COMMUNITY CONSERVATION PLAN

for the

Luck Lake Important Bird Area

February 2002

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Logos to be added:
CARDS
CSALE
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Sask. Lotteries

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Executive Summary

This Community Conservation Plan for Luck Lake was prepared as part of Saskatchewan's Important Bird Area (IBA) Program. In this program, special areas are awarded an Important Bird Area designation for conservation purposes if the areas are used by large concentrations of birds, if birds present are at risk, or if the sites represent intact biomes and their natural bird inhabitants with restricted ranges.

Luck Lake is a salt lake roughly 20 km^2 when full. It lies in the transition zone between mixed grassland and aspen parkland, at the edge of the Missouri Coteau in west-central Saskatchewan. The lake has no riparian connection to the South Saskatchewan River located a mere 10 km to the southeast, nor any other outflow. Soils in the immediate vicinity of the lake tend to be black Chernozems with sandy loam texture and little or no slope. Approximately 75% of the land surrounding the lake is under cultivation.

Luck Lake is of primary importance for species that congregate at the lake in large numbers during migration. These birds include Tundra Swan, Greater White-fronted Goose, Lesser Snow Goose, Hudsonian Godwit and Franklin's Gull. In the early 1990s, peak counts for the species were greater than 1% of the population in this region, making Luck Lake globally significant in IBA terms.

No major or imminent threats to the birds or the lake's ecosystem are apparent at this time. Land uses are primarily for agriculture and the birds have apparently coped well with this resource use. Major changes in water regimes or water quality could threaten bird use of the lake. Consideration is being given to water monitoring and management as needed and this should continue.

The objectives of this plan are to draw attention to the importance of Luck Lake for migratory birds, and to the need to monitor water quantity. Specific recommendations involve:

- Manage water levels to create open water, marsh vegetation and mud flats for the benefit of waterfowl and shorebirds.
- Encourage bird watching and nature interpretation as a tourism opportunity.
- Continue or increase monitoring of bird numbers and water quality.

The IBA Program was launched initially by BirdLife International in the UK. Today there are BirdLife Partners in over 100 countries. In

Canada the national partners are the Canadian Nature Federation and Bird Studies Canada. In Saskatchewan, the conservation component of this program is being delivered by Nature Saskatchewan. Funding partners of the Community Conservation Plan for Luck Lake include the Canadian Millennium Partnership Program, Canadian Adaptation and Rural Development Saskatchewan (CARDS), Saskatchewan Environment and Resource Management (SERM), and Ducks Unlimited Canada.

1. Introduction

Bird conservation is not 'just for the birds.' In a widely acknowledged and visionary treatment of the causes, human uses and the state of decline of diverse life forms on Earth, E.O. Wilson (1992) suggests that certain species will and should receive special attention. Wilson points out that individual species which may be large and colorful or otherwise charismatic, often are conservation favorites even though they represent a small fraction of living things. Such species, Wilson claims, can motivate conservation at many levels, from individual to government. Since no species exists in isolation from other species or its environment, such conservation efforts already in the first instance serve to protect elements of a

functioning life support system. If human economic, cultural and social values are adopted in addition to species and systems concerns, the conservation efforts will come 'full circle' and have gone well beyond the birds.

1.1 Why protect birds.

Surveys of human values and economic impacts have shown that birds have attracted the attention of many people in Saskatchewan and around the World. In a 1991 survey, 83% of Canadians reported that "maintaining abundant wildlife is very or fairly important" (Filion et al. 1993). Globally, 62% of people surveyed in 1990 in 42 countries reported "strong approval" for the ecology movement (Nevitte 1996). These human values are more than wishful thinking to many people. They signal a change in values by which we rank the worth of humans and wildlife, an expansion of the 'human-animal boundary' (Cartmill 1993). These changing world views represent both a responsibility and an opportunity. It will be the conservation planner's role to help formulate a scenario in which these new opportunities and responsibilities are realized.

A survey in Saskatchewan in 1996 showed that 74% of the population was involved in indirect nature-related activities (through media, visiting zoos, purchasing art and the like), and 15% of the population participated in trips specifically to view wildlife (www.ec.gc.ca/nature).

This community conservation[1] plan focuses on Luck Lake, in the Mixed Grass ecoregion of southwestern Saskatchewan (Fig. 1). The lake is considered "globally significant" in IBA program terms because of the large congregations of Tundra Swans[2], Lesser Snow Geese, Greater White-fronted Geese, Sandhill Cranes, Hudsonian Godwits and Franklin's Gulls.

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[1]In a book review (of D. Hulme and M. Murphree, Eds., 2001. African Wildlife and Livelihoods: The Promise and Performance of Community Conservation. Heinemann), Child (2002) writes: "Community conservation in Africa ranges from park outreach programmes in East Africa to southern Africa's radical policies to give back to communities the rights to use and benefit from the wildlife on their land. The latter, in particular, have contributed significantly to the emerging idea that conservation should contribute to basic human needs rather than conflict with them. This radical revision of a paradigm built on 'fortress conservation' is already incorporated into key international conventions, yet its practice remains new and experimental.....

Community conservation is being driven forward by a remarkably small number of 'scholar practitioners', who are attempting to realign institutions so that conservation benefits local communities and introduces democratic practices."

[2] There are many naming conventions in biology each having its own group of supporters. Birds are fairly uniform in appearance and their common names well known. Therefore, the Latin genus and species names are omitted in this document. Plants, in contrast are much more diverse, with ecological types or races common. Therefore plant ecologists and taxonomists generally use two or even three Latin names to identify their subjects.

Latin is used for naming not because the Romans used these names, but because when naming conventions began Latin was a dead language and unlikely to change as 'living' languages do over time. Latin names are more commonly called "scientific names," but using a two-name system in Latin is hardly enough to make a practice 'scientific." The question of what makes a method scientific is a matter of some debate (Bauer 1992).

It is hoped that this report may provide a significant impetus for further conservation into the future by

i) explaining why Luck Lake is 'important' to birds,

ii) describing the lake's ecosystems of which the birds are a part,

iii) reviewing appropriate literature, considering what is known but also speculating as to the potential impact of what is not known, and

iv) listing potential stakeholders and contact people (Appendix 1) toward these ends.

2 IBA Site Information

Luck Lake (Fig 1; IBA #SK003; 51º 4' N, 107º 6' W) is located near the crook of the elbow formed by the South Saskatchewan River and Lake Diefenbaker.[3] Luck Lake is removed from Saskatchewan's major highways but accessible through Highways 45 and 42, with the latter including a ferry ride. Nearby towns are Birsay, 5 km northeast, and Lucky Lake,[4] 8 km south.

[3]A summary of a book "The dam the drought built: A history of the South Saskatchewan River Project" by Max Macdonald (Canadian Plains Research Centre, University of Regina, Regina, 2000) reads as follows:
"Born out of the despair generated by the disastrous drought of the 1930s, the South Saskatchewan River Project was controversial from the very beginning. There were those who opposed the project as an unrealistic, uneconomical pipe dream. Others supported it as visionary, as a means of turning desert into an oasis. Politicians of all political parties wished to reap the benefits of its construction at the polls, and were unwilling to share the limelight with their opponents. Liberals, Conservatives and CCF/NDP - party loyalties were divided by the project, and it played a major role in both provincial and federal elections for decades. And, finally, after the dam was completed, there was an effort at reconciliation, as the contributions of men of all political persuasions were recognized: Gardiner Dam named for James G. (Jimmy) Gardiner, the Liberal premier who fought long and hard for the project, only to die before its completion; Lake Diefenbaker, for John G. Diefenbaker, the Conservative Prime Minister who made the construction of the dam one of his electoral platforms; and Douglas Provincial Park, for T.C. Douglas, the CCF premier who was also a long-time supporter of the dam. The principal players are all gone now, and history will be the ultimate judge of their legacies. Only the dam itself remains - the dam, and the controversy surrounding its construction."

[4] According to Barry 1998, Lucky Lake is "a village whose post office opened in 1908. Named after nearby Luck Lake, a large migratory waterfowl nesting ground. The lake was named by early settler Jock Swanson who "luckily" retrieved a team of oxen which had become mired in the lake. It may be that the name lengthened to Lucky Lake at the suggestion of the Post Office to avoid confusion with Duck Lake."

The 20 km^2 Luck Lake is nestled in the ragged escarpment of the Missouri Coteau (Fung et al. 1999).[5] The lake lies on the South Saskatchewan River plain at 500-600 m elevation. Luck Lake lies in an extensively cultivated landscape and is fed by shallow drainage runs arising in the Missouri Coteau to the North, West and South. The lake has no riparian connection with the South Saskatchewan River.

Luck Lake is saline, as are many other Saskatchewan lakes, especially those at the edge of the Missouri Coteau. According to Hammer, salinity of Luck Lake was 4.7‰ in June 1975. For comparison, sea water has a salinity of 40‰ and freshwater below 0.5‰.

Luck Lake is located between the Beechy Hills and Coteau Hills landscape areas within the Mixed Prairie ecoregion. Dominant soils in the immediate vicinity of Luck Lake are Brown Chernozems[6] with loamy texture. These soils are rated as having "severe" limitations for agriculture, due to the soil's poor moisture retaining capacity (Fung et al. 1999). Going northward Dark Brown Chernozems prevail, and capability for agriculture is rated moderately severe. Northward and southward, slope increases to moderate or steep (Fung et al. 1999).

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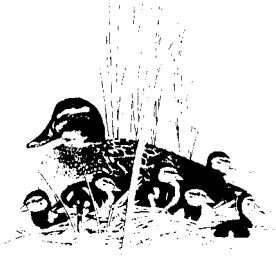
[5] Going westward, an abrupt but ragged step-like 200-m rise onto the second prairie plain with a total of three plains rising toward the Rocky Mountains. This band of hill-and-dale landscape extends northwesterly across southern Saskatchewan. The first prairie step lies near the eastern edge of Saskatchewan.

[6] Chernozem is a Russian word for the dark-coloured soil of grasslands.

Fig. 1

Mean daily temperatures were -16º C and 18ºC in January and July respectively. Mean annual precipitation was 30-35 cm, with most occurring in June and July (Fung et al. 1999).

Left to its own devices, Luck Lake would dry up roughly every other summer. In 1987, the Saskatchewan Water Corporation began construction of an irrigation system in the Birsay area. Water was piped out of Lake Diefenbaker in the Saskatchewan River Valley onto Luck Lake's plain. With a ready source of water, Ducks Unlimited Canada and its partners facilitated the pumping of water into Luck Lake and the subsequent management of water levels behind strategically constructed dykes (Sect. 5.4.1, 5.4.4).



