). Snow Geese overwinter in central California, New Mexico, Mexico, and along the Gulf of Mexico (Environment Canada 1989).

Snow Geese have different feeding habits than other geese. First, cutting edges on their mandible allow for effective clipping action. Secondly, they have the tendency to pull plants up by the rootstocks more frequently than other geese. They feed in areas with grasses, grains, sedges and various broad-leaved herbaceous plants.

Both “white” and “blue” morphs occur in Snow Geese but most are white phase at Beaverhill Lake. The blue morph is more common than white in the western and northern regions.

4.3 Shorebird Information
(from Johnsgard 1981, unless otherwise noted)

Black-bellied Plover

In spring, this plover has arrived as early as May 7 and left by June 1 to return as early as July 12 and stay as late as October 25 (Fairweather 1995). In 1999, this species occurred at Beaverhill from May 16 to May 29. Fall migration sightings were recorded from September 7 to October 23 (Fairweather 1999).

The breeding range in North America is in northern Alaska, and throughout arctic Canada. Breeding occurs in dry stony moss, grass, or lichen tundra. They are highly dispersed through-

out breeding grounds. Males arrive on the breeding grounds first. The entire laying, incubation and fledging period is about eight weeks.

Courtship displays have been observed during spring migration. During migration they are found on coastal mudflats, along lakeshores, and in freshly flooded fields. They feed on a variety of marine invertebrates, mollusks, insects, and some plant seeds. They winter over a wide area of North, Central, and South America on tidal sands or mud flats of ocean coastlines, bays, estuaries, and some inland habitats. During this time they are found in loose flocks or solitary.

Pectoral Sandpiper

This shorebird arrives as early as May 5 and has stayed as late as June 10. The autumn migration can be very protracted since this species has been recorded as early as July 3 and as late as October 31, but the peak migration is between September 15 to October 15 (Fairweather 1995). In 1999, spring migration occurred between April 25 and May 29 and fall migration from September 7 to September 29 (Fairweather 1999).

The breeding range of the Pectoral Sandpiper in North America ranges from Alaska to Southampton Island (Soothill and Soothill 1982). They nest in tundra habitats associated with flat, poorly drained and wet terrain. Incubation of the eggs lasts 21 to 23 days, followed by a three week fledging period. The males migrate first, followed by the females which leave shortly after the young have fledged. Young remain up to a month after adults have left.

During the early spring Pectoral Sandpipers feed on cranefly larvae, then shift to midge larvae. They eat a large number of adult insects, including crickets and beetles, and worms.

They winter in South America, from Bolivia and Peru to central Chile and Patagonia (Soothill and Soothill 1982). They occupy areas of wet and grassy habitats in small flocks of 10 to 50 individuals that are sometimes very territorial.

American Avocet

American Avocets have arrived as early as March 20 and stayed as late as September 10 at Beaverhill Lake (Fairweather 1995). In 1999, the first sighting was on April 24 and the last sighting on September 28 (Fairweather 1999).

The American Avocet breeds on Beaverhill Lake. The lake provides ideal nesting habitat on the sparsely vegetated shorelines, or mudflats close to shallow alkaline or subsaline water. The nests are in loose colonies but are located within discrete nesting and feeding territories established and defended by both the male and female. Nests are mere hollows on the shoreline or mudflats lined with grasses, weed stems, and small sticks (Soothill and Soothill 1982). Avocets lay a clutch of four eggs. Both males and females incubate the eggs for about 22 to 29 days. Fledging occurs at four to five weeks after hatching, but young leave the nest a few hours after they have hatched.

The breeding season is between April and June (Soothill and Soothill 1982). They winter in central California, southern Texas, and in southern Mexico. During winter and migration they are found along marine shorelines. They are very gregarious during these periods. They feed primarily on crustaceans, dragonfly nymphs, beetles, flies and their larvae. One third of the diet consists of plants associated with water.

Dowitchers, Long-billed and Short-billed

Dowitchers are difficult to separate, and on the shorebird surveys that have been done at Beaverhill Lake, they were often lumped. Bird watcher records compiled by Fairweather (1995) show that the two species have similar migration timing at Beaverhill Lake: arrive as early a May 1 and depart as late as May 25 in spring, then in autumn they are at the lake from approximately July 1 to as late as October 20.

5 Other Elements of Conservation Value

Beaverhill Lake has many other features that add to its conservation importance. In addition to the listed IBA species, it is a stopover site for many other species of migratory waterfowl and shorebirds. An estimated 40,000 to 70,000 ducks use the lake as a staging area and moulting area during spring and fall migration (Coopers and Lybrand 1989). Over 20,000 shorebirds use the lake as a staging area during migration (Saley 1994). The highest single day count for shorebirds was in May 1995, when 52,334 individuals were recorded.

Colonial nesting birds, including American White Pelicans and Double-crested Cormorants, nest on Pelican Island and Dekker Islands. However, nest success of these depends on the water levels (Saley 1994). Low water levels permit access by predators and cattle to the islands.

Fairweather (1995) and Dekker (1998) have listed about 291 bird species that have been recorded at Beaverhill Lake either on the lake or in the surround-

ing area. Common species can be seen yearly (Appendix C). Uncommon and rare species are listed in Appendices D and E.

