

COMMUNITY CONSERVATION PLAN
for the
Sandoff Lake Important Bird Area

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Executive Summary

This Community Conservation Plan for Sandoff 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.

Sandoff Lake is a roughly 100 ha (200 acre) salt lake, which lies on the sparsely populated Lake Alma Upland within the Missouri Coteau in south-central Saskatchewan. The upland plateau and moraine landscape surrounding it provides important fresh- and salt water ponds that support shorebirds and waterfowl. Roughly two third of the land in this arid portion of the brown soil zone is cultivated for the production of wheat primarily.

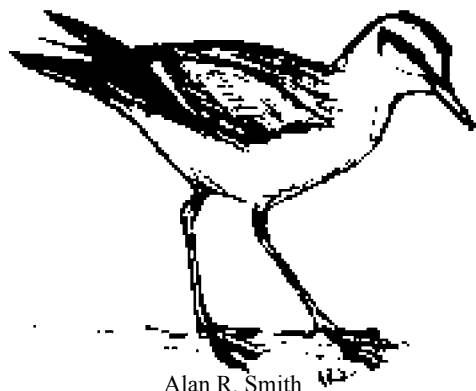
In addition to shorebirds which use the lake on migration, the primary importance of the site is for the endangered Piping Plover. Since 20-30 plovers use this lake when water allows it, careful management of the site for Piping Plovers is warranted. There are no major threats apparent at this time. An opportunity exists to manage the cattle grazing pattern. This promises to avoid impacts on the saline shore that are detrimental to birds and to improve pasture productivity.

The objectives of this plan are to draw attention to the importance of Sandoff Lake for plovers, but also for other migrant shorebirds, to avoid any future disruption of the ecosystem that might threaten the birds. this plan should also bring stakeholders together to chart a future

course to achieve these goals. Specific recommendations involve:

- Maintain or enhance native grasslands or other permanent cover in the immediate vicinity of the lake.
- Manage cattle through fencing and water supply in such a way that trampling of plover eggs or young is minimized.
- Assist schools and other local organizations to explain the value of the lake.
- Continue or increase monitoring of bird numbers and reproduction, and related ecosystem parameters.
- Conduct research in those specific areas that satisfy information needs or relate to future management and potential threats, such as documenting the type of invertebrate food used by birds.

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 this Community Conservation Plan include Canadian Adaptation and Rural Development Saskatchewan (CARDS), the University of Saskatchewan, Saskatchewan Environment and Resource Management (SERM) and the Canadian Millennium Partnership Program.



Alan R. Smith

Vision

Our vision is to practice land stewardship for the combined benefit of birds and people.

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 ecosystems concerns, the conservation efforts will come 'full circle' and have gone well beyond the birds.

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

- i) explaining why Sandoff Lake is 'important,'
- 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) anticipating opportunities and concerns across as many elements of the natural system as possible.
- v) outlining opportunities and challenges for conservation and listing potential stakeholders and contact people (Appendix 1).

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, 83.3% 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. 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 (<http://www.ec.gc.ca/nature.html>). These data 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 are realized.

This community conservation plan focuses on Sandoff Lake (Fig. 1), in the Lake Alma uplands of the mixed-grass ecoregion of south-central Saskatchewan. The lake is considered important because it holds Piping Plovers (*Charadrius melodus*) which are considered endangered nationally and provincially. Although there were only 20-30 plovers seen using the lake during two complete surveys between 1991-1996, given the endangered status of this plover, every effort should be made to maintain the site. Taken together, the smaller basins (such as Sandoff Lake) throughout the Missouri Coteau¹ supported 483 plovers, representing 36% of the Saskatchewan population in 1996 (Skeel et al. 1996).

¹ Going westward, an abrupt step-like rise onto the second prairie plain with a total of three plains rising toward the Rocky Mountains. This band of hill-land-dale andscape extends northwesterly across southern Saskatchewan. The first prairie step lies at the eastern edge of Saskatchewan.

1.2 Possible approaches to bird protection

Given the critical role that Sandoff Lake plays as a breeding site for the endangered Piping Plover, the lake's ability to provide this function should be protected. The plovers' use of these areas is not an accident. If this environment is seriously altered, the consequences will likely be to the bird's detriment. By protecting the lake's ability to function naturally in the water cycle, the regional ecological integrity is also maintained for current land uses. Effective conservation will require considerations of water levels, land use and ecological monitoring of potential changes in surrounding areas.

Most Saskatchewan IBAs are in the south of the province where agriculture is the dominant landscape modifier. Agriculture has had a tradition of change in prairie Canada (Sect. 5.2) and will continue to change. Bird conservation is intricately tied to developments in agriculture. Conservation is often perceived as a drain on an industry, and wrongly so.² The current agricultural crisis is severe and not due to bird protection initiatives. Birds are indicators of environmental sustainability and ecosystem health. The approach taken here is that there are many genuine and long-term solutions that are

good for both birds and for farmers and ranchers. Furthermore, a healthy

² According to statistics, farmers in the Redberry Lake IBA (Appendix 3) spend less on insect pest control than farmers in adjacent R.M.s. Although this is not proven, both farmers and biologists accept that this may be due to the thousands of gulls that nest on islands in Redberry lake and fly out to feed in the surrounding fields.

Fig. 1

ecosystem is a benefit for birds and for Saskatchewan people.

The people of the Lake Alma uplands exhibit a pattern of lifestyle and land use that is an outcome of complex forces. Such forces do change over time and people respond with their personal choices according to social and economic necessities, and regulations and incentives. Despite an intensively used agricultural landscape on the Missouri Coteau uplands, some important portions of the ecosystem are still shared with the birds - after all, the birds are still there today.

The Important Bird Areas (IBA) planning process should be sensitive to the complex cultural forces and could enhance bird-people coexistence in three major ways. First, the process aims to bring together all of the major stakeholders and help find opportunities for the future that complement one another. Second, the process recognizes that cooperation can involve compromise. Toward this end, the planning process will be directed toward alternatives that protect ecosystem function and respect a quality of life for the people involved. Third, this process should be vigilant to ensure that any future changes in the region are consistent with bird conservation. The IBA process should enhance or protect an environment which, by being healthy for birds, will also protect the health of people.³

³Some residents of the Lake Alma area have rejected this IBA planning process and wished not to be involved or contacted. A belief seems to be that Piping Plover are not actually endangered, and if declines in numbers occurred, these could be part of nature's natural ups-and-downs.

Effective conservation should include all elements of the natural system, and also the human elements. A participatory, community-based research and management system might be adopted. Kramer's (1986) model of community-based research and action outlines several stages that cannot be skipped: need -> interest -> involvement -> ownership -> commitment -> collaboration. An important characteristic in this process is the sharing of power. Weeks and Packard (1997) have illustrated how several barriers arising from a top-down management style have hampered conservation success.

Every attempt will be made in this project to respond to local issues and to represent the aspirations of the local people, making this endeavor a community-based, and interactive process with wide stakeholder involvement. While local involvement is critically important, 'community' and 'stakeholder' should also be broadly defined. The stakeholders and the community involve the local community first. However, because natural systems are inextricably connected, these obligations extend eventually to all Canadians and in some small sense to all citizens on Earth. In many respects, Canada has a tradition of collective goals with both local and regional input in decision making (Raad and Kenworthy 1998). Furthermore, Canada as a nation participates in international

Some birds species are difficult to identify, and this can lead to discrepancies in beliefs about their numbers.