2.1 Existing large scale conservation measures

The ecosystem and the birds of Luck Lake owe their persistence in large measure to their own ingenuity but also to past conservation values among people, and to legal protection. Large-scale Acts, policies and programs that relate to Luck Lake directly or indirectly are described below. These general measures have been complemented by many specific conservation initiatives described in Section 5.4.

2.1.1 Federal and provincial acts. In the late 1800s and early 1900s it became increasingly clear that migratory birds were on the decline. Market hunting was identified as a cause, but the other major cause, habitat loss, was not well recognized then. Legislated migratory bird protection passed the United States Senate in 1913. In 1916, Canada and the United States signed the Migratory Birds Treaty. The *Migratory Birds Convention Act* passed Parliament in 1917. Mexico signed the Migratory Birds Treaty in 1936 (Foster 1978).

The *Migratory Birds Convention Act* and its regulations give Environment Canada the authority to protect migratory birds, and control seasons and bag limits for hunted migrants. Soon after the Act passed Parliament, the first

Dominion ornithologist was hired. Bird management was under the Parks Branch until the section of the branch administering the Act became the Canadian Wildlife Service in 1947.

The province of Saskatchewan brought its legislation quickly into line with the *Wildlife Act,* as did most of the other provinces. The *Canada Wildlife Act* of 1973 fostered a partnership in conservation between the federal government, and the provinces and territories.

In addition to its traditional responsibilities in the area of fish, wildlife and parks management, the Government of Saskatchewan has recently passed the *Wildlife Act 1997* (replacing the *Wildlife Act)* to include Species at Risk. The province has also created the *Conservation Easements Act 1997* (Sect. 5.4.2) and introduced the Representative Areas Network program (Saskatchewan Environment and Resource Management 1997).

2.1.2 The proposed Species-at-Risk Act. Environment Canada Minister David Anderson introduced the newest version (Bill-C5) in January 2001, which replaces Bill-C33. Previous versions of this act expired when elections had been called. The new act prevents the direct killing of endangered species anywhere in Canada, and offers protection for the species and its 'home' on federal land. On lands of other jurisdictions, protection is a matter of negotiation. Provinces were encouraged to implement their own act. Saskatchewan did so in 1997 (Sect. 2.1.1).

The main objective of this proposed legislation, according to Minister Anderson, is to help prevent wildlife in Canada from becoming extinct and to provide for the recovery of species at risk. However, the proponents of stronger legislation point out there are a series of political loopholes that reduce its effectiveness. For example, the Environment Minister and Cabinet, not biologists, will have the final say about which species are placed on the list. When the listing of a species is approved by Cabinet, species recovery plans will be prepared, but the implementation of such plans is again at the discretion of the government. Therefore, the preservation of habitat which is usually identified in recovery plans and which must be an integral part of any meaningful action, is not mandatory but subject to a political decision.

The Act recognizes the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as the body to provide a public

record of species recommended for listing. However, the final say as to which of the species will actually receive protection rests with the Environment Minister and Cabinet, not biologists.

The proposed act is to prohibit unequivocally the killing of endangered or threatened species under its jurisdiction (migratory species, aquatic species and species on federal lands). When it comes to habitat, there is ample opportunity for political intervention and this, critics claim, may lessen the effectiveness of the legislation. The Minister recognized these shortcomings but felt that it was important to make some concessions to obtain greater buy-in by stakeholders.

Minister Anderson has accepted a proposed mechanism of compensation for landowners in the event that species protection comes into unequivocal conflict with resource use. The Government's 2000 budget contained a commitment of $90 million over three years, and stabilized funding of $45 million in subsequent years for the protection of species at risk. Also, a new habitat stewardship program has already started to contribute approximately $5 million to over 60 partnership projects. Provisions will also make it easier for Canadians to donate ecologically sensitive lands and easements by reducing the capital gains arising from such donations through the EcoGifts Program.

A recent survey by Pollara indicates that many Canadians are willing to restrict mining and logging activities, leave lands undeveloped, and even accept fewer tax cuts to protect wildlife; 45% stating that "...tax cuts are nice, but legislation to protect wildlife is more important." Of those surveyed, 66% said they "strongly supported" a law to protect endangered species, while another 28% said they "somewhat supported" such a law -- for a total support of 94%.

2.1.3 Saskatchewan's Representative Areas Network. Text in this section was provided by Nancy Cherney, Fish and Wildlife Branch, Saskatchewan Environment and Resource Management.

Saskatchewan has established a network of ecologically important land and water areas across the province, through a system called the Representative Areas Network (RAN). This system started with a base of sites totaling nearly 3 million hectares (7.4 million acres) including national and provincial parks, wildlife refuges, ecological and other reserves in the province. Working from this solid foundation, Saskatchewan's Representative Areas Network expanded by about 50 per cent in less than three years!

One of the primary goals of the RAN program is to protect biodiversity - the richness and variety of life - by selecting and designating areas representative of Saskatchewan's natural ecological diversity. An objective and consistent method for assessing this diversity was developed to guide representative area identification. Notably, an enduring features approach to define the range of diversity in Saskatchewan was

selected. Enduring features, such as specific rock, soil and land form patterns, are considered to be very stable over long periods of time and are likely to contain characteristic plant and animal communities. Classifying the province into different enduring feature groupings and measuring the level of protection already afforded to specific landscape types (and associated plant and animal communities) highlighted deficiencies in terms of protection. Landscape types with little or no protection were rated a high priority for action in the RAN.

This scientific approach for selecting representative areas was blended with the wealth of local knowledge gathered through land use planning and other community-based consultation processes. Suggestions and needs identified through these processes also help determine the kinds and levels of activity that may occur within designated sites. Regulations developed as a result govern activities in each site and are intended to reflect the diversity of goals and values that are meant to be protected.

Representative area designation is flexible, supporting many resource pursuits such as trapping, hunting, and fishing. However, site management seeks to curb activities like commercial logging, road construction and mining or petroleum exploration and development, particularly within Crown land sites. The intention is to ensure long-term resource protection within representative areas by minimizing disturbance and degradation.

Crown lands administered by Saskatchewan Environment and Resource Management may be designated according to any one of a number of legislative options. Depending on features/values to be protected and the level of use to be continued within a site, choices include Ecological Reserves, Provincial Parks (several categories), Protected Areas or Wildlife Refuges. From August, 1997 to March 31, 2000, about 500,000 hectares of Crown land were formally designated and added to the Network - 4 ecological reserves, several parkland reserves, 1 protected area, and 1 wildlife refuge.

Private lands and lands not under Environment and Resource Management's administration are also important within the network and can be managed or guided through the use of partnership agreements, memoranda of understanding or conservation easements. These types of arrangements enable the department to work closely with partners and private landowners to ensure maintenance of the long-term health of the soil, water, plants, animals, and other parts of the ecosystem. From August, 1997 to March 31, 2000, some 1.2 million hectares of private land and lands not administered by SERM were included in the Network through voluntary partnerships.

Government commitment to live up to the challenge of establishing a Representative Areas Network for the people of Saskatchewan remains strong. Public discussions for proposed representative areas are proceeding in order to bring together a mix of perspectives on the

particular lands and to identify the full range of values that may need long-term protection. As these discussions conclude and site boundaries are finalized, the Network will continue to grow and offer opportunities for education, research and the enjoyment of Saskatchewan residents, today and for generations to come.

2.1.4 Canadian Biodiversity Strategy. The authors of the Canadian Biodiversity Strategy defined "biodiversity" as "the variety of species and ecosystems on Earth and the ecological processes of which they are part" (Environment Canada 1995). Diversity is broadly defined including genetic and species diversity, diversity in ecological function (e.g. ground water recharge, plant production, soil building) and diversity among ecosystems (e.g. land-based, water-based).

The goals of the Canadian Biodiversity Strategy are to:

- conserve biodiversity and use biological resources in a sustainable manner;
- improve our understanding of ecosystems and increase our resource management capability;
- promote an understanding of the need to conserve biodiversity and use of biological resources in a sustainable manner;
- maintain or develop incentives and legislation that support the conservation of biodiversity and the sustainable use of biological resources; and
- work with other countries to conserve biodiversity, use biological resources in a sustainable manner and share equitably the benefits that arise from the utilization of genetic resources (Environment Canada 1995).

2.1.5 North American Bird Conservation Initiative. Conservation plans, including the present one, are wish lists - but not without important functions. They can coordinate the will and strategies between different people/programs. The North American Bird Conservation Initiative is a 'super plan' that attempts to unify various bird conservation initiatives that are narrower in scope (Fig 2). Different plans focus on different levels (national vs. provincial, birds vs. biodiversity, disturbance zones vs. ecosystems). When combined with local context and stakeholder participation, these plans can to lead to meaningful action.

It is noteworthy that in addition to bird monitoring projects by professional biologists, an enormous amount of data is gathered by many thousands of bird watchers (e.g. bird feeder watches, and other bird counts; Fig. 2). This is tangible evidence of a widespread care and personal will to conserve this charismatic component of nature (Sect 1). This public will and power has been harnessed effectively for data gathering, it is starting to be harnessed in a tourism-economic sense, but many opportunities may have been ignored thus far. How could this

power be harnessed, for instance, by farmers in IBAs?