High profile species also breed and migrate through Beaverhill Lake. The endangered Piping Plover has been recorded nesting on the shoreline of the lake. During the 1996 International Piping Plover Survey, seven breeding pairs were recorded. Peregrine Falcons migrate through the area. From 1969 to 1983, Dick Dekker recorded 880 sightings of Peregrine Falcons in the spring, the majority in May, but only 51 sightings in the fall (Dekker 1998).

Banding records from both the Beaverhill Lake Bird Observatory and Edgar Jones, a local bird bander with several decades experience at the lake, show that Beaverhill Lake is a major spring and fall migratory stopover location for songbirds (Jungkind 1993). Jungkind (1993) reported that 26,450 birds were banded at Beaverhill Lake from 1980 to 1991 in which 22,000 were "woodland" songbirds, representing over 71 species. The quality and effort in the migration monitoring banding program at the Beaverhill Bird Observatory has improved since his report, and now includes daily banding and census information throughout the spring and autumn migrations.

A number of mammals occur in the area as well. White-tailed Deer and Moose are two common ungulates. Coyotes represent the top carnivore. Weasels and Snowshoe Hares are abundant. A host of small rodents make up the prey base for many of the raptor species.

6 Land Ownership and Use

6.1 Land Ownership

The majority of the land within Beaver County is privately owned. Exposed shoreline from the receding water levels of Beaverhill Lake is owned by the Crown. The majority of this Crown land is leased under various dispositions. These dispositions include grazing leases and permits, cultivation permits and farm development leases (Coopers and Lybrand 1989). Two recreational leases have also been issued (Coopers and Lybrand 1989). The Beaverhill Bird Observatory (BBO) is located on the south shore within the Natural Area. The Mundare Recreational Lease is located on the east side of the Lake. A small portion of Crown land is under a riparian rights system; the exposed shoreline is given legal title to landowners leases (Coopers and Lybrand 1989).

6.2 Historical Land Use

Historically, agriculture has been the primary land use, with grazing and haying as the two most common practices. Crown land surrounding the lake has been leased to landowners with surrounding patented land since the 1930's (Alberta Energy and Natural Resources 1981).

The lake's recreation value was recognized in 1925 when Beaverhill Lake was designated a Public Shooting Ground. It has also been a popular destination for naturalists and birdwatchers. William Rowan spent 40 years, beginning in 1921, observing birds and collecting birds at the lake and became a pioneer in research of bird migration (Saley 1994). Bird and migration studies continue through efforts of individuals, such as Dick Dekker and Edgar Jones, and the Beaverhill Bird Observatory.

6.3 Current Use

Grazing is the principal agricultural land use within the Crown lands subject to lease dispositions (Coopers and Lybrand 1989). Grazing of cattle usually occurs for four to five months from May to September. Many factors determine range conditions in the grazing leases including: entry date, stocking rates, cattle preference for forage, and palatability of different types of vegetation (Coopers and Lybrand 1989). Cattle have access to the shoreline for grazing and watering. Grazing rotations are used both to increase grazing capacity and to allow waterfowl nesting and production (Coopers and Lybrand 1989).

Hay and cereal crops are grown under the Farm Development Dispositions or Cultivation Permits. However, the majority of cropping and cultivation occurs on private lands away from the lake (Coopers and Lybrand 1989).

Existing and potential oil and gas leases are also present in the area. Most are located to the southwest of the lake and they include a License of Occupation which covers roadway access to the sites (Coopers and Lybrand 1989). The current extent of the operations is unknown to us.

Ducks Unlimited (DU) has many projects which promote wetland development for duck habitat. Within the Beaverhill Lake area, DU focuses on refilling drained ponds and wetlands, as well as creating early spring habitat for the waterfowl to use. These projects create unfrozen water in fields to give the ducks a place to stay instead of the frozen lake. These temporary spring

ponds are also heavily used by the migrating geese and shorebirds as stopover sites.

Beaverhill Lake provides a number of recreational activities. Birdwatching is highly popular because of the large spring and fall migrations of waterfowl and shorebirds (Coopers and Lybrand 1989). The majority of the birdwatching tends to be on the southern shoreline, due to public access, and bait stations attracting flocks of birds (Coopers and Lybrand 1989). Birdwatching is a relatively low impact activity, but does put stress on the environment and birds with increased visitation rates. One annual public focus on birds at Beaverhill Lake is the Snow Goose Festival in April when 5000 participants take bus and walking tours to view snow geese and other early spring migrant birds.

Located within the Natural Area, the Beaverhill Bird Observatory (BBO), established in 1984, observes and conducts studies on birds, amphibians, mammals, plants, and insects. It also provides interpretive nature walks throughout the Natural Area. The BBO staff and volunteers act as stewards of the Natural Area. Low impact structures have been built to accommodate the staff through the summer months.

Hunting is allowed during the hunting seasons, except on the south side of the lake (including Lister Lake), which is designated as Restricted Wildlife Area where hunting of all game birds within 0.8 km of the edge of the lake is prohibited prior to November 1 (Coopers and Lybrand 1989).

Trapping within the Beaverhill Lake area does not provide the sole income for any of the trappers (Coopers and Lybrand 1989). In 1972-73 there were no registered trap lines and only a few trapping permits were issued to residents in the area (Coopers and Lybrand 1989). We are not aware of more current information on trapping at the lake.