There was also a concern in general about permission to access land for counting birds. An oft-quoted comparison is that walking on any of a farmer/rancher's land is akin to walking on a city-home front yard.

agreements such as the Biodiversity Convention (Anonymous 1995) and many others listed below.



2 IBA Site Information

Sandoff Lake is a roughly 1 km² saline lake in a highly bisected hill-and-dale landscape. To do justice to the goals of this plan, the IBA should be considered the lake per se, and a 1 km border around it. Because of the bisection in the landscape, the lake is likely to have a small watershed around it, perhaps 1-2 km at most. As is true of many saline lakes, it is probably fed from a ground water source.

Small local springs are visible on the lake's edge and within, evident from the cattails growing in small tufts where they can have their roots in water year-round. On 20 October 2000, there was no standing water covering the white salt flat. Patches of water and wet mud existed

only around seepage springs near the eastern shore. Some springs at least are fed with freshwater; a previous lessee maintained one spring along the shoreline to provide water for his cattle. According to another local resident, the area has many underground aquifers and quality ground water is not difficult to find.

Sandoff Lake has no above ground outflow, but if it had one, it would likely be connected via the Missouri-Mississippi River drainage to the Gulf of Mexico. The border of the Hudson Bay Drainage Basin is located approximately 20 km N. The Wood River Drainage, a self-contained watershed within the Hudson Bay drainage, lies about 60 km NW.

Towns nearest Sandoff Lake are Beaubier, and Lake Alma on Hwy. #18. Both towns have under 250 inhabitants. Sandoff Lake lies 19 km north of the Montana border.

The dominant soils at the transition from the mixed grassland to the moist mixed-grass ecoregions, where Sandoff Lake is located, are loamy dark brown Chernozems,⁴ with 10-30% slopes. The glaciers left a steeply undulating moraine landscape whose kettles collect water and support waterbirds. The rating of soil capability for agriculture is Class 5 which includes "soils with very severe limitations which are best suited to the production of perennial forage crops; improvement practices are feasible." The limitation is mainly due to steep terrain. Water

⁴ Chernozem is a Russian word for the dark-coloured soil of grasslands.

erosion risk is high and wind erosion moderate (Fung et al. 1999).

Monthly mean temperatures are 20° C in July and -14° C in January. Mean annual precipitation is 30-35 cm, with most occurring in June and July (Fung et al. 1999).

2.1 Existing conservation measures

The ecosystem and the Piping Plovers of Sandoff Lake owe their persistence in large measure to their own ingenuity, but also to conservation values among people, and to legal protection. The legal statutes and policies outlined below have been complemented by specific conservation initiatives outlined 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 quickly identified as a cause, but the other major cause, habitat loss, was not well recognized. 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 species. 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* (Section 5.4.3) and introduced the Representative Areas Network program (Anonymous 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 has done 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 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 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" (Anonymous 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 (Anonymous 1995).

2.1.4 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 landform 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.

2.1.5 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 strategy' that attempts to unify various bird conservation initiatives and create national and international partnerships (Fig 2). It is the role of IBA and others to foster complementary local partnerships.

Different conservation 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 lead to meaningful action. This North American Bird Conservation Initiative hopes to provide serious impetus for cooperative solutions, and joint action taken in Canada, the United States and Mexico. This continental initiative is supported in principle by the Commission on Environmental Cooperation, which was established as a companion to the North American Free Trade agreement.

In regard to cooperation in conservation, Figure 2 also shows that birds have a long tradition of care by many people. It is noteworthy that in addition to bird monitoring projects by professional biologist, an enormous amount of data is gathered by thousands of bird watchers each year (e.g. bird feeder watches, and other bird counts; Fig. 2). This is tangible evidence of a widespread personal will to

conserve this charismatic component of nature (e.g. Sect 1). This public will and public 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 (Sect. 6.3)?

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 (www.manomet.org). A shorebird plan for Mexico is in preparation (McNicht 1999).

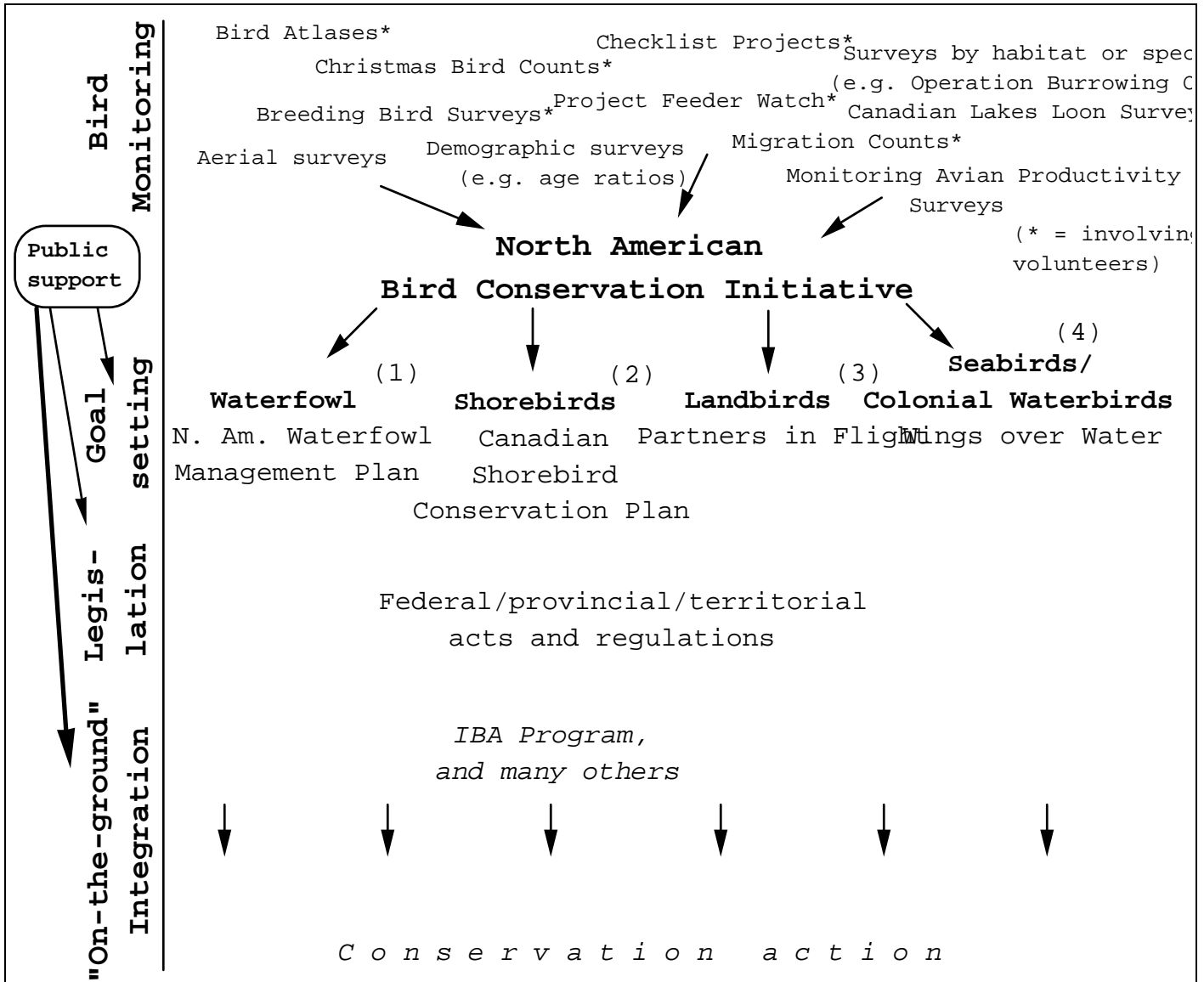


Figure 2. A schematic diagram to show how different bird monitoring approaches might combine with public support and regulatory instruments to form a basis for conservation action. References: (1) North American Waterfowl Management Plan Committee 1998, (2) Anonymous. 1999, (3) Canadian Landbird Conservation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