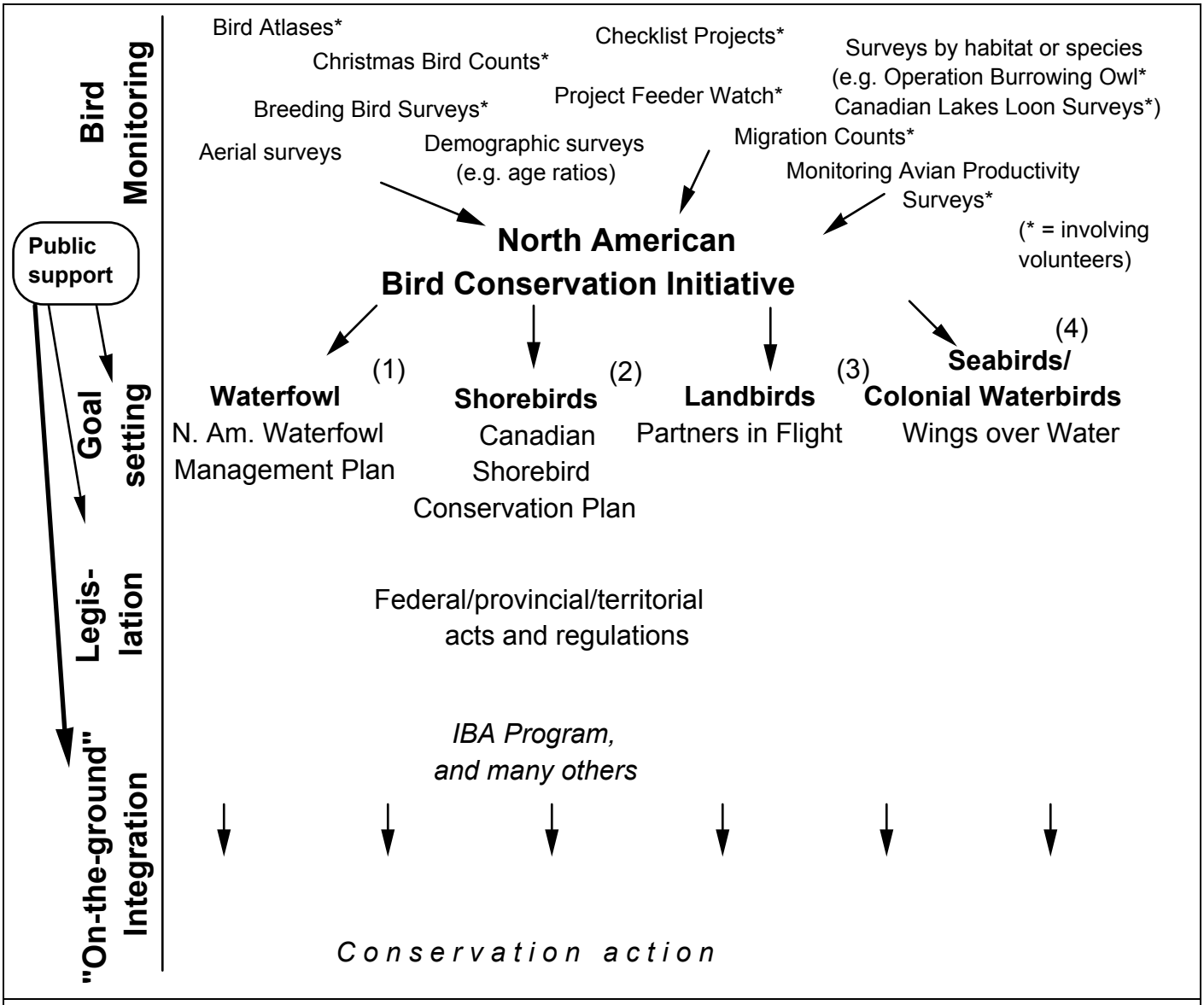


Fig. 2. A schematic diagram to show how different bird monitoring approaches might combine with public support and regulatory instruments to form a basis for conservation action. References: (1) North American Waterfowl Management Plan Committee 1998, (2) Canadian Shorebird Conservation Plan Management Board 1999, (3) Canadian Landbird Conservation Working Group 1996, (4) in preparation.

2.1.6 Prairie Canada Shorebird Conservation Plan. The goals of the Prairie Canada Shorebird Conservation Plan (Gratto-Trevor et al. 2000) are similar to those included in the Canadian Shorebird Conservation Plan. Goals are to:

- acquire sufficient information about population dynamics, population trends, migration and staging strategies, and habitat preferences of prairie Canada shorebirds to make knowledgeable management recommendations;
- sustain and enhance sufficient high quality habitat to support healthy populations in prairie Canada;
- inform the public, decision-makers, and all those involved in land management in prairie Canada about the importance of prairie Canada to shorebirds, and about shorebird species, biology, trends and management; and
- ensure that coordinated conservation efforts (regionally, nationally, and internationally) are in place to address the key conservation priorities for shorebirds in prairie Canada.

Implementation will be encouraged and guided by a management board in cooperation with government and non-governmental organizations. A technical advisory committee was struck to encourage actions based on sound ecological knowledge and to address information gaps.

A companion plan exists in the United States. A Mexican shorebird plan was in draft stage at the time of writing (McNight 1999).

2.1.7 North American Waterfowl Management Plan. This plan was approved in Canada in 1986 by the Minister of Environment, and in Mexico in 1994. The plan was envisioned as an extension to the Migratory Birds Convention Act to coordinate effective management between the three signatory countries, including the United States. The plan was intended to help restore waterfowl populations to 1970s levels, to perpetuate waterfowl habitats, to employ management strategies according to subpopulations or flyway populations, and to incorporate subsistence and recreational hunting into management strategies. The prairie Canada portion of this plan came to be known as the Prairie Habitat Joint Venture (Environment Canada 1986, Dickson and McKeating 1993).

In their 1993 analysis of the Prairie Habitat Joint Venture, Dickson and McKeating compliment the program for its achievements in waterfowl management, but they also conclude that more must be done to include species other than ducks. They point toward initiatives that were promising and suggest that multi-species management should be included more often than was usually the case in the early stages of habitat management.

In 1998, this plan was updated to recognize the "changing context of waterfowl conservation" (North American Waterfowl

Management Plan Committee 1998). Aspects in need of adaptation include: i) more than 60 million people watch migratory birds and only 3.2 million hunt waterfowl, ii) the signatory countries are also part of other alliances that create their own obligations (e.g. the Biodiversity Convention), iii) initiatives for migratory birds other than waterfowl exist (e.g. Western Hemisphere Shorebird Reserve Network), iv) an increasingly suburban existence and increasing demands for food globally bring new challenges.

Under this waterfowl management plan, Ducks Unlimited Canada operates approximately 10,000 wetland and upland segments within the Prairie Habitat Joint Venture. Waterfowl and shorebird habitat management are seen as complementary, not exclusive. Many properties are specifically managed for both. "Cooperative partnerships are the key to better shorebird conservation in prairie Canada" (Sadler 1999).

3 The IBA Program

The IBA program is an international initiative coordinated by BirdLife International[7] (Appendix 2), a partnership of over 100 countries seeking to identify and conserve sites important to all bird species worldwide. Through the protection of birds and habitats, it also promotes the conservation of the world's biodiversity. There are currently IBA programs in Europe, Africa, the Middle East, Asia, and the Americas. The Canadian IBA program is part of the Americas IBA program which includes the United States, Mexico, and 17 countries in Central and South America.

The Canadian BirdLife co-partners are the Canadian Nature Federation and Bird Studies Canada (Appendix 2, http://www.ibacanada .com/html). Bird Studies Canada is primarily responsible for site identification and designation. The Canadian Nature Federation facilitates conservation planning and implementation, working with its provincial partners.

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 participate in development and implementation of appropriate on-the-ground conservation plans; and
- 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-upon categories:

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

[7] In 2000, BirdLife International was active in over 100 countries with a network of 95 national NGOs with over 2.5 million members worldwide. Globally the budget for conservation was over 269 million US$ with a staff of 4,161 people. BirdLife partners owned or managed 1,131,916 ha of natural habitat. Over 2 million children were involved in "Building a better future."

BirdLife International's Director of Network and Programs, Marco Lambertini, concludes "... we are indeed an impressive network. But there is something else beyond the figures, the budgets and the programs that makes BirdLife even more effective for conservation; it's the competence and the passion for what we do and believe in."

3.1 IBA Saskatchewan

Nature Saskatchewan is working with the Canadian Nature Federation and Bird Studies Canada (Appendix 2) to deliver the conservation planning component of this program in Saskatchewan. IBA Saskatchewan was launched on 1 February 1999. Conservation plans for 13 sites (Appendix 3) have been prepared.[8]

IBA Saskatchewan has two homes, one in Nature Saskatchewan's office in Regina (Appendix 2) and one at the Centre for Studies in Agriculture, Law and the Environment (CSALE, www.ag.usask.ca/centres/csale), at the University of Saskatchewan in Saskatoon. CSALE is a newly formed strategic partnership integrating the disciplines of science, law and economics to conduct research into environmental issues related to agriculture. CSALE undertakes studies, provides education and develops policy options so as to enhance prairie and other agroecosystems.

[8] The author, Joe Schmutz is internationally known for his research and conservation of prairie birds of prey, and has participated in a nationally sponsored interdisciplinary ecosystem and community-based research program. Joe was contracted by Nature Saskatchewan as IBA Community Conservation Planner. Joe has been appointed as a Research Fellow and taken up residence in the Centre for Studies in Agriculture, Law and the Environment (CSALE), College of Agriculture, University of Saskatchewan.

4 IBA species information

In the IBA classification, Luck Lake is of primary importance for species that congregate at the lake in large numbers during migration (Table 1). These birds include Tundra Swan, Lesser Snow Goose, Greater White-fronted Goose, Sandhill Crane, Hudsonian Godwit and Franklin's Gull. In the early 1990s, peak counts for the species were greater than 1% of the population in this region, making Luck Lake globally significant in IBA terms.

According to Poston et al. (1990), the Luck Lake area is "locally important" for breeding geese and moulting ducks, "regionally important" for staging ducks, and "nationally important" for staging Geese. Roy (1996) calls Luck Lake one of Saskatchewan's great birding areas and the hot spot of the region. Many species use the lake and marsh for breeding, others nest in the shrub-grassland or abandoned farmsteads surrounding the lake. As of 1995, a total of 229 species of birds had been identified at the lake and immediate vicinity.

4.1 Tundra Swan.

The Tundra Swan, formerly Whistling Swan, is one of two native and a third feral swan in North America. Adult Tundra Swans show a yellow spot below the eye and have a concave upper border of the black bill and white head.

Table 1. Birds satisfying the IBA criteria, their significance status (Global, Continental or National) and season of main use at Luck Lake. Some other birds prominent in the IBA are also listed. Data are taken from the IBA database, and originally derived from surveys by federal and provincial biologists and other sources.

Species	Average Numbers	Years	Season	status
IBA birds				
Tundra Swan	1,995	1991-93	Spring migration	
	10,187	1992-94	Fall migration	Global
Greater White-fronted Goose	19,150	1990-92	Fall migration	Global
Lesser Snow Goose	28,663	1989-93	Fall migration	Global

Sandhill Crane	10,200	1992	Fall migration	Global
Hudsonian Godwit	2,850	1991,'93,'95	Fall migration	Global
Franklin's Gull	15,000	1993	Fall migration	Global

Trumpeter Swans lack the yellow lore and have a wedge-shaped head. The feral Mute Swan holds its neck more curved than the two natives, and has an orange bill with a black base and black knob. The natural history of the Tundra Swan has been reviewed by Limpert and Earnest (1994).

The current breeding range of the Tundra Swan includes lakes, ponds and river deltas across the northern tundra, from the Aleutian Islands of Alaska to Quebec. In winter, the swans occupy disjunct areas. Swans breeding along the western coast of Alaska winter along the coast and some distance inland from Vancouver Island to central California. In addition, the swans winter inland far from the coast in British Columbia, and the Rocky Mountain states. The northern Alaskan and all of the Canadian breeders winter in a short coastal stretch including the Chesapeake Bay area, from New Jersey to South Carolina.