Power driven vessels are prohibited on Beaverhill Lake under the Boating Restrictions Regulations (Coopers and Lybrand 1989). Non-motorized boats are permitted on the lake. This allows access to critical breeding and feeding areas of waterfowl, but regulations restrict encroachment withing one half mile of Pelican Island and the shallow nature of the lake provides some natural protection to wildlife habitat (Coopers and Lybrand 1989).

Other recreational activities include hiking, picnicking, photography, cross-country skiing, snow shoeing, and snowmobiling.

7 Conservation and Management Achieved *(from Chute 1997)*

The importance of Beaverhill Lake to birds has been recognized on regional, national, and global levels. Numerous land management agreements and designations from international programs are in place to help manage and conserve bird habitat throughout the lake.

Special Places

Beaverhill Lake was designated under the Alberta Special Places program in November 1999. The designation includes it under the Heritage Rangelands category of the new Natural Heritage Act and will be subject to its regulations once the Act has passed.

Special Places created a network of protected areas to preserve the biodiversity of Alberta. A management plan, including input from local stakeholder groups, will focus on preserving the natural heritage of Alberta with goals of heritage appreciation, recreation activities, tourism, and economic development (Alberta Environment 2001).

Important Bird Area (IBA)

Beaverhill Lake was officially recognized as a globally significant Important Bird Area in April 1997. The IBA designation provides identification of important habitat for birds. IBA status does not confer legal protection. A conservation plan for an IBA is community based and developed by local stakeholders. The IBA designation also provides awareness of the birds and the area on local, regional, national, and international levels.

Western Hemisphere Shorebird Reserve Network (WHSRN)

Beaverhill Lake received designation as a WHSRN regional site in May 1996. WHSRN provides international recognition to important shorebird habitats. Beaverhill Lake falls into the regional criteria because it supports 5% (or greater than 20,000) shorebirds annually of the flyway population. No legal protection is given with the designation, but it promotes the conservation of the area by landowners, managing agencies and other stakeholders. Designation also attracts international attention to the location.

Ramsar Site

The *Convention on Wetlands of International Importance*, otherwise known as the *Ramsar Convention*, designated Beaverhill Lake as a Ramsar

Site in May 1987, because of the importance of the lake as a staging area for waterfowl.

The *Convention* is an intergovernmental treaty that provides the framework for international cooperation for the conservation of the world's wetland habitats. Contracting Parties to the *Convention* undertake to respect four main obligations: "designation of at least one wetland for inclusion in *the List of Wetlands of International Importance*; promotion of the wise use of wetlands within their nation particularly through the implementation of wetland conservation and management policies; consultation with other Contracting Parties about implementing the obligations arising under the *Convention* particularly for those wetlands shared between nations; and establishment of protected wetland areas throughout their nation." (Environment Canada, 2000).

Designation of Beaverhill Lake as a Ramsar Site offers no legal protection, but management priorities support programs and activities on the site which are consistent with Canada's obligations under the *Convention.* Presently over 90% of the land within the Ramsar Site is under agricultural dispositions. The remaining land is disposed to resource development reservations (wildlife habitat, a recreation lease, and natural gas well sites), or is undisposed.

Natural Area

The Natural Area was established in 1987 as a protected area under the Wilderness Areas, Ecological Reserves and Natural Areas Act (1981). The Natural Area includes Dekker Islands, Pelican Island and Lister Lake. Some management priorities include protection of significant natural features; maintenance of habitats and communities of native species; and accommodation of public appreciation, education and enjoyment of the site which are compatible with the primary intent of wildlife protection. Public lands designated as Natural Areas are protected from development to ensure the maintenance of their natural features for public appreciation, education, and research. Facilities are limited to staging areas, trails, and signs.

National Nature Viewpoint

In 1981 the Canadian Nature Federation designated Beaverhill Lake as a National Nature Viewpoint, the second site in Canada to receive this status. This designation is designed to promote awareness of the area and has no legal implications.

Beaverhill Lake Integrated Land Use Plan

The draft land use planning document applies only to Crown lands (Alberta Energy and Natural Resources 1981). It identified local development plans (LDP) for each parcel of Crown land. The LDP must conform to the land use intent for the theme area in which the parcels fall. The theme areas include agriculture, agriculture-wildlife, wildlife-agriculture, wildlife, and recreation. Management priorities vary depending on the theme area and physical constraints of each parcel of land. The Beaverhill Lake Natural Area falls in the wildlife theme area. The lake itself is undefined since the draft plan only deals with land area.

Seasonal Sanctuary

This legal designation includes the area within 0.8 km radius of the pelican nesting island in Section 8/Township 52/Range 17/West of the 4th Meridian. All access is prohibited from 15 April to 15 September. The management objective is protection of the pelican nesting colony.

Restricted Wildlife Area

This provincial regulation applies to the southern half of the lake and all areas within 0.8 km of the edge of the water of the southern half of the lake (i.e. the lake and adjacent lands within Townships 50 and 51, Ranges 17 and 18, west of the Fourth Meridian). Hunting of game birds is prohibited until after 31 October in any year. Access for other purposes is not restricted. The objective is to provide a safe area for staging waterfowl during the peak of the migration.