2.1.7 International Shorebird Survey. The highly migratory nature of shorebirds requires international cooperation. There is a tendency for countries to focus on the birds that breed there and pay comparatively little attention to species that pass through on migration. The tremendous length of shorebird migrations and the need to short-stop and find high energy food makes shorebirds vulnerable. Many of the shorebirds are small in size and therefore have high energy demands.

Most conservation actions presuppose effective monitoring of shorebird numbers, the timing of passage and threats. The Manomet Center for Conservation Science in Maine started to organize an international shorebird survey in 1974. To date, this survey has fostered some 50,000 counts at more than 600 strategic sites by more than 900 observers.

Sandoff Lake may seem small in the context of shorebird conservation internationally. However, given the birds' small size and need to migrate long distances, every small stopover and feeding site is important. In fact, it may be crucial for those individual birds that use the lake, albeit briefly, in each season. The global goal of conservation can only be achieved one step at a time.

2.1.8 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 and 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 (Anonymous 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 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 brings 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).

2.1.9 Prairie Conservation Action Plan. The Prairie Conservation Action Plan was an initiative spearheaded by World Wildlife Fund Canada. The plan was released in 1987, Canada's Wildlife Centennial year commemorating the 100th anniversary of North America's first wildlife sanctuary, the Last Mountain Lake National Wildlife Area. The plan's main focus, delivered under "Let's leave some wild in the West," was identifying critical habitat and its threats, preparing status reports for species at risk of extinction, and executing conservation action for these species.

Since the formulation of the Prairie Conservation Action Plan, many named or unnamed and large or small initiatives led to prairie conservation. Most important was an increasing awareness of the values of native prairie and also awareness of its imminent threats.

It was during this time, for instance, that government-subsidized re-grassing programs were phased out. New extension programs were created or existing programs brought into line with the increasingly mature perceptions of native prairie and its role in a ranching economy and in the biosphere.

In the late 1990s, the Prairie Conservation Action Plan was re-invigorated through collaborative partnerships in each of the prairie provinces with some cross-coordination. In Saskatchewan, leadership was undertaken by the Saskatchewan Stock Growers Association and Saskatchewan Environment and Resource Management, with headquarters for the plan housed in the offices of the Saskatchewan Stock Growers Association in Regina (www.pcap-sk.org). A coordinating committee includes approximately 20 agencies. Funding partners of the program are: Canadian Adaptation and Rural Development Saskatchewan, Canadian Wildlife Service, Ducks Unlimited Canada, Prairie Farm Rehabilitation Administration, Saskatchewan Agriculture and Food, Saskatchewan Environment and Resource Management, and the Saskatchewan Wetland Conservation Corporation. Goals are to sustain a healthy native grassland grazing resource, to maintain biological diversity, to promote a sustainable use of the resource and a quality of life for people, and to disseminate quality information.

The change in this scenario from a non-government/government conservationist's initiative to one co-driven by a production sector

is a welcome sign of our time. The challenge will be to move from a narrow focus on individual components of the native ecosystem (e.g. rare plants) to incorporate conservation values systematically in the full food production and consumption chain.

2.1.10 Crown-owned pasture lands. According to Saskatchewan Agriculture and Food (www.agr.gov.sk.ca/Crown_Lands_Pastures/), the purpose of the pasture lease program is to provide a means to manage agricultural Crown land in a sustainable fashion and to preserve it for future generations. This is accomplished by: i) selecting lessees for advertised Crown land in a consistent and objective manner; ii) establishing requirements for renewing agricultural leases; and iii) facilitating the transfer of leases between generations, co-lessees, or buyers and sellers.



3 The IBA Program

The IBA program is an international initiative coordinated by BirdLife International (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.

The goals of the Canadian IBA program are to:

- identify a network of sites that conserve the natural diversity of Canadian bird species and are critical to the long-term viability of naturally occurring bird populations;
- determine the type of protection or stewardship required for each site, and ensure the conservation of sites through

partnerships of local stakeholders who 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.

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) will be completed by March 2001.⁵

⁵ The author, Joe Schmutz is internationally known for his research and conservation of prairie birds of prey, and has

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.

4 IBA species information

Sandoff Lake is of primary importance to Piping Plovers, especially given this species' endangered status. Based on complete surveys of the lake in the last decade, there were over 20 birds at the lake on average, making Sandoff Lake an IBA of national significance.

In addition to Piping Plovers, other shorebirds use this lake during migration.⁶ Where patches of native grasslands persist, Burrowing Owls and Ferruginous Hawks can be found nesting (Fig. 1). Burrowing Owls are endangered and Canada and Ferruginous Hawks are considered vulnerable.⁷

4.1 Piping Plover.

The ecology of this species has been summarized by Haig (1992). The Piping Plover took the name

⁶ On 30 August 2000, several flocks of migrating sandpipers waded and fed in the shallow water near the NW shore of Sandoff Lake.

A roughly 10 ha freshwater pond (no salt margin) located 2 km S, held approximately 100 Tundra Swans, 100 Mallards and 75 Canada Geese.

⁷ Risk categories are:

Extinct

Extirpated - gone from a region

Endangered - facing extinction

Threatened - likely to become endangered

Vulnerable or of Special Concern - sensitive to human activities or natural events. Species in this category are not legally considered 'at-risk.'

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.

'shorebird' literally. It spends virtually its entire life on the beach, at ocean shores, in bays, on inland lakes and rivers, and temporary ponds. It uses primarily the very edge of the water and adjacent upland. Bathing seems to be the only time when its body gets deliberately wet.

Piping Plovers feed on aquatic and terrestrial invertebrates. At the water's edge, they capture those invertebrates that are vulnerable after having been whipped up by wave action, or left behind in the film of receding water. On the Great Plains, aquatic invertebrates include mostly aquatic insects in the larval stage. The plovers also run down terrestrial insects on the beach and seem not to take them in flight.

To raise their brood, Piping Plovers begin by making a depression in the sand or gravel. This inconspicuous depression is then lined with items found nearby, including pebbles and sometimes broken shells from snails or clams. The male and female appear ritualistic when they line their nest, tossing items with their bills. During egg laying and the 4-week incubation period the plovers are 'tied' to this spot, but soon after the young hatch, the family is able to move to other areas on the beach. The young fledge at three weeks of age.

In some areas, Piping Plovers apparently can raise a second brood (Bottita et al. 1997), but this has not been observed in at least two Canadian populations (East Coast, Sabine Dietz and Roland Chiasson pers. comm.; Prairie, Wayne Harris and Margaret Skeel pers. comm.).