On the southward migration, Tundra Swans depart from the Arctic in late September in family groups (4 young are common) or small to medium sized flocks (possibly ≥100). Individuals arrive on the Great Plains in October. Once they reach Ontario or Minnesota, they depart in a non-stop flight to reach their wintering quarters about mid-November. One radio-marked individual was clocked at 82 km/h. In mid-March the swans depart again northward, to cross the northern Great Plains in April. Juvenile birds probably separate from their parents after their northward migration to the breeding grounds. Fidelity to wintering areas is high, and here the previous year's offspring may rejoin the new family and recognize their parents. The oldest neck-collared Tundra Swan was 21 years old.

While on migration, Tundra Swans use ponds, lakes and marshes for feeding and resting. They feed on seeds, stems, roots and tubers of submerged and emergent aquatic vegetation. They will frequent fields to feed on waste grain and growing winter cereal crops. Tundra Swans will also consume some animal matter, mainly mollusks.

Populations of Tundra Swans are tracked through annual mid-winter surveys. An average population estimate over three years yielded 87,000 individuals for the eastern and 64,000 for the western population. The swans have benefited from regulated hunting, and have doubled in population size during the 35 years prior to 1989. Shooting is the most common source of mortality of swans once they have fledged. There is currently a regulated hunt of roughly 4,000 Tundra Swans, and an additional take of 5,000 by native peoples.

A moderate mortality other than through shooting was attributed to ingestion of lead shot and lead fishing sinkers. The greatest threats to Tundra Swans now come from oil and gas

extraction in the Arctic, and a continuing loss of wetland stopover sites.

There is one record from Stony Lake (western parkland) of a pair of Tundra Swans breeding in Saskatchewan, from 1973-80 (Smith 1996). Most swans of the eastern population migrate through Saskatchewan (Smith 1996).

4.2 Greater White-fronted Goose.

The Greater White-fronted Goose, weighing 2400-2800 g, is the only North American representative of the grey goose group. Other species in this group include the Lesser White-fronted Goose, the Graylag Goose *(Anser anser)*, and the Bean Goose *(A. fabilis)*. The natural history of the Greater White-fronted Goose has been described by Ely and Dzubin (1994).

Greater White-fronted Geese from different regions differ in size and colour, which has led to attempts to subdivide the species. In North America, the American Ornithologists' Union recognizes two subspecies, the Greater White-fronted Geese *per se, Anser albifrons frontalis* , and the Tule Goose, *A. a. gambeli*. These two types likely interbreed in nature, but this subspecies separation is facilitated by traditional breeding areas, wintering areas and migration routes which keep the geese somewhat separate in geography and timing.

All members of the species breed in the permafrost areas of the Arctic Tundra, west of Hudson Bay to the Aleutian Islands of Alaska. The mid-continent population breeds from Alaska to Hudson Bay and winters in an area from the Mississippi Valley in Arkansas to Mexico. This population is the focus in this conservation plan.

The Pacific population of Greater White-fronted Geese breeds only in Alaska and winters west of the Rocky Mountains from southern British Columbia to southern Mexico, most commonly in California. The larger and darker Tule Geese breed primarily at Cooke Inlet in Alaska and winter in California.

Greater White-fronted Geese feed and store energy for their long migrations at traditional "staging" areas in both spring and fall. One leg of the migration in August through September extends from the breeding grounds in fall over 2000 km across the Boreal Forest to the grain fields of the northern prairies; the reverse occurs in spring. Among first arrivals in August, adults without young predominate. Studies by Canadian Wildlife Service personnel using neck collars have shown that these early arrivals include adults and young from the Alaskan interior. As fall advances, geese leave their prairie feeding ground and move south in stages. The last of the geese leave their prairie staging grounds when cold temperatures, high winds and snow signal the advance of fall, generally around mid-October but sometimes as late as early November. On leaving the Canadian prairies, the geese stop only in modest numbers in the Great

Plains states, until they reach Arkansas, Louisiana and Texas. Some move eastward along the coast, some inland west and north, and some southward. Formerly strongly tied to coastal areas in winter, the geese have shifted to use inland rice fields more frequently since the 1960s.

Depending on the severity of winter, Greater White-fronted Geese leave their wintering grounds between January and March, mostly in early February. Passage is influenced by spring melt. They pass through Saskatchewan from April to mid-May. Females gain 30% of body weight and double their fat reserves in preparation for spring migration. Although energy stored in winter and replenished on migration is very influential for breeding success, Greater White-fronted Geese also rely on food on the breeding grounds. Greater White-fronted Geese do not seem to "import" as much of their energy for breeding as do other Arctic-nesting geese.

Foods taken by white-fronts include seeds, grains and grasses in winter, and sedges, grasses, berries and underground plant parts in summer. These foods are taken in water or on land, with an increased use of agricultural fields in recent decades. Feeding takes place in daytime, often within a short distance (85% within 12 km) from predator- and disturbance-secure roosts. Feeding flocks spend 40-55% of the day in fields in spring, and 30-40% in fall.

Non-breeding yearling geese and failed breeders tend to remain in the southern portion of the species' breeding range, where they moult. The sites chosen by this segment of the population tend to be low-lying deltas at mouths of rivers flowing into lakes. During this flight-impaired moulting period, the geese are especially apt to seek disturbance-free and predator-safe areas.

Greater White-fronted Geese generally remain paired year-round and as long as both members live. Young remain with the family well into spring migration. Even though some families, but not all, break up during nesting, parent-offspring and sibling bonds seem to exist through life. First-time pairing geese in Greenland were 2.5 years old, and pairing is thought to happen in spring. Pairs and families are territorial, maintaining a neck-long individual distance between neighbors all year. The gander keeps other individuals away from the family but is particularly territorial prior to and during nesting.

Female geese select nest sites, lay their 4-5 130-g eggs and incubate for 25 days. The young can walk or swim as soon as down feathers are dry. They grow rapidly, grazing wherever parents lead them. Young gain flight at 42-49 days.

If found during the rare times when unattended by adults, eggs are subject to a variety of aerial and terrestrial predators. Adults are subject to predation by eagles and large mammalian predators. In addition to predation, mortality is caused by a variety of diseases including botulism. There have been serious outbreaks of avian cholera which killed large numbers of white-fronts, particularly on the spring staging grounds in Nebraska. This mortality seems to be repeated each spring at

varying levels (Dan Nieman, pers. communication). Additional threats include food shortages in winter due do increasingly efficient field harvesting practices, and these shortages can be exacerbated by crowding imposed by drought. Also, on the winter range in the United States and Mexico, white-fronts experience increasing competition for food and space from growing numbers of snow geese. While staging in Canada, snow geese may displace white-fronts in some cases (Dan Nieman, pers. communication).

The abundance and distribution of Greater White-fronted Geese has been assessed by annual aerial surveys starting in the 1950s. Pacific populations of Greater White-fronted Geese have recovered from declines experienced prior to the 1970s. The Tule population is considered "at risk" by the International Waterfowl Research Bureau.

Aside from weather-induced fluctuation in reproduction, hunting is the major factor influencing population size of Greater White-fronted Geese. In the past, before nutrient-rich waste grain was abundantly available, numbers were likely limited by seed, shoot and tuber availability in grasslands, and by food quality.

Given the largely terrestrial and non-insect food chain, there is as yet no evidence that environmental contaminants are a problem. Low levels of organochlorines have been detected in eggs and carcasses. Before the requirement of steel shot, lead poisoning was perhaps the most severe factor. Habitat alteration and disturbance on the Arctic nesting ground could cause substantial losses.

On the migration-staging and wintering grounds, water level fluctuations can affect geese negatively causing crowding. Freshwater marsh habitat is increasingly altered and this could represent a stress for winter residents.

White-fronts are present in large numbers in southern Saskatchewan, particularly the Galloway and Miry bays and adjacent 55 km stretch of the South Saskatchewan River (Appendix 3), generally from the last week in September through early October. The concentrated use of this region is presumably an outcome of the creation of Lake Diefenbaker.

4.2.1 White-front population counts in Saskatchewan. When the geese arrive on the prairies in fall, they will have expended much energy on the approximately 2,000 km flight from the Arctic. For the young geese of the year this will be their first leg of migration. The energy for this flight will likely have been gained from Arctic grasses and sedges. The geese stop on the prairies to refuel, and unlike other species of geese, white-fronts choose a remarkably small area in which to feed on the energy-rich prairie grains and pulse crops.

According to Smith (1996), observations of white-fronts are scattered throughout southern Saskatchewan. However, the vast majority of white-fronts use only parts of southwestern

Saskatchewan, with fewer in south-central Saskatchewan and parts of southeastern Alberta (Warner and Nieman 1999; Fig. 3).

For many years, biologists used the population counts south of the Platte River in Nebraska to evaluate white-front population trends. Surveys by members of the Canadian Wildlife Service in the 1970s and early 1980s showed white-fronts present at the South Saskatchewan River, and growing in number (Alex Dzubin and Dan Nieman, pers. communication).

From 1989-91, Mike and Bernie Gollop documented this increase in goose numbers with fall counts along the Galloway and Miry bays IBA (Fig. 3; Roy 1996). Mike Gollop (1995) summarized a three-year project to estimate the population size of White-fronted Geese in 1992-94, and to document the extent of population growth and enormous concentrations on parts of the South Saskatchewan River including Galloway and Miry bays. To include as many geese as possible in this survey area of manageable size, a 55 km stretch of river, from the mouth of Antelope Creek to the Lancer Ferry, was chosen for combined air and ground counts. The species composition of geese in late September at selected ground observation sites was 68% white-fronts, 29% Canada Geese and 3% white geese (Gollop 1995).

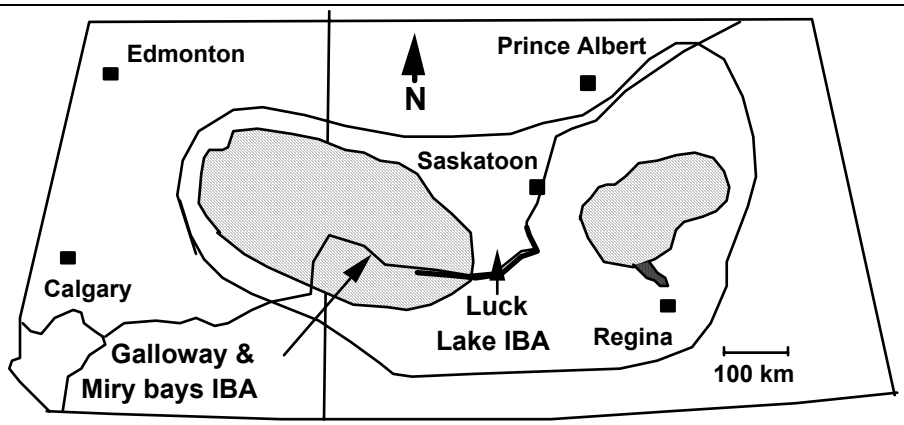


Figure 3. Distribution of Greater White-fronted Geese in late September, indicating the location of Luck Lake. Hatched area represents high density areas, the line-bounded area represents low density (Warner and Nieman 1999).