8 Stakeholder Activities

The Beaverhill Lake Stakeholders Committee is an excellent model of an effective partnership that the IBA program seeks to establish to conserve critical bird habitat. The committee represents a comprehensive cross-section of the local communities. The stakeholders include private landowners, ranchers, provincial and federal government wildlife agencies, provincial land management agency, naturalists, local municipal government and County representatives, and a diverse selection of non-governmental organizations. The committee functions cooperatively with the shared goal of conserving the natural integrity of Beaverhill Lake and cooperating with the surrounding landowners. Some

conservation issues at Beaverhill Lake have been covered in other plans and projects including the land use and tourism plans.

The Beaverhill Lake Stakeholder Committee meeting was held in January, 2001 to discuss the IBA. The individuals present represented the following groups: lease holders, Town of Tofield, Ducks Unlimited, Beaverhill Bird Observatory, Canadian Wildlife Service of Environment Canada, County of Beaver, Tofield Nature Center, Alberta Agriculture- Public Lands, and Edmonton Bird Club. A few of the issues were discussed, but the general feeling from the group was that all activities should benefit the lake and its birds, and not interfere with the lease holders' and landowners' private activities.

9 Opportunities

9.1 Tourism

Tourism offers potential economic benefits to the community. In 1996, 20 million Canadians participated in nature related activities, spending $11 billion dollars. Wildlife viewing involved 400,000 Alberta residents who spent $1.1 billion within Canada (Environment Canada 1999b). The potential for tourism in the Beaverhill area is 50,000 –75,000 tourists per year bringing in an estimated $2 million (Saley 1994).

Birdwatching is one of the fastest growing recreational activities (Coopers and Lybrand 1989). People travel regionally, nationally, and internationally to high profile areas to view wildlife and birds. For example, the annual Tofield Snow Goose Festival attracts over 5000 visitors over two days to watch the flocks of Snow Geese in April. Visitors spend an estimated $316,455 (Hvenegaard and Manaloor 2001).

9.2 Co-operative Research

Several research programs, such as the Beaverhill Bird Observatory and private individuals studying songbirds, and Ducks Unlimited and Canadian Wildlife Service waterfowl studies are conducted within the area. Within the IBA, cooperative research programs could target solutions to the conservation concerns indentified in the next section. The research programs should include biological, social and economic topics to ensure the results have a broad application to the issues of concern.

9.3 Education

Education at Beaverhill Lake has the potential to inform the public about the local natural history, as well as broader conservation issues. Educational programs about local resident species and habitats will lead to greater understanding of the ecology of this important lake and associated natural lands, and the impact of surrounding land uses. Education programs about migrant species will improve the public's awareness of the importance of Beaverhill Lake to species that breed in the arctic and winter from the southern US through Central America to South America.

9.4 Hunting

With a high concentration of geese passing through the lake, the hunting potential is great, even with the restrictions on the south shore. The quality of the lake as a staging area should be maintained, such that the geese continue to migrate through the area, allowing continued hunting opportunities.

10 Conservation Issues

10.1 Water Level Fluctuations

Beaverhill Lake has a history of fluctuating water levels. In recent years, water levels have been dropping because of decreased precipitation and little run-off. Lower water levels have resulted in warmer water in the lake during summer months, which combined with wind, have increased the rate of evapotranspiration on the lake. As a result, Beaverhill Lake has experienced a considerable net loss of water and significantly lower lake levels. This drop in water allows cattle and predator access to Pelican Island and Dekker Islands. Various species of waterfowl nest on the islands as well as colonies of American White Pelicans and Double-crested Cormorants. Since the mid 1990s predators had access to the island and totally depredated the nests of pelicans and cormorants. By 2000, neither of these colonial species nested on the island. These species may have moved to nearby lakes to nest, but the net impact of the drying of the lake and subsequent predation is unknown.

The water of Beaverhill Lake is highly saline (Griffiths *et al.* 1996). Drought may cause the lake to increase in salinity to the point of being toxic to some species (Saley 1994). The deterioration of the watershed may be accelerated by man-made changes. Forest clearing and the drainage ditch from Miquelon Lake to Camrose (Saley 1994) may be redirecting runoff flows into Beaverhill Lake.

10.2 Disease

Whenever wildlife are concentrated, the potential for disease increases. With high densities of waterfowl in a concentrated area, the spread of disease may be quick and the disease may affect a high number of individuals.

A disease of particular concern in Beaverhill Lake is botulism. Botulism outbreaks occur with low water levels, hot weather, and a source of organic matter which may include agricultural fertilizers. A main source of organic matter is dead waterfowl. Large flocks are predisposed to the disease once it has started (Schmutz 2000). Moulting ducks are particularly vulnerable to botulism because the moult occurs during warm summer days when the chances of an outbreak are highest.

10.3 Grazing

Grazing along the shoreline is both beneficial and harmful to different bird species. Shoreline grazing substantially reduces the vegetation, which reduces the nesting cover used by some ducks, shorebirds, and sparrows. However, the expanded shoreline provides feeding opportunities for some species of shorebirds and sparrows.

Cattle also trample the soil. The trampling increases water turbidity at the lake edge, disrupts colonization of vegetation (reduces future grazing opportunities), creates a poor cloudy physical condition in the soil, and increases the potential for wind erosion as the disrupted surface dries (Griffiths *et al.* 1996). Soil compaction causes sulfate salts to be brought to the surface, which causes an increased saline condition in the soil that supports non-native weedy species (Griffiths *et al.*1996).