Concealment and camouflage are essential features in the Piping Plover's life, especially during nesting. Nests are sometimes near larger objects such as sticks or stones, presumably selecting rough areas which large animals might avoid. Piping Plovers have many predators of eggs and young, including mammals and birds. Their reliance on shores predisposes the plovers to predation, because these water bodies are visited by many animals in an arid landscape where drinking water can be rare. Human activity also is often concentrated at shores and this can result in conflicts. Rushing storm water sometimes washes away nests, and others are flooded when water levels are drastically altered in reservoirs.

4.1.1 Status and requirements. Attempts to protect the declining Piping Plovers have been many. Plover numbers on the Great Plains continue to decline (from 3,469 in 1991 to 3,284 in 1996), although they increased in Saskatchewan from 1,172 to 1,348 over this period (Skeel et al. 1996). Along the Atlantic Coast, numbers are maintained, no doubt due to the intensive protection measures including limiting human, vehicle or other recreational travel along shores. Plovers of the Great Lakes are showing an increase in recent years (Paul Goossen, pers. communication).

In Saskatchewan, Piping Plovers are widely distributed (Smith 1996), often with only a few pairs at any one lake. Also, as habitat

changes, the plovers are often forced to select different sites. Suitable Piping Plover habitat is dependent on water level fluctuation. If water levels are low for several years in a row, vegetation invades the broad beaches and Piping Plovers do not return, apparently due to a shortage of exposed beaches. A broad beach or mud flat with nearby water is a requirement (Skeel and Duncan 1998).

4.1.2 Local distribution. A suitable beach exists at Sandoff Lake virtually throughout the basin in years of adequate moisture. When Piping Plovers were counted at Sandoff, they were widely distributed around the lake (Table 1).

		Single	Total
Year	Pairs	plovers	plovers
1991	8	9	25
1993			8 ^a
1994			10
1996	6	16	28

^a Only portion of lake searched

Throughout the Missouri Coteau, 483 plovers were counted in 1996 on 30 of a total of 43 basins visited, including Sandoff Lake (Skeel et al. 1996). The larger lakes and smaller and semi-permanent sloughs comprise a mosaic in the landscape. During particularly dry years or very wet years with beaches reduced to narrow strips, shorebirds may be forced to crowd onto the larger lakes. During years with average snow melt and

runoff, the birds may move to smaller basins to reproduce and feed, taking advantage of the relaxed competitive conditions when distributed among many sites.

4.2 Other Shorebirds. Sandoff Lake is an important stopover site for many other species of shorebirds, in addition to Piping Plovers. These busy little 'peeps' spend their life wading in the salty water on inland salt lakes or on the sea shore. These peeps arrive from Central and South America on their way to breed in the Canadian Arctic. Most of these birds are small, some the weight of a chicken egg. They 'fly' a tightrope between energy demand for the 6,000-8,000 km flight, egg laying, incubation and tending young on the one hand, and having too small a body to carry enough energy for long distances on the other. Estimates are, that after a fattening stay, a shorebird can fly 850-1,500 km before energy is depleted and a feeding stop is needed (Skagen and Knopf 1994). Finding stop-over sites is ever more difficult for the birds given estimates of prairie wetland loss in Saskatchewan of 35-50% since settlement. Therefore, if Sandoff Lake was unavailable or unsuitable, shorebirds would need to scramble for suitable alternatives.

Arctic-nesting shorebirds can be expected in Saskatchewan, including Sandoff Lake, from late April to early June, and again from late August through October.

5 Human Context

It is unlikely that birds can be protected in perpetuity in isolation from human practices and values. The section below is intended to provide a review of historical and current context that inform approaches currently employed.

5.1 Land ownership

The three quarter sections including Sandoff Lake, an additional two including the unnamed lake to the south and two of grassland are owned by the Crown (Fig. 3; Sect. 2.1.10). Lands along the western shore are privately owned, for a total of three landowners/lessees in the immediate vicinity of the lake. Leasing of Crown lands is administered by an agrologist of Saskatchewan Agriculture & Food, in this case in the Weyburn office. In the region generally, 56-60% of land is privately owned (Fung et al. 1999).



5.2 Historical land use.

Sandoff Lake is part of a large block of land claimed under Treaty No. 4 which was signed in 1874. The lake lies close to the eastern edge of Palliser's Triangle, an arid region of southern Saskatchewan and Alberta which Palliser correctly declared as marginally if at all suitable to European-style agriculture. Despite this limitation, over time much of the land came to be cultivated, encouraged through a series of acts and policies repeatedly modified as an emerging nation tried to come to grips with territorial claims and the limited capacity of the land.

Potyondi (1995) provides a detailed settlement history for southwestern Saskatchewan. This review is pertinent because it gives insight into how it was that agriculture in western Canada was and still is considerably removed from ecological and economic sustainability (e.g. Anderson et al. 1991).⁸

When John Palliser traversed the Moose Jaw Creek area in 1858, NW of Sandoff Lake, Palliser recorded in his notebook that the "...whole region as far as the eye could reach was covered by buffalo, in bands varying from hundreds to thousands" at an estimated density of 3-4 individuals per km².

At such high densities, bison rapidly denuded the grasslands over which they passed. Some range ecologists speculate that the

remaining grasslands in prairie Canada today may be in better condition on average than grasslands at the time of the bison. Palliser likened their denuding impact to locusts and recorded in his notes his concern for food for the horses after a herd had passed through an area (Potyondi 1995).

Gradually, after the Hudson's Bay Company sent Henry Kelsey to explore the northern prairies in 1691, trading took place by the Hudson's Bay Company and subsidiaries of the rival American Fur Company. Between 1830 and 1880 hunting by Métis became prominent; they traditionally made two military-style expeditions into the region from their permanent settlements in today's southern Manitoba.

The Saskatchewan portion of the Palliser Triangle was occupied by the allied Indian Nations of Assiniboine, Saulteaux and Plains Cree. Potyondi (1995:19) writes:

"Isaac Cowie, a young apprentice clerk with the Hudson's Bay company, records the historical richness of the local game and fur resources. In 1868, he traded at his Wood Mountain post for '485 prime buffalo robes, 22 buffalo bosses, 79 buffalo tongues, 21 prime badgers, 1 grizzly bear, 21 red foxes, 132 kitt [swift] foxes, 16 hares (jackrabbits), 3 skunks, 1 wolverine [and] 59 wolves.'

Once live bison became scarce, their scattered and bleached bones were profitably sent to the 'American' mid-west for their phosphate, required as fertilizer and in sugar refineries. This 'bony endeavor' became especially lucrative after

⁸ Winston Churchill is quoted for saying "The farther you look back, the farther you can plan into the future."

the Canadian Pacific Railway reached the region in 1881.

Determined to find another economic activity for Palliser's Triangle after the loss of the 'keystone' bison, the Canadian Government introduced a liberal and attractive grazing lease policy in 1881. The markets had and continued to have dramatic impacts on this frontier economy. For instance, an outbreak of anthrax in Britain led to the import of North American beef. Canadian beef became even more desirable after the British learned of an outbreak of pleuropneumonia in the 'American' herds.