4.3 Lesser Snow Goose.

The Lesser Snow Goose is a 2.0-2.5 kg goose with white and blue color forms. It is apparently one of the most abundant species of waterfowl in the world. The natural history of this species was summarized by Mowbray et al. (2000).

Lesser Snow Geese nest in large and dense colonies north of the tree line in three fairly discrete breeding populations. These range from Wrangle Island in northeastern Russia to Greenland. Populations do not mix throughout their range, giving rise to three regions: the western population ranges from Alaska to Queen Maud Gulf in the central Canadian Arctic, the mid-continent population from Victoria and other Arctic Islands to the Hudson Bay, and the eastern population from northeastern Ellesmere Island and Greenland south to Bathurst Island, with isolated reports from Quebec.

In winter, western Lesser Snow Geese can be found from the Fraser River Delta in B.C. south to the coastal lowlands of the Gulf of California. Mid-continent geese most commonly range from Louisiana through Texas to northern Tamaulipas but also westerly and northwesterly. Eastern populations range from Massachusetts to the Carolinas. Thus, the Lesser Snow Geese of the Canadian prairies are from the mid-continent population and some from the western population.

Lesser Snow Geese nest among low shrub when available or on exposed upland, but generally near moist-meadow brood-rearing areas, near lakes, inland or along the coast. Main foods taken include grasses and sedges, below-ground tubers and roots, and grain.

Pairs are monogamous and mate for life. Territories are vigorously defended around nests and around small young. Snow geese arrive on their breeding ground with enough energy to lay an average clutch of four eggs, from mid May to July depending on latitude and advance of spring. After a 24-day incubation and 43-day fledgling period, the young take their first flight and continue to feed to store energy for their southward migration.

Threats to individual geese include starvation; avian cholera; ingestion of lead, plastics and pesticides consumed as part of grazing; and striking powerlines. Of all the mortalities, hunting accounts for 97%. Even with longer seasons and increased bag limits the 5% annual rate of population growth has not yet been reduced.

With increasing numbers, the geese exert considerable pressure on their brood-rearing habitats. In one study, 59% of plant communities within one area had been denuded to the extent that peat or mineral soil is exposed. There is concern that this habitat degradation by the geese will impact other vulnerable species detrimentally.

Spring arrivals may be in early April with peaks in late April and early May. In fall, early migrants may arrive in late August but peaks not until mid- to late September (Roy 1996).

4.4 Hudsonian Godwit.[9]

Information about the Hudsonian Godwit *(Limosa haemastica)* is taken from Godfrey (1986) unless otherwise indicated. It is a large shorebird with a long slender slightly upturned bill. Its tail is mainly black and contrasts with the white upper tail coverts and white wing stripe. Its blackish tail separates it from the Willet and Greater Yellowlegs which it may be confused with in the fall. Its bluish-grey legs are very different from those of either species of Yellowlegs.

Hudsonian Godwits breed in a variety of northern habitats including northeastern Manitoba at Churchill. During the spring migration it crosses the prairie provinces. During fall migration large concentrations can be found on tidal mud flats, gently sloping beaches and sandbars.

The Hudsonian Godwit lays four olive-buff eggs. It nests in a hummock or low mound in wet sedge or grass tundra with widely scattered trees. Incubation period is generally about 22 days.

Morrison et al. (2001) estimate the Western Hemisphere (i.e., global) population to be at least 50,000 birds based on wintering ground surveys.

According to Smith (1996) and his citations, "The Hudsonian Godwit is an uncommon transient and very a rare summer visitant in Saskatchewan. In the fall, it occurs in large numbers on several lakes in south-central Saskatchewan. Flocks in excess of 2500 birds have been recorded at Luck and Little Quill lakes. During the more dispersed spring migration, flocks are smaller and more frequent on smaller wetlands. Although migration routes have not been determined, most Hudsonian Godwits migrating through Saskatchewan probably breed on the Mackenzie Delta rather than the other major breeding area near Churchill, Manitoba."

4.5 Franklin's Gull.

The Franklin's Gull is a small gull that nests in colonies in marshes on the northern Great Plains. Here it was first collected as part of the Franklin expedition in 1823. Buoyant and pigeon-like in flight, it has been called rosy or prairie dove, rosy because of a pink tinge on the breast that fades after arrival on the breeding ground. Franklin's Gulls have a black head, a grey mantle and a black band near the wing tip.

[9] Text was kindly provided by Cory Lindgren, Community Conservation Planner for IBA Manitoba.

The natural history of this gull has been summarized by Burger and Gochfeld (1994).

Franklin's Gulls breed from Alberta through Saskatchewan and southwestern Manitoba, southward on the Great Plains to South Dakota and Montana. Pockets of breeding populations exist in other states. Franklin's Gulls may have bred in British Columbia. Once freed from reproduction in mid- to late July, Franklin's Gulls undergo extensive dispersal movements, prior to southward migration. Migration proceeds through the southern Great Plains, southward into Mexico. On the West Coast, the gulls follow the shore to reach their wintering grounds in Chile and Peru. They migrate in aggregations ranging from small flocks to numbers over a million. In winter, they often take advantage of waste, for example at fishmeal plants. The Franklin's and Sabine's Gulls *(Xema sabini)* are the only North American gulls that winter south of the Equator.

One Franklin's Gull banded in Saskatchewan was recovered in Chile (Houston 1974). Some individuals scatter widely during post-breeding dispersal, on migration or in winter. Sightings were made on the Atlantic Coast, South American interior, and some as far afield as Hawaii and Europe.

Franklin's Gulls select large prairie marshes where males build a nest platform upon arrival in mid-April. They complete the nest after pairing with the female. Nests are over water on mats of vegetation (cattails, bulrushes, phragmites), muskrat houses or floating debris. Most reported water depths at nest sites were 30-60 cm. While breeding, this otherwise gregarious gull defends territories with distances of 50-200 cm between birds in colonies, and somewhat larger during pair formation. Colonies can include over 100,000 breeding pairs. Both males and females incubate most commonly 3 eggs, brood the young and regurgitate food for their young up to 1 week after fledging. During a 4-month pre-migration dispersal phase, Franklin's Gulls range over an area often 500 km wider than the area in which they breed.

The food taken by Franklin's Gulls poses little or no conflict with human values. Foods include earthworms, grubs, midges and grasshoppers, seeds and other vegetable matter, mice, fish, crabs, snails and other invertebrates. Franklin's Gulls will also visit garbage dumps and other refuse dumps. Because of their small size and habitat use, Franklin's Gulls have been observed only rarely taking ducklings or other young birds. The gulls feed largely over land, but return to the lakes for roosting at night.

Because Franklin's Gulls disperse widely, and may chose different nesting areas between years in relation to water depth conditions, population monitoring is difficult. In the period 1970-94, the population was estimated as 500,000 gulls. Estimates of trends differ. A reported 7.4% annual decline may have been influenced by the gulls being difficult to census in breeding bird surveys due to the gulls' remote and inaccessible nest locations. The reported decline may be an overestimate, due to gulls dispersing after deserting their nesting areas.

In southern Saskatchewan, Franklin's Gulls arrive in mid April, after California and Ring-billed Gulls. Franklin's Gulls depart in mid-September. They are commonly seen in fields feeding on wire worm and cutworm grubs (Roy 1996). Franklin's Gulls concentrate in Saskatchewan where marshes, shallow lakes, open grasslands and fields prevail, south of the Precambrian Shield. Nesting data are rare for this species, because few of the extensive reed beds have been surveyed (Smith 1996). Houston (1974) terminated banding of Franklin's Gulls to avoid the disturbances this caused when wading through water from nest to nest.

5 Human Context

It is unlikely that birds can be protected in isolation from human practices and values. The following human context is intended as a background against which future conservation opportunities and threats can be evaluated.

5.1 Land ownership

Luck Lake is large enough to extend across many parcels of land and falls under the responsibility of the Crown. Several adjacent quarter sections of land are also Crown-owned (Fig. 4).

5.2 Historical land use.

Luck Lake is part of a large block of land claimed under Treaty No. 6, which was signed in 1876.

Peter Fidler and expedition members apparently were the first EuroCanadians to use the

South Saskatchewan River as a fur trading route in 1800-1802. This was over 100 years later than

Fig 4.

some of the first routes established farther north in Saskatchewan (Fung et al. 1999).

Before Saskatchewan became a province in 1905, the Canadian government administered the prairies for 35 years. Grazing leases were granted on the 'open range,' but these were subject to cancellation when lands were opened for settlement. The Matador Ranch was a major ranch whose headquarters was farther west. Most lands in the Luck Lake area were settled for homesteading around 1911. The railway reached the area by 1917.

John Palliser explored the Canadian Prairies including the Luck Lake region in 1857-1860. His map (Fung et al. 1999:40) shows the South Saskatchewan River and Coteau Creek-Annerly Lakes drainage nearby, but does not show Luck Lake. He described the location of the Coteau escarpment and noted "poplar clumps in the river valley."

Palliser was not optimistic about the potential of the southern Canadian prairies for agriculture. His endorsement was slightly better for the parkland and parkland edge. Luck Lake lies squarely within what has come to be known as Palliser's triangle. In this region, recurring droughts are the norm and precipitation is low, 60-70% of potential evaporation. John Macoun's exploration in 1879-1881 was much more optimistic of the region's potential for agriculture and lead to the railway's routing through the heart of the Palliser Triangle (Fung et al. 1999).

Luck Lake was close to an emerging ranching economy located southwest. Ranching became prevalent there after the Canadian Government introduced a liberal and attractive grazing lease policy in 1881. The government was determined to find another economic activity for Palliser's Triangle after the loss of the 'keystone'[10] bison.

During Sir Wilfried Laurier's second term in office, in the rush to unify Canada right across to the West Coast, he spared no cost to settle the prairies and to achieve an economic integration to solidify Canada's stronghold on the region. In this haste, there was little regard for environmental or sustainability concerns, even if these had been recognized at the time (Potyondi 1995).

The Saskatchewan Department of Agriculture was formed in 1905 and data were gathered. Mixed farming was hailed as the path to success. The Dominion Lands Act was created

[10] Bond. (2001) reports on "...experiments in the Chihuahuan desert of southeastern Arizona that were designed to exclude a guild of seed-eating rodent, the kangaroo rat, from a desert ecosystem. By cutting calibrated holes in the fencing around their study plots, the investigators were able to selectively exclude kangaroo rats, the largest of the seed-eating desert rodents, but not smaller rodent species. Fast forward 10 years, and, as one might predict, smaller seed-eating rodents and seed-eating ants that normally would have had to compete with kangaroo rats for seeds were more abundant in the study plots than in the control plots. The plant community in the study plots had also changed because seed predators were now selecting different seeds. The repercussions extended to birds whose numbers declined because of changes in plant cover and even to a fungal pathogen, which increased because of the denser population of its host plant.