Receding water levels and expanding shorelines allow cattle to walk around the ends of existing fences and enter the Natural Area.

10.4 Clearing Willow and Aspen Groves

Willow and aspen are fast growing invasive species. When they invade grassland they reduce the amount of forage for cattle. The expanding willow and aspen stands do provide nesting and feeding habitats for both songbirds and waterfowl. The different ages of groves provide opportunities for different species. Migrating songbirds that stopover in the Natural Area also use different habitat types. Clearing of aspen in the Natural Area has resulted in dense young aspen groves. The effects of both natural succession and cutting of aspen on wildlife populations are unknown.

10.5 Grassland Management

The vegetation in sedge meadows in the Natural Area is very dense. Little fire or other vegetation control of the grassland biomass has occurred within the Natural Area in more than a decade. High vegetation density could be having an effect on the composition of grassland bird species. Many species of birds and plants require more open habitat, or early succession grasslands. The sedge fens do provide habitat for other species to live in the dense vegetation.

The dense vegetation in the sedges meadows combined with dry years and lower lake levels is posing a fire risk to the area. If a fire were to occur it may be difficult to control and may spread to adjacent lands.

10.6 Ecotourism

Ecotourism is a relatively low impact activity, however, a large influx of visitors can have detrimental effects on an area. One concern is the public going off trails. Trampling can impact the vegetation and disturb wildlife. Another concern with ecotourists is trespassing on private land. Problems include vehicle rutting on trails and pasture during flooding and wet periods, open gates, harassment of stock, theft, litter, and damage and vandalism to equipment, fences and gates. (Coopers and Lybrand 1989).

The stakeholders were divided when it came to the issue of tourism. A very large influx of tourists could damage the area and disturb landowners. However, with proper facilities, visitors can be directed to visit only specified areas, as has been done at Francis Point. Three areas have been designated as view points: Francis Point on the south, the Stone House access on the north, and Mundare beach to the east. Only Francis Point has been developed with facilities, an outhouse and observation blind. Currently the only facilities in the Natural Area are trail signs and the Bird Observatory, including its outhouse.

10.7 Exotic Species

With increased global trade and travel, plants, insects, disease and other organisms are spreading around the world and in some cases, changing the ecology in their new “homes”. The extent of introduced species in the IBA is unknown. Exotic weeds could threaten the integrity of the vegetation communities and their value to birds.

10.8 Cultivation

The shoreline lands of Beaverhill Lake are predominately grazing lands and Natural Area. Cultivation of lands immediately adjacent to the lake would increase the risk of water and wind erosion. These lands should be maintained in native vegetation to reduce the risk of soil erosion and to maintain biodiversity.

11 Conservation Goals and Objectives

The goal of the Beaverhill Lake IBA is to maintain the natural integrity of Beaverhill Lake by working with the stakeholders to develop a solid conservation plan that works with all parties involved. There are no timelines or strategy for the implementation of this plan.

Priorities

High Priorities- indicate current actions or actions that will directly benefit the IBA species and Beaverhill Lake. Items have high support from members of the stakeholders committee or are of central concern to at least one member.

Medium Priorities- possible actions that will benefit the integrity of Beaverhill Lake and the IBA species in the long term. These items have some members of the stakeholders committee interested, but do not feel that immediate action is necessary.

Low Priorities- Possible long term actions, but at present are not relevant or not feasible. These items are of little concern to the stakeholder committee.

11.1 Monitoring and Research

Research and monitoring is important to obtain the baseline data that is needed to determine whether or not the health of Beaverhill Lake is being compromised. Such information should be used to identify other conservation concerns, goals and objectives.

1. Create new and continue existing population monitoring programs of birds.

· High priority.
· Ongoing monitoring of migrating and breeding landbirds is conducted by the BBO and private individuals; more standardized effort could be made in monitoring the IBA species and wetland birds.

2. Research the effects of shoreline grazing regimes. Determine effects of grazing on vegetation, soil quality, and bird species (ie. nesting or feeding opportunities).

· Medium priority, possible action through cooperation of DU, BBO, and landowners.
· Compare the ungrazed shoreline in the Natural Area and the adjacent grazed lease land to find possible effects on the shoreline and species.

3. Monitor the nesting success of the colonial nesting birds on Pelican Island and Dekker Islands.

- Medium priority.
- Monitoring will determine how often the colonial birds nest there, and if predators have access, particularly in periods of low water levels. Actions to try to promote nesting can be taken if the island nests are frequently depredated.

4. Monitor the water quality at Beaverhill Lake to ensure that agricultural chemicals (fertilizers and pesticides) are not adversely affecting water quality and the lake's productivity. Monitor to determine if salinity increases during periods of low water levels.

- Medium priority.
- Action by the conservation and science groups to provide methods of monitoring.

5. Inventory exotic plants and implement control measures as appropriate.

- Medium priority
- Action by conservation organization and science groups to provide and implement methods of inventory.

6. Monitor the expansion of willows and aspen groves. Determine if the expansion has a negative impact on forage available on the grazing leases. Study the bird communities to see if any additional bird species using the natural area with an older forest, and if other species will change the use as a migratory stopover point or breeding location.

- Low priority
- This goal has little focus on the IBA species in the near future.