As is often the case in public administration, the design of new initiatives is strongly influenced by prevailing approaches and customs of the time. So it was for prairie settlement. In Sir Wilfrid 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 extensive land use and sparse occupation of the grasslands under a ranching economy seemed not to satisfy the eastern Canadian urge to settle and claim once and for all Canada's West.⁹ In 1886, a druggist-entomologist-fruit breeder was retained by the

Canadian Government to make recommendations on how to best prosper from prairie agriculture. A series of agriculture stations was conceived, and the first, Indian Head near Regina, was established in 1890. The Saskatchewan Department of Agriculture was formed in 1905 and data were gathered. Mixed farming was hailed as the path to success. Settlement and essentially free land was aggressively promoted, such that by 1916 the human population in southwest Saskatchewan had nearly quadrupled in 10 years.

If competition from American ranchers who blatantly ignored Canadian range laws, and a decimating winter of 1906-07 was not enough, the ranching economy of the Palliser Triangle was dealt a final blow with the introduction of the Dominion Lands Act in 1908. This act encouraged farming by allocating extra land, beyond the 160 acres per farmstead as was customary, outside of the arid Palliser Triangle.

It soon became apparent that Palliser's doubts about the suitability of the plains to 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 by loss of organic matter that had been accumulated over 10,000 years and halved in 50 years.

⁹ If history repeats itself, what is today's equivalent to the prairie-settlement-panacea 100 years ago? Is it globalization?

The drought of 1918-22 was to be expected at some time as we now know (e.g. Nemanishen 1998), but it was different in that it lasted longer. By 1919, southwestern farmers were farming dust. The economic devastation and the personal pain to many families was enormous. While farmers paid limited attention to the advice by agricultural specialists during the exuberant settlement years, the hardship made them receptive to scientific knowledge. A 'Better Farming Conference' in Swift Current in 1920 lead to many extension activities, including a 'better farming train' which stopped frequently across the country for experts to deliver advice and answer questions. The Prairie Farm Rehabilitation Administration was conceived at this time and officially created in 1935.

In many ways, settlement of the prairies is not over, but it continues to this very day and beyond. When a new (economic) force came to bear, or when sustainability challenges had to be faced, practices were merely amended in reaction to what was in existence. Agricultural research and extension played an important role, as it does today. In the 1920s, summer fallowing was advocated by experts who reached local farmers via the 'better farming train.' Today, the mode of communication is pamphlets, TV and the internet.

In Potyondi's Chapter entitled "Lessons taught in vain," he concludes that "The more things change... The more they stay the same." One element of "same" relevant to the birds of Sandoff Lake may be the difficulty in accounting for broad (eco)systems-based limitations and the

forging of solutions that consider many system elements broadly and holistically. The 'creative tension' between the two strategies of adapting what works on the one hand, and starting fundamentally new, might be more often critically examined.¹⁰

5.3 Current land use.

Lands of the Lake Alma uplands and surrounding region were settled around 1910. Settlers were largely of Scandinavian and Finnish origin.

5.3.1 Farming. Currently, approximately 50% of the land is in crops, 15-25% is summerfallow, and the rest is grazing land (Fig. 3). Wheat is the primary crop grown ($\geq 50\%$), with oats, flaxseed and rye secondary. Wheat yields are among the lowest in the province. Sixty-five percent of farmers practice some kind of soil conservation tillage, and at least 25% zero tillage (Fung et al. 1999).

5.3.2 Ranching. There are apparently no large ranches where the majority of a landowner's livelihood comes from range cattle. The Lake Alma uplands were not part of the ranching

¹⁰ Einstein is quoted as saying "One shouldn't use the same kind of thinking that lead one into trouble, to try and get oneself out."

industry that was active farther west from the 1880s to 1920s. Still, cattle are raised on 16-21% of farms (Fung et al. 1999).

Although ranching is a more minor land use as compared to farming, ranching has a much greater potential for conservation than the prevailing 'factory-without-a-roof' style farming. Cattle held on farms may graze small parcels of land too steep to cultivate, spend their summers on range in community pastures, range over stubble fields after harvest picking up waste grain, or are 'finished' in feedlots prior to 'shipping.' Gayton (1991) estimated from 1986 statistics that less than 25% of cattle owners in Saskatchewan derived their primary income from cattle.

In general, and there are clearly exceptions, the contribution to biodiversity of native grasslands on farms is limited because the sites are highly fragmented. Also, when a family's main income is derived from grain production, attention is often diverted from the careful range management needed to sustain both the ranch and grassland life. For instance, fall and winter range 'rested' during the summer growing season provides cover for breeding birds requiring mid-high grass cover.

Gayton (1991) broadly analyzed range condition in Saskatchewan from a variety of agricultural statistics. This indirect approach was apparently necessary because the data recorded even for public lands are insufficient to properly analyze land use, grazing and range vegetation trends. According to this analysis, declining cattle and improved grain prices were linked to a

"massive conversion of native rangeland into annual cropland" in the late 1970s and early 1980s (Gayton 1991:107). When grain prices declined again in the late 1980s, more and larger-bodied breeds of cattle exerted increasing pressure on the remaining native and seeded grasslands. Given that native grasslands require an estimated 55 years to return to their original condition, some lands were re-seeded to satisfy more quickly some of the increased demand for grazing. Still, Gayton concluded that Saskatchewan rangelands were in a deteriorating condition at the time.

Currently, there is no single Public Lands policy for Saskatchewan. However, there are diverse attempts, especially in grasslands, to improve range condition on all public lands. The impetus comes from the recognition that range in good to excellent condition serves as 'drought proofing' for the periodic dry years that are an inevitable part of the ecosystem. Once destroyed, range takes decades to recover.

In a nearly 100-year-old tradition of agricultural extension in Saskatchewan, the Grazing and Pasture Technology Program is a joint government and industry funded program. Interestingly, this program has neither stick nor carrot to affect grazing strategies. According to Zoheir Abouguendia (pers. comm.), the most effective way to raise a producer's awareness is to have one producer talk to another producer, not 'expert' to producer. This strategy may be

fruitfully employed in 'community conservation' planning for IBA.¹¹

5.3.3 Oil and gas extraction. There are apparently limited gas reserves. The Lake Alma uplands lie at the edge of a major oil field located northeast of Sandoff Lake. One of the field's outlying reservoir lies under Sandoff Lake. Some pump jacks are scattered through the area.

5.3.4 Tourism.¹² There are apparently no tourist attractions, campgrounds or parks near Sandoff Lake.

5.4 Conservation management achieved at the site.

¹¹ In some sense, this may be happening in the Chaplin and Reed lakes IBAs (Appendix 3). Observing the involvement of the people of Chaplin and the surrounding community during a "Shorebird ecology and conservation workshop," it was evident that the people had 'bought into' the value of the birds. The enormous bird concentrations there and the international connections which the birds provided had clearly been noticed. This interest was bolstered by a vision to capitalize on the tourism potential which the birds help provide. If this ecological, social and economic tie can come to fruition, this will be noticed by other communities and will no doubt be a bonus for other community conservation efforts.

¹²"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 of \$2 billion annually." (Saskatoon Sun, 4 June 2000, p. 17).

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 The Migratory Birds Convention Act.