What many ecologists find intriguing is that some species, such as the kangaroo rat, seem to have effects on ecosystems out of all proportion to their relative abundance. Robert Paine first labeled such species "keystone" species."

in 1908 encouraging farming by allocating 160 acres per homestead. Settlement and essentially free land was aggressively promoted, such that by 1916 the human population in southwest Saskatchewan had nearly quadrupled in 10 years.

It soon became apparent that Palliser's doubts about the capability of the prairies to support European-style farming were warranted. Severe water limitation was soon recognized and 'summer fallowing' was hailed as the technique of choice, growing crops only twice in three, or once in two years. This practice conserved moisture but predisposed the soil to erosion by wind and water. The moisture holding capacity of the soil was further weakened when the soil's organic matter that had been accumulated over 10,000 years was halved in 50 years .

Although it took only a matter of decades for land on the prairies to be claimed privately or by the Crown, human adaptations and land uses on the prairies continue to change. This is relevant for conservation. During settlement, sustainability was not perceived as a need. When a new (economic) force came to bear, or when sustainability challenges had to be faced, practices were merely amended reacting to what was in existence (e.g. Potyondi 1995). It is urgent to make sustainability a consideration now for our own sake and for the birds.

5.3 Current land use.

The township including the majority of Luck Lake (Fig. 1) was settled around 1911. In a 1996 census, the major ethnic groups represented did not differ markedly from the Saskatchewan average.

Currently, about 50% of the Rural Municipality in which Luck Lake is located is used for growing crops, about 30% is in summerfallow and the remainder is pasture (Fig. 4). The main portions of pasture include a Prairie Farm Rehabilitation Administration community pasture in the crook of Lake Diefenbaker, and grassland in the Beechy and Coteau Hills. The location of these hills is roughly coincident with the area of high pond density on the western portion of Figure 1.

Throughout Saskatchewan, cultivated acreage was increased in response to agricultural policies and the profitable farming of the 1970s. The Luck Lake area, however, did not experience much increase in cultivation between 1951 and 1996 (Fung et al. 1999), suggesting that crop production has a long tradition in the region. However, the sustainability of this land use is much in question.

5.3.1 Farming. On the roughly 80% cultivated land in the Rural Municipality of Coteau (Fig. 4),

wheat is the primary crop grown (>50%) with good yields in recent years. Specialty crops that are prominent include lentils and potatoes. Of the area in crops, 5-10% is under irrigation. Less than 50% of farmers practice conservation tillage (Fung et al. 1999).

5.3.2 Ranching. There are apparently no large ranches where the majority of a landowner's livelihood would come from range cattle. Only 6-10% of farms also hold cattle (Fung et al. 1999).

5.3.3 Mineral, oil and gas resources. There are apparently no gas, oil or mineral deposits in the area (Fung et al. 1999).

5.3.4 Tourism.[11] Birsay has no tourist accommodation or attractions. Lucky Lake (Fig. 4) has one hotel and one museum. Traffic volume is low, with less than 100 vehicles per day on average. At least one outfitting operation is listed for the area (Fung et al. 1999).

[11]"Tourism in Saskatchewan generates $1.14 billion annually for the provincial economy, employs 42,000 Saskatchewan people, and is the province's fourth largest economic sector. By 2010, it is expected to employ 65,000 workers and to generate revenues o $2 billion annually. " (Saskatoon Sun, 4 June 2000, p. 17).

5.4 Conservation management achieved at the site

This section highlights activities by some organizations that are active and visible in the watershed. This list does not give due credit to the day-to-day choices people make in their own lives that advance - or discourage - conservation one step at a time. One is reminded by the sage advice of unknown origin '...to heed only the important things in life, but to know that all things important are small.'

5.4.1 Luck Lake Heritage Marsh. Luck Lake is one of ten designated Heritage Marshes in Saskatchewan. This designation was launched in 1981 to recognize the historical value and to preserve these important wetlands. The original participants in the program were: the former Saskatchewan Parks, Recreation and Culture (now Environment and Resource Management), the Saskatchewan Wildlife Federation, Saskatchewan Natural History Society (now Nature Saskatchewan), Ducks Unlimited Canada and Wildlife Habitat Canada.

The following portions of text were excerpted from Roy (1996:40) and these describe the marsh as follows (Fig. 5): "Until recently, however, the lake dried up by midsummer in years of low spring runoff or below average summer rainfall (about 50% of the time). In a drought year, instead of the estimated fall duck

Figure 5. Diagram of Luck Lake, showing dykes, basins and islands.

population of 45,000 when the lake contains water, clouds of white alkali dust blew from the lake bottom. It seemed unlikely that the cyclical pattern would ever change.

Then, in 1987, the Saskatchewan Water Corporation (Sask. Water) announced construction of a major irrigation project in the Birsay district. With the prospect of a water source, Ducks Unlimited, in collaboration with the government of Saskatchewan, the Saskatchewan Wildlife Federation, Wildlife Habitat Canada and the Saskatchewan Natural History Society, undertook development of Luck Lake Heritage Marsh, one of the largest single investment DU had made in Canada. At a cost of $4 million, the project involved bringing in a 5 km pipeline from the newly developed irrigation system; the construction of two dykes wide enough for vehicles (a total length of 8.6 km), that would divide the lake into three segments; control structures; a bait station to help prevent crop depredation; 10 nesting islands in the west segment; and the purchase of 194 ha of cultivated land at the west end of the lake which was seeded to native grasses to improve upland habitat.

Work was completed in the fall of 1988 and water began pouring into the lake in the spring of 1989. Since that time, efforts have been made to create an extensive marsh, particularly in the east and west segments of the lake. Monitoring and experimenting continue.[12] Lake levels vary according to long range plans to foster marsh development, the

[12] Robin Meadows (Conservation Biology in Practice 2(2):4) summarizes an article entitled "Marsh creation in a northern Pacific estuary: Is thirteen years of monitoring enough? (Conservation Ecology 4(2):12) Reporting on management in Vancouver Island's Campbell River estuary, the authors N.K. Dawe et al. draw two main conclusions. 1) "We need to monitor restored marshes at least until their vegetation is as stable as that of nearby natural marshes. Ecosystems are moving targets, having uncertain and unpredictable futures. Had our monitoring survey ended after the sixth year, we might have concluded that the project was a success. 2) We need to recognize that we may not know enough about marshes to create them. Otherwise, the result may be the trading of natural coastal wetlands or mudflats for human-made marshes that ultimately fail to become productive systems."

degree of natural runoff and the available supply of water from the irrigation system, farmers' needs taking preference. Whatever the situation, there is always water in at least two of the segments, sometimes in all three.
In 1994, a combination of high water levels and rapidly developing emergent vegetation eliminated most of the mud flats and beaches traditionally used by shorebirds. The balancing act continues as those in charge learn to take cognizance of the needs of all the species of birds which traditionally use this lake.

Many prefer to start their tour of Luck Lake by visiting the smaller eastern segment of the lake (100 ha) and the east dyke first. After leaving Birsay on Grid Rd 646, turn south off the grid 4.8 km west of Birsay. The dirt road runs through a variety of prairie, bush and crop habitat, then continues south around the ancient shoreline of the lake. Stop several times; you may pick up numbers of grassland sparrows here, among them Baird's, Le Conte's and Nelson's Sharptailed, as well as obtaining initial glimpses of geese, ducks and shorebirds. The poorly marked entrance to the east dyke is about 4 km south of the grid road..... Depending on the season and the water supply, you may spot as many as 20 species of shorebirds and 10 or more species of ducks. At the north end of the dyke, adjacent to the turnaround, a willow and shrub bordered coulee (complete with beaver dams) winds its way south and west to the lake. In 1995 DU developed a short nature trail starting at the bend in the road at the north side of the east basin. At the west end of the trail, a small bridge crosses the coulee permitting access to uplands from which a view of the lake and coulee shrubland can be obtained. Two hundred metres farther east a shelterbelt of tall trees, planted by between 1992 and 1995, still attracts a number of nesting and transient birds. Returning on the east dyke .....

From the time the ice melts, in early April until freeze-up in mid to late October, Luck Lake is always worth a visit. In spring the best viewing is between 10 April and 10 June, before vegetation fully develops.....When conditions are right (shallow water, extensive mud flats), between 3000 and 15,000 shorebirds representing 20 or more species may be present on any day between 15 July and 15 August, among them Hudsonian Godwits, seldom seen on the prairies prior to 1970. In July and August 1995 daily counts of 2500 to 3600 established new regional highs."

5.4.2 Conservation Easements Act. This act represents a useful tool for habitat conservation and could play a role in protecting the vicinity of Luck Lake.

> The Saskatchewan Environment and Resource Management web site states: "A conservation easement is a voluntary legal agreement between a landowner and a qualified conservation agency. Under this agreement, the landowner continues to own and manage the land with benefits to both the landowner and the environment. As a landowner, you can take steps to preserve your property's conservation values, retain use of the land, and at the same time receive income tax benefits.
>
> A conservation agency of your choice can assist you in preparing an agreement. A conservation easement can be granted for a specified time, or in perpetuity.
>
> Granting a conservation easement means you are preserving the environment value of your land for the future. If the easement is granted in perpetuity, the natural values of the property will be protected indefinitely, no matter who owns the land in the future. The donation of a conservation easement is viewed by Revenue Canada as a charitable gift. The value of the gift is the difference between the land's value with the conservation easement and the best land-use value without the easement. This taxable benefit may be observed at the time of donation or extended over five years.
>
> If the land is sold, the conservation easement will be transferred with the property, and terms of the easement will remain. These arrangements may also ease the financial burden of intergenerational land transfer. In some instances, conservation agencies may be willing to purchase an easement on privately-owned lands."

5.4.3 Saskatchewan Wildlife Heritage protection area status is also assigned to Luck Lake. Luck Lake is thus also included in Saskatchewan's Representative Areas Network (Sect. 2.1.3).

5.4.4 Ducks Unlimited Canada manages the Luck Lake Heritage Marsh (Sect. 5.4.1). In addition, Ducks Unlimited Canada's upland projects in the area include land leases, or purchases in partnership with the Saskatchewan Habitat Development Fund. The general strategy is to seed uplands that are near wetlands with grasses to serve as nesting cover for waterfowl.

From the 1950s until the mid 1980s, Ducks Unlimited Canada's activities were based on securing and enhancing permanent wetland habitat for breeding, moulting and staging waterfowl. From the mid 1980s to the present, strategies focused on encouraging land use practices which benefit waterfowl and other wildlife by improving habitat through the provision of upland nesting cover, securement of small wetlands, and by encouraging sustainable land use practices that provide soil and water conservation benefits.