11.2 Management

1. Ensure that bait stations, or other methods of deterring migrating geese from feeding on crops, are effective.

- Medium priority.
- Action by individual landowners to determine if waterfowl are feeding on crops. Action by wildlife

agencies and landowners to determine if bait stations are effective and identify other actions to discourage the geese from feeding on crops. The sharing of this information among landowners is critical.

2. Ensure that all gates and fences are in good repair and are extended to the water edge to stop cattle movement into the Natural Area, in compliance with land lease dispositions.
- Medium priority.
- Action by Alberta Public Lands, neighbouring lease holders, and BBO.

3. Restrict vehicular activities within the Natural Area.
- Medium priority.
- Action by Alberta Public Lands and BBO. Setting up visible signs that designate a parking area and informing the visitors that vehicle access is discouraged.

4. Manage the grasses and sedges in the Natural Area to maintain biodiversity and reduce the risk of a major fire.
- Medium priority.
- Develop a program that will maintain the grasslands allowing for a diversity of species and manage the vegetation to minimize the risk of a major fire.

5. Determine if the lake levels should be stabilized, and if extreme water level fluctuations can be avoided.
- Low priority.
- Many factors affect the water levels, and the fact that the water fluctuations are a natural occurrence makes this management scheme very unlikely and if any action is attempted it may be ineffective. If future information determines a human cause to the decreasing water levels, then action should be taken.

6. Conduct carcass removal programs in an attempt to reduce the chance of a botulism outbreak.
- Low priority.
- Beaverhill Lake is such a large lake that it may not be feasible to remove all the carcasses. Studies are being conducted elsewhere that are attempting to determine if removing carcasses will actually stop or reduce botulism outbreaks.

11.3 Enforcement

1. Ensure hunting regulations are being followed**.**
- Low priority.
- Few problems occur with the hunters, according to members of the stakeholders committee.

2. Ensure that the nesting areas on Pelican and Dekker Islands are not disturbed as per provincial regulation.
- Low priority.
- Inform residents and visitors of the regulation and the rational for restricting access.

11.4 Visitor Education

1. Provide facilities for tourist to view wildlife.
- High priority.
- Ongoing action by County of Beaver, County of Lamont, Town of Tofield and Tofield Nature Center. Construction of a viewing site at Mundare Beach and adequate signage to direct visitors to the location.

2. Promote visitor attitudes and activities that are respectful of local landowners and the natural environment.
- High priority.
- Action by the Tofield Nature Center and BBO. Provide information to visitors including what is expected from visitors.

3. Provide information on all species found at Beaverhill Lake and its importance as a wetland and stopover point for migrating birds.
- High priority.
- Action by BBO and Tofield Nature Centre. Provide information brochures and checklists.

4. Clearly designate public and private lands.
- Medium priority.
- Action by leaseholder to properly designate their land at their discretion.

5. Provide schools and teachers with resource material so that local students can learn more about the wildlife and ecosystems at Beaverhill Lake.
- Medium priority.
- Action by conservation groups and government agencies to provide suitable material.

Evaluating Success

Implementation

Current actions by members of the Stakeholders Committee are the first step in the success of this conservation plan.

Population Monitoring

Ongoing population monitoring will provide long term population trends. These trends are fundamental in determining whether or not the populations of species are declining in the area and if the declines are due to local conditions.

Education

The Town of Tofield has recently applied for funding to create the viewing wall at Mundare Beach and signs guiding visitors to the beach. The Beaverhill Bird Observatory is planning to create updated information brochures and species checklists for Beaverhill Lake to be distributed to visitors and other nature organizations.

These items are the high priority actions listed in this IBA conservation plan. When these are completed the conservation plan can be reevaluated to determine what other actions can be taken. If major concerns develop that are not included in this conservation plan, they can be added and be addressed immediately.

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Appendix A: IBA Partners

BirdLife International

A pioneer in its field, BirdLife International (BL) is the first non-government organization dedicated to promoting world-wide interest in and concern for the conservation of all birds and the special contribution they make to global biodiversity. BirdLife operates as a partnership of non-governmental conservation organizations, grouped together within geographic regions (e.g. Europe, Africa, Americas) for the purpose of planning and implementing regional programs. These organizations provide a link to on-the-ground conservation projects that involve local people with local expertise and knowledge. There are currently 20 countries involved in the Americas program throughout North, Central and South America.

For further information about BirdLife International, check the following web site: http://www.birdlife.net/.

The Canadian Important Bird Areas Program has been undertaken by a partnership of two lead agencies. The Canadian Nature Federation and Bird Studies Canada are the Canadian BirdLife International partners.

The Canadian Nature Federation (CNF)

The Canadian Nature Federation is a national conservation organization with a mission to be Canada's voice for the protection of nature, its diversity, and the processes that sustain it. The CNF represents the naturalist community and works closely with our provincial territorial and local affiliated naturalists organizations to directly reach 100,000 Canadians. The strength of our grassroots naturalists' network allows us to work effectively and knowledgeably on national conservation issues that affect a diversity of ecosystems and human populations in Canada. The CNF also works in partnership with other environmental organizations, government and industry, wherever possible.