The Migratory Birds Convention Act (1917) was a pivotal legal instrument in favor of shorebirds by introducing year-round protection for many species, and regulated hunting and bag limits for others. At one time shorebirds were favorite game for market- and presumably also 'sustenance-hunters.' According to Alexander Wetmore (*in* Houston 1999), the Upland Sandpiper and Eskimo Curlew were still on the menu in upper class restaurants in Buenos Aires in 1921. The protection that had been afforded in North America by the Migratory Birds Convention Act was slow to reach countries in Central and South America, where shorebirds reside in winter. In Colombia for instance, the Upland Sandpiper gained protection by law only in 1940 (Houston 1999). In many cases, protection by law satisfied a formal requirement but hunting for sustenance continued, in some cases possibly to this day.

5.4.2 The Wildlife Habitat Protection Act is one conservation tool protecting 3.4 million acres of public lands. Sandoff Lake and the un-named lake to the south (Fig. 3) are designated as critical habitat under the Wildlife Habitat Protection Act (Anonymous 1997). By virtue of being designated as wildlife Habitat Land, this land is automatically included in the Representative Areas Network (2.1.4).

This Wildlife Habitat Land ensures that the land cannot be sold by the government, and prevents development detrimental to the wildlife identified. However, it does allow oil and natural gas extraction, electrical-, radio-, and telecommunication transmission lines, livestock grazing, haying, and cultivation where the land had been cultivated prior to inclusion in the 1970s or 1980s. According to Thornton et al. (1995), this designation offers only nominal protection, but at the time when the act was established the concern was that more far-reaching protection would not have passed cabinet.

Sandoff Lake and the un-named lake are designated as critical habitat under the Wildlife Habitat Protection Act to protect Piping Plovers (Anonymous 1997).

5.4.3 The Conservation Easements Act.

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."

5.4.4 Piping Plover Survey. Coordinated surveys to count Piping Plovers are carried out every 5 years throughout this species' breeding range in prairie and eastern Canada, and in the United States. This survey is one of the actions suggested in the revised Canadian piping plover recovery plan endorsed by the recovery team struck by RENEW (Committee for the Recovery of Nationally Endangered Wildlife in Canada, Environment Canada).

The first plan was approved in 1989 and an updated plan was approved in 2000. Surveys were completed in 1991 and 1996, with the next breeding season survey in 2001. A similar survey is undertaken on the plovers' wintering grounds.

5.4.5 Ducks Unlimited Canada has a long and active presence in the Missouri Coteau region, including to some degree the Lake Alma uplands.

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. 5.4.3) 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.

5.4.6 Saskatchewan Wetland Conservation Corporation (SWCC) is cooperating with towns, RMs and private landowners to promote the conservation of native prairie. SWCC also has riparian habitat restoration and demonstration projects in the wider region around Sandoff Lake (e.g. Huel 1998). SWCC's mission is "To lead and coordinate the province's wetland conservation initiatives to ensure the sustainability and biodiversity of the prairie environment for people and wildlife."

SWCC is delivering a program called "Linking communities, wetlands and migratory birds" in partnership with Wetlands International-The Americas. Two workshops have been held with many delegates representing different sites (Demoskoff 1999). SWCC also established a TransAmerica Migratory Bird Fund to facilitate research, land management and education (Demoskoff 1999).

6 Opportunities

If the birds in the IBA do not exist in isolation of the people, and *vice versa*, and if people and birds are not independent of the ecosystem, then the aim of this conservation plan will be well served by pointing out those circumstances which can help the combined cause of conservation and quality of human life.



6.1 Range Management.

Prairie conservationists are increasingly coming to accept that prairie ecosystem conservation and ranching have much in common (Schmutz 1994, Page 1997, van Tighem 2000). The kinds of benefits realized depend on the grazing management strategies employed and the degree to which landscapes are intact. Even though there are no large expanses of grassland in the immediate vicinity of Sandoff Lake, the grazing that is practiced there nonetheless represents an opportunity for limited conservation of grassland, soil, water quality and biodiversity.

From a biodiversity conservation prospective, a distinction deserves to be made between range and pastures. While 'fields' and 'pastures' can be terms used to denote fenced blocks of extensive rangeland, pastures when interspersed in cropland are ecologically different. Range, according to Jim Romo (pers. communication) are those areas of the earth that have not been cultivated because of climatic, soil or topographic limitations, but are a source of forage for wildlife and livestock, as well as water, minerals and esthetics. Range implies an expansive area where natural space-related ecological functions are able to operate. To conserve big space and the ecological functions in it, Rowe (1997) called for the protection of 'ecoscapes,' where habitat and ecological processes can function normally. Predation is an ecological process, as are dispersal, soil formation, water purification and so on. Wroe et al. (1981) define range management " ..as the art and science of planning and directing range use to obtain sustained maximum animal production, consistent with the perpetuation of natural resources."

Pastures, tend to be smaller patches of grassland interspersed in cropland (Fig. 3). Weed control can be a particular challenge here, because of the proximity of weed seed on the borders of cultivated lands. Especially if pastures are "improved" through re-seeding with Eurasian grass varieties, they support fewer species of birds (Wilson and Belcher 1989) and need periodic re-grassing to sustain cattle. The term "improved"

has its roots in farming and not ranching, and represents a value inappropriate in rangeland management. In recent years, the agricultural community has slowed its use of Eurasian grasses in favor of maintaining native range or using North American varieties in re-seeding. Locally adapted native grass varieties have some distinct advantages in the long term (Christian and Wilson 1999)

Examining the relationship between cattle grazing and biodiversity, Groskorth (1998) has

shown that plant biodiversity in the mixed grasslands of Saskatchewan peaked in the 'fair' to 'good' range categories (Fig. 4). This conclusion was corroborated by Bai et al. (1998) who examined sites in the mixed, moist mixed and aspen parkland ecoregions.