Extension program options include winter cereals promotion and development, forage production and management, grazing management, and the provision of 'flushing bars' to protect nesting birds from injury during hay

cutting. Modified agriculture options include the conversion of cropland to forages and managed grazing. Intensive programs are implemented in areas with the highest capabilities for waterfowl production and include purchase and lease of existing native habitat, hay land, tame pasture, and cultivated land, which is then converted to nesting cover. Conservation easements (Sect. 5.4.2) and the restoration, enhancement and creation of wetlands are other options included as intensive programs. Policy initiatives that promote sustainable land use and provide wildlife benefits are also being pursued by Ducks Unlimited Canada.

6 Opportunities

Since birds and people do not exist in isolation of one another, the aim of this conservation plan may be well served by pointing out those circumstances which can help the combined cause of conservation and quality of life for people.

6.1 Water quantity.

Luck Lake is a managed marsh and lake whose water source in Lake Diefenbaker is dependent on melt water supply in the Rocky Mountains and water demand for consumption and irrigation in Saskatchewan. This water source and the ability to manage water levels provides an opportunity for bird management. It also represents a responsibility to manage for biodiversity in general (Sect. 2.1.4, 7.1)

6.2 Tourism.

Bird watchers know Luck Lake to be a key birding spot and many make day trips to the area. Ducks Unlimited Canada has developed a "Nature Watch Brochure" (Appendix 3) to help direct bird watchers in the area. Day-trip nature events are

recognized as a having high volume in Saskatchewan, but the economic benefit to local communities is small (Western Management Consultants et al. 2000). Many birders bring their bag lunch, but perhaps local businesses have failed to capitalize on that opportunity. Luck Lake could be a stopping point *en route* to Chaplin, Old Wives and Reed lakes (Appendix 3), and this opportunity could be part of a strategy for attracting visitors (Sect . 6.3).

According to Fung et al. (1999:269-270), "Tourism is already the world's number one industry in terms of overall contribution to the international economy. It continues to grow in importance. Tourism is the fastest-growing industry in Saskatchewan. It is an economic generator with travelers spending an estimated $1.1 billion in the province in 1997." Despite the promotional enthusiasm bordering on hype, there are pitfalls in the industry, especially in situations when start-up costs are high and economic losses possible. Tourism clearly needs to be managed to match the aspirations of the local community and the necessary infrastructure needs to be in place.

6.3 Bird Trails

Saskatchewan IBAs, such as Chaplin-Old Wives and the Quill lakes, may soon become a major 'anchor point' in Saskatchewan's budding Bird Trail network. 'Bird Trails' have been established in many parts of the world. In these trails, birds are the theme used to attract visitors and to realize tourism opportunities. Bird watchers have become the largest of nature-loving groups. Bird watchers, or birders, look for birds to identify them as a primary hobby, ornithologists study birds professionally, and naturalists appreciate birds and other living things as members of larger living communities in their environments. The Bird Trail initiative is part of Saskatchewan's Ecotourism strategy, complemented by an Agritourism strategy (Pam Wight and Associates 1998).

In Saskatchewan, 648,000 people aged 15 or older participated in nature-related activities in 1996, for a total of 41 million person-days and an expenditure of $388 million. Wildlife viewing on nature-related trips was reported by 15.1% of Saskatchewan residents (Filion et al. 1991).

7 Threats

7.1 Water dynamics.

Given Luck Lake's characteristic flood-dry cycles (Sect. 5.4.1) in the pre-heritage marsh days, this lake may have served shorebirds primarily and ducks secondarily. Now, this may be reversed. In view of widespread declines of both permanent and semi-permanent wetlands in Saskatchewan, open water (for staging), marshes (for brood rearing) and wetlands with flood-dry dynamics (for 'probing' shorebirds) are needed. If the managed Luck Lake can serve all three major functions adequately this would be ideal. Access to adequate water in the required season is important and lack thereof a threat.

Several species of shorebirds are adapted to probing for their food in exposed mud or the mud below shallow water. Figure 6 offers a glimpse into some of this complexity from the point of view of feeding lifestyles of shorebirds -- greatly simplified at that. If any one of the many factors that operate here is disrupted, this can be a threat.

Different species of shorebirds occupy rather specific habitats along a shore or on a lake. Management strategies should be cognizant of different feeding styles and different small-scale habitats used at different times. Biodiversity relies

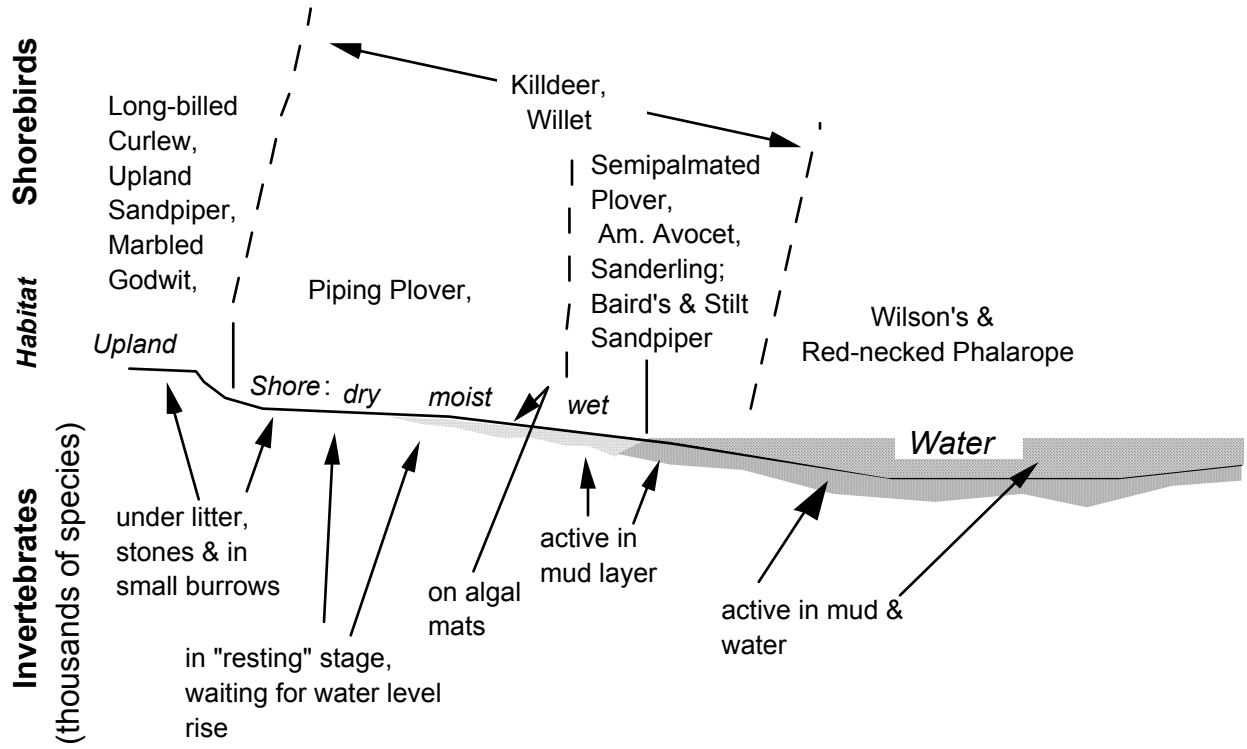


Figure 6. Different zones and characteristics of a pond affect how and where invertebrates species live, and the degree to which these are available to different shorebirds with different feeding strategies. Habitat use by birds is based on Skagen et al. (1999).

on habitat diversity. Different feeding strategies by shorebirds include:

- gleaning, to peck, scrape or pry out insects in view on or near the surface of ground or water (e.g. Long-billed Curlew, Piping Plover, Sanderling).
- probing, using bill in soft mud to feel for and grab live insects or resting cocoons (e.g. Sanderling, sandpipers, Am. Avocet).
- scything, pushing bill through soft mud sweeping side to side in search of insects (e.g. Am. Avocet[13])
- spin-swimming is exhibited by phalaropes as they swim in tight circles and disorient insects in the water column making them easier to catch.

For insects to survive in their resting stage, a flood has to recur before their 'time is up' (even resting takes small amounts of energy and this can be depleted over years). Altering the regular occurrence of flooding and drying in a pond's seasonal cycle will impact insects. Prolonged droughts may be expected under climate change. Dams in the drainage basin could also reduce the occurrence and extent of needed floods.

[13] A subtle connection between feeding strategy and habitat is illustrated here. Avocets tend to avoid sandy beaches, presumably because the bill would suffer too much wear during scything in this abrasive substrate and not retain its pincer-like feeding function.

Insect resting stages die if they are exposed to the extreme drying of the sun. Agricultural cultivation of wetlands in their dry period exposes insects to the sun, as does trampling by cattle. A trampled shore alters the soft mud layer and potentially reduces availability of insects to birds.

7.2. Water quality.

Luck Lake is saline (Sect. 2). This in itself is not a problem, since salt lakes can be very productive at low or moderate salt concentrations. When much of the water evaporates, the salt is left behind, and this can lead to great changes in salt content. In the prairie ecosystem located in the rain shadow of the Rocky Mountains, precipitation is low, the water cycle's cleansing action is reduced, and natural and human-induced impurities are flushed slowly from the surface waters. Therefore, water quality for birds and people needs to be particularly carefully managed (Coote and Gregorich 2000).

In addition to salt and silt, chemicals carried in water can threaten water quality and impact food chains. In southern Saskatchewan, 44% of the land is treated with pesticides annually. In a study in southern Saskatchewan, Donald et al. (1999) found that in early July the average number of types of pesticides detected in wetlands ranged from 1.8 in areas with less than 21 mm of rain during the previous 15 days, to 3.2 in areas with more rainfall. The high rainfall areas resulted in greater erosion. As many as 60% of the wetlands had at least one pesticide in amounts that exceeded Canadian guidelines for the protection of aquatic life. Lindane and triallate exceeded these guidelines most often (Donald et al. 1999).

Tests for the presence of pesticides and pollutants in water are costly. Even when funds are available for studies of pesticide exposure through drinking water, the task is difficult at best. Environment and water quality experts in Canada and around the World are given the virtually impossible task of deciding whether a given chemical or practice is safe or not safe. The public demands answers in a simplistic science-based yes-or-no evidence style. This approach is hopelessly mismatched to the complex natural system in which the chemical finds itself. A yes-or-no conclusion is impossible because once a synthetic pesticide leaves the sprayer nozzle, it becomes virtually impossible to track. Furthermore, when a given concentration of a pesticide is studied for impact on a certain life stage (e.g. adult but not embryo) of a plant or animal in the controlled microcosm of a laboratory, this does not automatically reveal its impact on different life stages in nature, its impact under the simultaneous exposure of two or more pesticides, or the impact of multiple exposures (Donald et al. 1999).

7.3 Accidents.

The distances between Luck Lake and major highway and rail-lines, make threats from chemical spills unlikely.