Our approach is open and cooperative while remaining firm in our goal of developing ecologically-sound solutions to conservation problems. CNF's web site is http://www.cnf.ca

Bird Studies Canada (BSC)

The mission of Bird Studies Canada is to advance the understanding, appreciation and conservation of wild birds and their habitats, in Canada and elsewhere, through studies that engage the skills, enthusiasm and support of its members, volunteers, staff and the interested public. Bird Studies Canada believes that thousands of volunteers working together, with the guidance of a small group of professionals, can accomplish much more than could the two groups working independently. Current programs collectively involve over 10,000 volunteer participants from across Canada.

Bird Studies Canada is recognized nationwide as a leading and respected not-for-profit conservation organization dedicated to the study and understanding of wild birds and their habitats. Bird Studies Canada's web site is http://www.bsc-eoc.org

Federation of Alberta Naturalists (FAN)

The Federation of Alberta Naturalists is a provincial conservation organization, founded in 1970. FAN is an affiliate of the Canadian Nature Federation and is composed of corporate clubs and individual members.

The objectives of FAN are:

- to encourage Albertans to increase knowledge and understanding of natural history and ecological processes;
- to provide a unified voice for naturalists on conservation issues;
- to promote field meetings, conferences, nature camps, research symposia and other activities; and
- to promote the exchange of information among clubs and societies.

FAN publishes Alberta Naturalists four times a year.
Phone: (780) 427-8124, FAX: (780) 422-2663
Website: www.fanweb.ca/.

Appendix B: Brief Description of 18 Habitats at Beaverhill Lake

(from Bilyk et al. 1998)

Identified habitat type	Features	Land use/size
Continously Grazed Grasslands	retained native grass, with significantly reduced amount of woody shrub cover	year long grazing
Conventional Hay	alfalfa, wheat grass and brome	which is harvested at least once
Cropland	cultivated land that is seeded with cereal crops	
Delayed Hay	crops of alfalfa, wheat grass and brome	that have had the first harvest after July 15
Deferred Grazed Grasslands	retains some woody shrub cover on a field of tame or native grass	rotational grazing
Grazed Deciduous Upland	stands of mature trembling aspen and balsam poplar	grazed season long
Grazed Shrub Upland	native shrub community with greater than 50% cover dominated by willow & young poplar	grazed season long
Idle Native Grassland	retained tame or native grasslands with limited shrub cover	no grazing for more than three years
Idle Deciduous Upland	mature tracts of trembling aspen & balsam poplar	no grazing
Idle Shrub Upland	native shrub communities dominated by willow and young poplar	no grazing
Shelterbelt	dominated by trembling aspen & balsam poplar, with an understory of willow, aspen & poplar	mature tracts of deciduous shelter-belts or windrows adjacent to perennial cover
Large Saline Wetland	saline wetlands; include emergent & riparian zones	between 8 and 40 hectares
Large Seasonal Wetland	freshwater wetlands; include emergent and riparian zones	between 8 and 40 hectares and are present for longer than 3 years
Large Semi-permanent Wetland	freshwater wetlands; include emergent and riparian zones	from 8 to 40 hectares in size; occur on semi-permanent basis
Medium Seasonal Wetland	freshwater wetlands; include emergent and riparian zones	from 1 to 8 hectares in size; exist for longer than three weeks
Medium Semi-permanent Wetland	freshwater wetlands; include emergent and riparian zones	from 1 to 8 hectares in size; occur on a semi-permanent basis
Riparian	areas adjacent to creeks and rivers and the associated uplands	
Small Seasonal Wetland	freshwater wetlands; include emergent and riparian zones	less that one hectare in size; persist for greater than three weeks into the summer
Small Semi-permanent Wetland	freshwater wetlands; include emergent and riparian zones	less than one hectare in size; existing on a semi-permanent basis

Appendix C: 153 Species of Birds Commonly Found at Beaverhill Lake

(from Dekker 1998 and Fairweather 1995)

Pied-billed Grebe
Horned Grebe
Eared Grebe
Western Grebe
American White Pelican
Double-crested Cormorant
American Bittern
Great Blue Heron
Black-crowned Night Heron
Tundra Swan
Greater White-fronted Goose
Snow Goose
Canada Goose
Green-winged Teal
Mallard
Northern Pintail
Blue-winged Teal
Cinnamon Teal
Northern Shoveler
Gadwall
American Wigeon
Canvasback
Redhead
Lesser Scaup
White-winged Scoter
Common Goldeneye
Bufflehead
Common Merganser
Red-breasted Merganger
Ruddy Duck
Bald Eagle
Northern Harrier
Sharp-shinned Hawk
Cooper's Hawk
Swainson's Hawk
Red-tailed Hawk
Rough-legged Hawk
American Kestrel
Merlin
Peregrine Falcon
Gray Partridge
Ring-necked Pheasant
Ruffed Grouse
Sharp-tailed Grouse
Yellow Rail
Sora
American Coot
Sandhill Crane
Black-bellied Plover
American Golden Plover
Semipalmated Plover
Killdeer
American Avocet
Greater Yellowlegs
Lesser Yellowlegs
Solitary Sandpiper
Willet
Spotted Sandpiper
Upland Sandpiper
Whimbrel
Hudsonian Godwit
Marbled Godwit
Ruddy Turnstone
Red Knot
Sanderling
Semipalmated Sandpiper
Least Sandpiper
White-rumped Sandpiper
Baird's Sandpiper
Pectoral Sandpiper
Stilt Sandpiper
Buff-breasted Sandpiper
Short-billed Dowitcher
Long-billed Dowitcher
Common Snipe
Wilson's Phalarope
Red-necked Phalarope
Franklin's Gull
Bonaparte's Gull
Ring-billed Gull
California Gull
Common Tern
Forster's Tern
Black Tern
Rock Dove
Great Horned Owl
Snowy Owl
Short-eared Owl
Downy Woodpecker
Northern Flicker
Western Wood-Pewee
Alder Flycatcher
Least Flycatcher
Eastern Kingbird