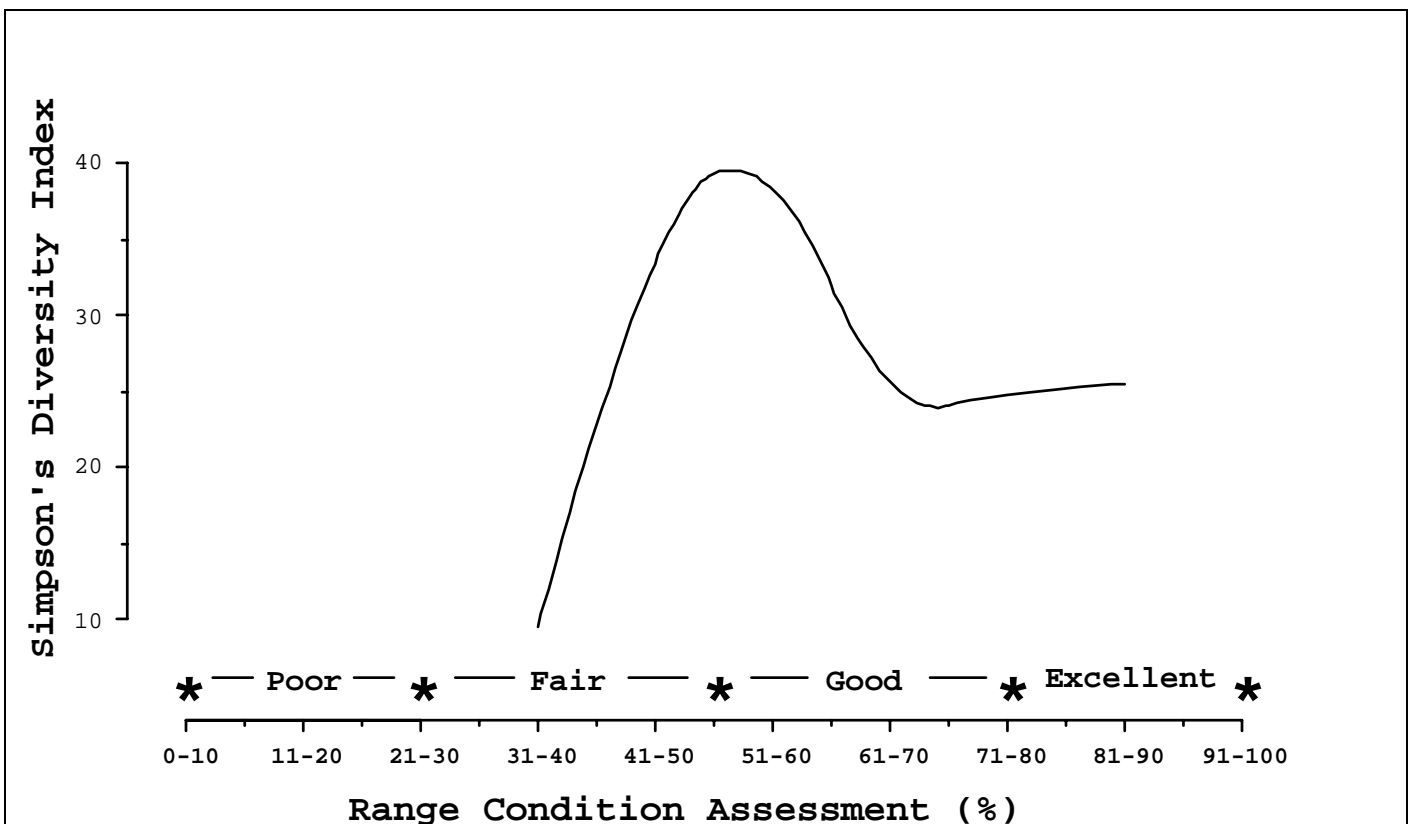


Figure 4. Species diversity estimates from study plots in the Saskatchewan mixed grass ecoregion are compared with a standard method in which range condition is assessed (Groskorth 1998). Although the two

methods measure communities differently, the data show a generally accepted trend of peak diversity under fair to good range condition.

Grassland ecosystems have evolved under the influence of grazers, from the large and once numerous bison to mice (voles) and grasshoppers. For this reason the link between grazing, biodiversity and ecosystem stability is not surprising. While the goals of range management are to maintain good-excellent range condition - to the right of the biodiversity peak - most pastures and range in practice include nearly the full spectrum of conditions. Despite attempts to achieve even grazing pressure, cattle will overuse some areas (near water, salt blocks or gates) and under-use others. This within-pasture-diversity in range condition is also fortuitous, because some species prefer slightly overgrazed sites (Horned Larks, Richardson's ground squirrels, grasshoppers), and others underutilized sites (mice and voles, Baird's Sparrow). The result is a complex and interdependent prairie ecosystem where human use is an integral part.

The criticisms that have been raised by some against beef 'producers' have been directed mostly at the feedlot segment of the long production chain from cow-calf operator to consumer. Feeding grain to cattle is highly inefficient and costly from an environmental point of view. The feedlot 'finishing' process could be much shorter than in prevailing practice. The grassland conservation opportunity arising from a well-managed traditional ranch is potentially enormous.

6.2 Crown lands.

The conservation of Crown grasslands is critical given how much grassland has been lost (Fig. 3). These grasslands represent a conservation opportunity in perpetuity. Here, land uses should be buffered from short-term market signals that could undermine grassland conservation. Crown-owned lands also represent an opportunity for incorporating societal benefits, such as biodiversity conservation, recreation, and land and water quality.

According to Gayton (1991), the exact area that remains of each of tall-, mixed-, and fescue grasslands and aspen parkland with fescue is unknown. Using Canadian Wheat Board statistics and adding acreage for provincial and PFRA community pastures, he estimated that approximately 11.3 million acres of native rangeland remain in Saskatchewan. This represents only 17% of the provinces original area of grassland.

Because most of Saskatchewan's extensive grasslands are Crown-owned, public land policy is highly relevant to grassland conservation. According to Thornton et al. (1995), "the Saskatchewan government, through Saskatchewan Rural Development [now Saskatchewan Agriculture and Food], owns and administers over 9 million acres (36,423 km²) of Crown land designated as 'agricultural.' Included in those 9 million acres are over 7 million acres of grazing

land. Saskatchewan Rural Development estimates that more than 95% of their grazing land are native range. The Prairie Farm Rehabilitation Administration holds title to over 1.3 million acres of Saskatchewan grazing land. They estimate that 80% of their titled acres remain as native rangeland." Together, they administer 68% of Saskatchewan's native grasslands. Saskatchewan's Wildlife Habitat Protection Act is one tool for protecting key public grasslands (Sect. 5.4.2, 2.1.1).

Various policies threaten the conservation-minded administration of Crown lands. Lands that are not Wildlife Habitat Land or otherwise restricted are for sale with the purpose to "improve the equity base for farm operation and agriculture in Saskatchewan" (Thornton et al. 1995). Range improvement assistance may, according to Thornton et al. (1995), reward mismanagement by encouraging overgrazing through the subsequently reduced lease rates. Another threat is the conversion of native range to tame pasture. Finally, when the government moved from a land tax based on the land's production capacity to one based on the land's market value, taxes on marginal lands increased out of proportion to other lands. This placed pressure on extensive ranchers to recover this extra cost somehow (Panel, Fifth Prairie Conservation and Endangered Species Conference, Saskatoon, 22 Feb. 1998).

Thornton et al. (1995) challenge that the "policy governing the management of federal and provincial grazing lands should be rewritten to

reflect the wider public rather than solely agricultural interests." The Saskatchewan Round Table on the Environment and Economy (1991:23) suggested that "Governments and agricultural producers must develop programs and policies to ensure the sustainable use of grazing resources" to

- "1. Develop management plans for all grazing lands to ensure sustainable use of grazing resources and to achieve multiple land use objectives;
2. Manage all remaining native rangelands to maintain Saskatchewan's biological diversity. Restore damaged areas to productive rangelands; and
3. Retain grazing policies and programs that support retention of native prairie ecosystems."

Saskatchewan Agriculture and Food has created a Crown Land Stakeholder's Forum with the mandate "To provide advice to the Department on agricultural Crown land policy development that helps promote the sustainable and integrated use of Crown land while providing opportunities for diversification and economic growth." This forum is to help draft a new policy to replace land lease legislation coined in the 1960s. The inaugural meeting was held on 9-10 February 2000, followed by a meeting on 12-13 April. The committee overseeing the forum is given a two-year period within which to review accomplishments and make recommendations.

6.3 Strategic cooperatives.

Bird watchers and the conservation minded public are growing in numbers (Sect. 1.1) and an opportunity may exist to enlist their help specifically for strategic conservation initiatives. Volunteer bird watchers already perform an important role in bird monitoring (Sect. 2.1.5).