7.4 Disturbance.

Human disturbance can reduce an animal's feeding time, prevent it from breeding, or interfere with an animal's occupancy of cover which it ordinarily occupies to escape from predators or the elements. Bird watching is a benefit in the greater scheme, but when visitor numbers are high, it should be managed to avoid it becoming a threat.

8 Conservation Goals and Objectives

'A conservation plan does not conservation make.' This conservation plan is no different. It is a stepping stone in the continuum from conservation goals to conservation action (Fig. 2). A purpose of this plan is to serve as a tool, by providing a description of ecosystem elements which are presumably critical for conserving the IBA birds, the IBA sites, the landscape and the people's quality way of life. The plan also outlines some specific goals and actions.

8.1 Management goals

Goal 1. Ensure the continued availability of adequate water supply to maintain the Luck Lake Heritage Marsh as a site for brood rearing, staging and feeding by birds.

Goal 2. Manage the marsh in the different basins (Fig. 5) for waterfowl and shorebirds, which are and were traditional species using Luck Lake.

8.2 Infrastructure goals

Goal 3. Encourage the inclusion of Luck Lake in the 'bird trails' system, and any other tourism opportunity that ensures both a quality experience

for visitors without any loss to the birds themselves.

8.3 Educational goals

Goal 4. Provide schools with appropriate resource materials (e.g. Nature Watch Brochure by Ducks Unlimited Canada) to highlight the special nature of Luck Lake, particularly with regard to staging by long-distance migrants.

Goal 5. Encourage where possible the sharing of information with local people to highlight the treasure they have 'at their door' and also the threats to conservation.

8.4 Research and information needs

Goal 6. Monitor bird use at the heritage marsh and assess any potential impact of birds through food chain effects or diseases.

Goal 7. Monitor water quality and invertebrate communities such that declining trends, if any, can be detected.

9 Evaluating Success

This IBA program is a new conservation program in Canada. In its current form, it was designed with a ten-year vision, to 2008.

The participants of the Important Bird Area program in Saskatchewan and nationally will support this conservation process. These participants and local stakeholders should be ever vigilant for opportunities to support the local initiatives where possible. Most importantly, however, a local 'champion' should be identified for each area and perhaps for special goals. It is hoped that these champions will accept some ownership for this initiative and keep the ball rolling, and never cease to be vigilant for threats and for opportunities for conservation support.

10 Acknowledgments

This conservation plan owes its existence to BirdLife International, and to the joint initiative by the Canadian Nature Federation and Bird Studies Canada for launching this program in Canada. The Important Bird Areas Program is part of the Natural Legacy 2000 program, a nationwide initiative to conserve wildlife and habitats on private and public lands. We gratefully acknowledge the financial support of the government of Canada's Millennium Partnership Program. Ducks Unlimited Canada also provided financial support for the IBA program.

For making IBA possible in Saskatchewan, we acknowledge the participation of our funding partners. Financial support for this IBA plan has been provided by the Canadian Adaptation and Rural Development Fund in Saskatchewan (CARDS). Funding for the CARDS Program is provided by Agriculture and Agri-Food Canada. Saskatchewan Environment and Resource Management has provided financial and in-kind support. The Centre for Studies in Agriculture, Law and the Environment (CSALE) has provided office space and other services.

The IBA Advisory Committee members helped select IBA sites for conservation planning: Gregg Brewster, Stephen Davis, Frank Roy, Margaret Skeel, Alan R. Smith and Earl Wiltse.

This specific plan also owes its existence to the local people who have cared and employed good judgment for which the birds are able to reside at the lake today. We are grateful to the persons listed here who have agreed to participate in this conservation planning in their professional or private capacity (see Appendix 1).

This plan has been greatly improved by various people through providing input including: Fred Beek, Gregg Brewster, Attila Chanady, Rob Foster, Mike Gollop, Dan Nieman and Margaret Skeel.

Darrel Cerkowniak, Sask. Land Resource Centre, Univ. of Sask., and Bill Sawchyn, Sask. Environment and Resource Management, and Ryan Cossitt, Saskatchewan Agriculture and Food produced the maps used in this report. Jeff Keith, Saskatchewan Conservation Data Centre, provided data and the map of threatened species.

Information from the Canadian IBA Database was provided by the Canadian BirdLife International co-partners, Bird Studies Canada and the Canadian Nature Federation. Data sources include surveys organized by NGO's and unpublished data sets kindly provided by provincial and federal department biologists. Updated information can be obtained by contacting Bird Studies Canada (see Appendix 2).

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Appendix 1. Names, affiliation and general interests of individuals in connection with the Luck Lake IBA. By letting their name appear here, these individuals have made no commitment beyond agreeing to be contacted when their participation is requested.

Fred Beek, Sask. Environment and Resource Manage., 3211 Albert Street, Regina, SK, S4S 5W6; 306-787-3019, fbeek@serm.gov.sk.ca
Interests: Fred is the team leader for SERM's Representative Areas Network program.

Gregg Brewster, Ducks Unlimited Canada, Box 4465, 1030 Winnipeg Street, Regina, SK, S4P 3W7; 306-569-0424 g_brewster@ducks.ca
Interests: Gregg is a wetland and waterfowl biologist familiar with the region.

Attila Chanady, 15 Simpson Crescent, Saskatoon, SK, S7H 3C5; 306-374-6962 achanady@home.com
Interests: Attila is the Conservation Director for Nature Saskatchewan.

Mike Gollop, Sask. Env. & Research Management, 112 Research Drive, Saskatoon, SK, S7K 2H6; 306-933-5767 mike.gollop@ innovationplace.com
Interests: Mike is a Wildlife Biologist with SK Environment and Resource Management.

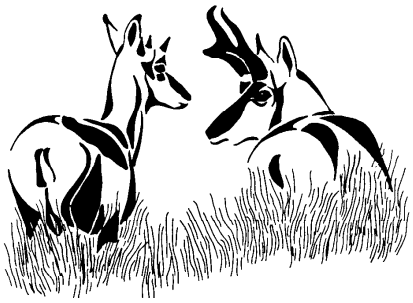
Wayne Harris, Sask. Env. and Resource Manage., 350 Cheadle Street W., Swift Current, SK, S9H 4G3; 778-8218 wayne.harris.erm @govmail. gov.sk.ca
Interests: Wayne is the Provincial Biologist for the grassland ecoregion and a naturalist with broad knowledge of species and ecosystems.

Dan Nieman, Canadian Wildlife Service, 115 Perimeter Road, Saskatoon ,SK, S7N 0X4,,306-975-4098 dan.nieman@ec.gc.ca
Interests: Dan is a Wildlife Biologist with the Canadian Wildlife Service. He is a principal representative for Canada in the international management of White-fronted Geese.

Frank Roy, 650 Costigan Way, Saskatoon, SK, S7J 3R2; 306-374-8571
Interest: Frank is a naturalist and author who, after retiring from teaching school, has spent many days watching and recording birds in the area. Frank also serves on the IBA Advisory Board

Margaret Skeel, Nature Saskatchewan, 1860 Lorne Street, Regina, SK, S4P 2L7; 306-780-9273 Fax 306-780-9263 mskeel@unibase.com
Interests: Margaret is the Program Coordinator for Nature Saskatchewan. In this role and with her strong interest in conservation, she helps deliver IBA-Saskatchewan.

Earl Wiltse, Sask. Environment & Resource Manage., 3211 Albert Street, Regina, SK, S4S 5W6; 306-787-2889 or 2464 earl.wiltse.erm@govmail.gov.sk.ca
Interests: Earl is SERM's Species at Risk Specialist. He also serves on the IBA advisory Board.



Appendix 2: Information on the lead organizations of the IBA Program

BirdLife International (Wellbrook Court, Girton Road, Cambridge, CB3 0NA, UK; birdlife@ECNET.ec)

A pioneer in its field, BirdLife International 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 the Americas BirdLife Program, check the following web site: <http://www.birdlife1.org.ec/ingles.html>. The **Canadian Important Bird Areas Program** has been undertaken by a partnership of two lead agencies. The Canadian Nature Federation (CNF) and Bird Studies Canada (BSC) are the Canadian BirdLife International partners. **The Canadian Nature Federation** (1 Nicholas Street, Ottawa, ON, K1N 7B7; http://www.cnf.ca)

The CNF 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 (P.O. Box 160, Port Rowan, ON, N0E 1M0; http://www.bsc-eoc.org)

The mission of BSC 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. BSC 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.

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

Nature Saskatchewan (1860 Lorne Street, Regina, SK, S4P 2L7; www.naturesask.com)

Nature Saskatchewan is one of the largest conservation organizations in Saskatchewan whose vision is "Humanity in harmony with nature." Nature Saskatchewan was founded in 1949 and has been a reasoned and respected voice in conservation. Nature Saskatchewan's major accomplishments are in the areas of education, conservation, research and publication.

Nature Saskatchewan's educational programs include delivery of the *Living by Water Project* in Saskatchewan and Manitoba, BirdQuest and PlantQuest workshops for youth and adults, a scholarship for graduate studies at universities, and support of nature camps for youth. In the conservation area, Nature Saskatchewan owns and maintains six nature sanctuaries, negotiates and refers conservation easements, and fosters conservation through working with governments and industry.

Research conducted or facilitated by Nature Saskatchewan is through support for

monitoring at high priority sites and for threatened species. Nature Saskatchewan is conducting inventories of flora and fauna at its nature sanctuaries. The organization co-manages the Saskatchewan Conservation Data Centre and operates a landowner stewardship program *Operation Burrowing Owl.* Nature Saskatchewan quarterly publishes an internationally known journal *Blue Jay,* releases special publications on an irregular basis (22 to date),and publishes a quarterly newsletter *Nature Views*.

Appendix 3. At the inaugural **IBA-Saskatchewan** workshop (Saskatoon, 22 October 1997), 123 candidate areas were nominated by several dozen naturalists. On 10 January 2001, the data compilation and assessment by outside reviewers was completed, yielding 53 IBAs approved by Bird Studies Canada.

The number of approved IBAs may yet grow as more information becomes available, particularly in the north. However, current IBA priorities involve conservation planning and implementation of suggested actions. The 13 sites shown below have conservation plans completed or in various stages of completion. Two sites focus on grasslands (Govenlock, Nashlyn and Battle Creek IBA, and Colgate IBA), one on a marsh-lake-upland complex (Cumberland Marshes IBA), and the remainder on water bodies. For lake IBAs the adjacent upland is usually equally if not more important in the ecology of IBA birds. In some cases the IBA has been expanded to include the entire watershed (Redberry Lake, and Chaplin, Old Wives and Reed lakes) or portions of watersheds.

Appendix 4. Nature Watch Brochure for Luck Lake, produced by Ducks Unlimited Canada