Appendix C: 153 Species of Birds Commonly Found at Beaverhill Lake cont'd

Horned Lark
Purple Martin
Tree Swallow
Bank Swallow
Cliff Swallow
Barn Swallow
Blue Jay
Black-billed magpie
American Crow
Black-capped Chickadee
Red-breasted Nuthatch
House Wren
Marsh Wren
Ruby-crowned Kinglet
Mountain Bluebird
Swainson's Thrush
American Robin
American Pipit
Sprague's Pipit
Cedar Waxwing
European Starling
Red-eyed Vireo
Warbling Vireo
Tennessee Warbler
Orange-crowned Warbler
Yellow Warbler
Magnolia Warbler
Yellow-rumped Warbler
Palm Warbler
American Redstart
Common Yellowthroat
Wilson's Warbler
Rose-breasted Grosbeak
American Tree Sparrow
Chipping Sparrow
Clay-coloured Sparrow
Vesper Sparrow
Savannah Sparrow
LeConte's Sparrow
Nelson's Sharp-tailed Sparrow
Song Sparrow
Lincoln's Sparrow
Swamp Sparrow
White-throated Sparrow
White-crowned Sparrow
Dark-eyed Junco
Lapland Longspur
Snow Bunting
Bobolink
Red-winged Blackbird
Western Meadowlark
Yellow-headed Blackbird
Brewer's Blackbird
Common Grackle
Brown-headed Cowbird
Northern Oriole
Purple Finch
American Goldfinch
House Sparrow

Appendix D: 69 Species of Birds Uncommon at Beaverhill Lake

(from Dekker 1998 and Fairweather 1995)

Common Loon
Red-necked Grebe
Ross's Goose
American Black Duck
Ring-necked Duck
Greater Scaup
Surf Scoter
Barrow's Goldeneye
Hooded Merganser
Osprey
Northern Goshawk
Ferruginous Hawk
Golden Eagle
Gyrfalcon
Prairie Falcon
Piping Plover
Long-billed Curlew
Western Sandpiper
Dunlin
Red Phalarope
Parasitic Jaeger
Herring Gull
Glaucous Gull
Mourning Dove
Black-billed Curlew
Long-eared Owl
Northern Saw-whet Owl
Common Nighthawk
Ruby-throated Hummingbird
Yellow-bellied Sapsucker
Hairy Woodpecker
Olive-sided Flycatcher
Yellow-bellied Flycatcher
Willow Flycatcher
Eastern Phoebe
Say's Phoebe
Northern Rough-winged Swallow
Common Raven
Boreal Chickadee
Brown Creeper
Sedge Wren
Golden-crowned Kinglet
Veery
Hermit Thrush
Gray Catbird
Brown Thrasher
Bohemian Waxwing
Northern Shrike
Loggerhead Shrike
Solitary Vireo
Philadelphia Vireo
Cape May Warbler
Black-throated Green Warbler
Bay-breasted Warbler
Blackpoll Warbler
Ovenbird
Northern Waterthrush
Mourning Warbler
Canada Warbler
Western Tanager
Baird's Sparrow
Fox Sparrow
Harris' Sparrow
Smith's Longspur
Chestnut-collared Longspur
Rusty Blackbird
Common Redpoll
Pine Siskin
Evening Grosbeak

Appendix E: 64 Species of Birds Rare at Beaverhill Lake

(from Dekker 1998 and Fairweather 1995)

Red-throated Loon
Clark's Grebe
Great Egret
Snowy Egret
White-faced Ibis
Trumpeter Swan
Brant
Wood Duck
Eurasian Wigeon
Black Scoter
Harlequin Duck
Oldsquaw
Turkey Vulture
Greater Prairie-Chicken
Virginia Rail
Whooping Crane
Black-necked Stilt
Wandering Tattler
Surfbird
Sharp-tailed Sandpiper
Ruff
Long-tailed Jaeger
Little Gull
Mew Gull
Iceland Gull
Black-legged Kittiwake
Sabine's Gull
Caspian Tern
Arctic Tern
Ancient Murrelet
Barred Owl
Northern Hawk-Owl
Boreal Owl
Burrowing Owl
Belted Kingfisher
Red-headed Woodpecker
Pileated Woodpecker
Great Crested Flycatcher
Western Kingbird
Gray Jay
White-breasted Nuthatch
Winter Wren
Townsend's Solitaire
Wood Thrush
Gray-cheeked Thrush
Varied Thrush
Northern Mockingbird
Nashville Warbler
Chestnut-sided Warbler
Black-throated Blue Warbler
Blackburnian Warbler
Townsend's Warbler
MacGillivray's Warbler
Connecticut Warbler
Scarlet Tanager
Lark Sparrow
Lark Bunting
Golden-crowned Sparrow
McCown's Longspur
Indigo Bunting
Red Crossbill
White-winged Crossbill
Pine Grosbeak
Hoary Redpoll