Agricultural cooperatives exist in many forms, from machinery cooperatives to marketing cooperatives and to vertically integrated organizations. Recent conservation literature (e.g. Roberts et al. 1999) describes the notion of 'intentional communities.' One future option may be the formation of cooperatives uniting consumers and producers strategically around a product (food) that also has specific meaning (bird conservation in an IBA). Such cooperatives may be local in scope at first, but there is little reason to think they cannot unite people over considerable distances (e.g. suburban Vancouver or Montreal. A focus on food is appropriate, because agriculture is the dominant landscape modifier in Saskatchewan's IBAs. A focus on food is furthermore important because the recent trends to ever larger industrial farms threatens landscape diversity and thus birds.

7 Threats

7.1 Threats to Shorebirds away from Sandoff Lake.

If the primary factor limiting a population of shorebirds operates outside of the IBA, then local monitoring will reflect a decline but local conservation action will not lead to the hoped for recovery. Many species of shorebirds, including Piping Plovers, are facing population declines in North America. Sixteen species of shorebirds are on the decline, 1 is increasing, 15 remain unchanged and 15 have inadequate information to judge (Harrington 1999). In Canada, two thirds of the species of shorebirds show a downward trend (Dickson 1999). Threats that have been identified at a continental level include non-consumptive uses of shores by people leading to disturbances and energy losses by shorebirds, shore developments, shrimp farming, and coastal impoundment (Harrington 1999).

According to Sallaberry (1999), increasing tourism opportunities are encroaching on important shorebird staging areas in Chile, where this industry is unregulated. In another example, 90% of the coastal salt marsh acreage in the United States has been drained for mosquito management using ditches. In actuality, only about 5% of the drained area actually supported many mosquitoes. Changes are now in place to focus mosquito management more precisely. This represents an example of how knowledge of a

species' ecology can save time and effort, and also reduce harm to the environment, through cooperation and conservation (Harrington 1999).

Gonzales and Vega (1999) have outlined how runoff from chemical agriculture, the depletion of shorebird food from shrimp farming, lead shot used in hunting, and wildlife depletion through local consumption have impacted shorebirds along the coast of Sinaloa, Mexico. Sinaloa in particular and Mexico in general provide critical habitat to some short- and long-distance shorebird migrants. It has been estimated that one third of the shorebirds that winter in the Pacific coastal region of North America occur in two bays in Sinaloa. Here, industrial farming and aqua-culture have increased rapidly after the North American Free Trade Treaty was signed.

These big-picture scenarios illustrate threats potentially faced by the plovers and other shorebirds when they are away from Sandoff Lake. These threats are largely if not entirely out of local control.

7.2 A Complex of large and small wetlands.

The 22 species of shorebirds that migrate across the prairies to their northern nesting grounds concentrate in spectacular numbers at 18 sites across the prairies. However, countless small wetlands also support many shorebirds and

this is the case at Sandoff Lake. Combined, these modest spots may be of critical importance.

While the spectacular staging sites are critical for many migratory species, conservation should not stop there. Management strategies should complement the natural history of the species. For instance, long-distance migrating shorebirds stop and fatten at specific staging areas and then fly non-stop 2,000-3,000 km relying on the fat gained (Harrington 1999; Sect 4.2). Others, move in a broad front and make frequent stops to re-fuel. This broad-front and frequent-stops type of migration appears to be more prevalent on the Great Plains than along the east or west coastal migration routes (Skagen and Knopf 1993). Also, the species that exhibit this pattern tend to be smaller in size as they cannot store as much fat as larger-bodied shorebirds or fly as far without replenishing reserves, abundant small wetlands may be critical to their survival.

7.3 Wetland dynamics

While a local freshwater or saline pond is often discounted as 'just a slough,' the biodiversity and ecosystem dynamics that operate there are staggeringly complex. Figure 5 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.

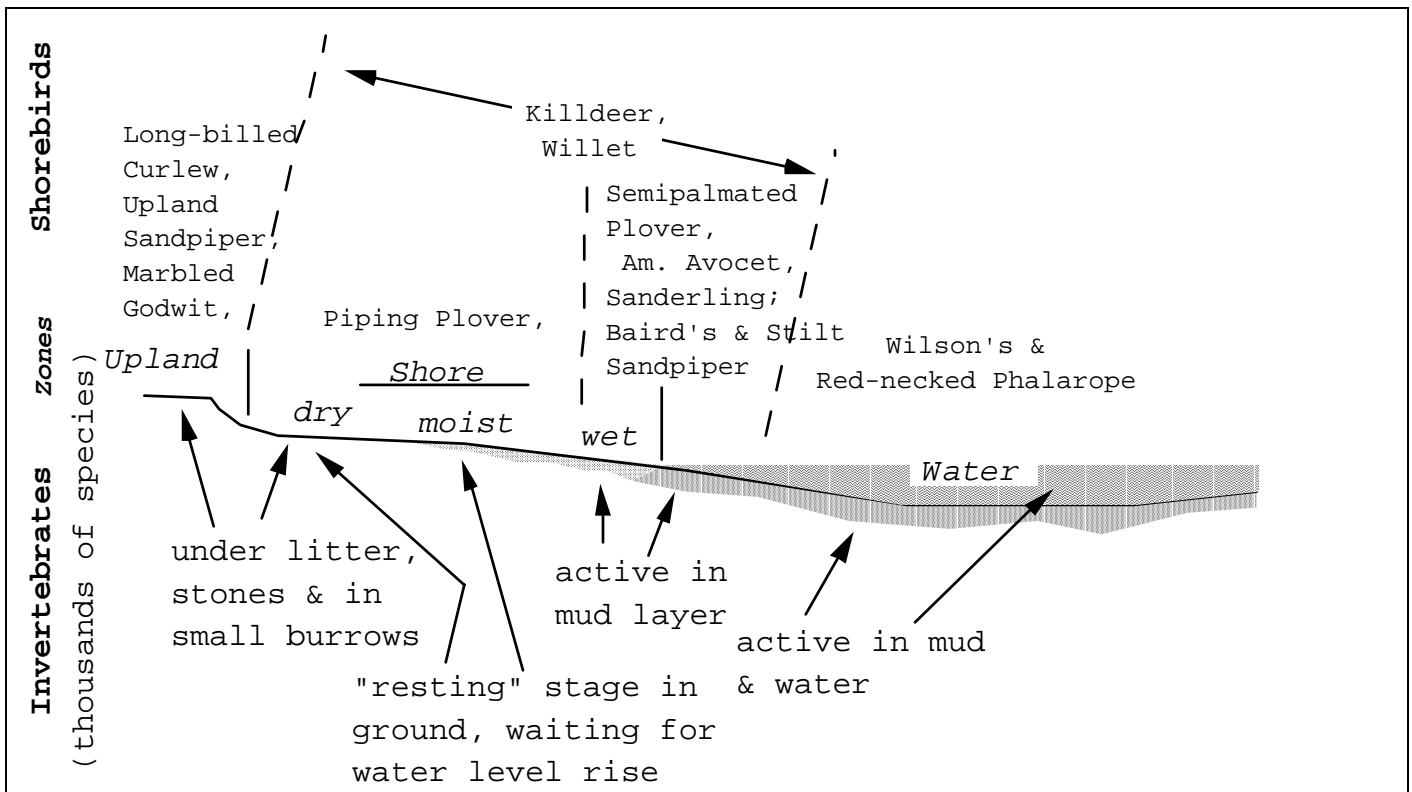


Figure 5. Zones and characteristics of a pond affect how and where invertebrates species live, and the degree to which these are available to different shorebirds with different feeding strategies.

Shorebirds occupy rather specific habitats along a shore, where diverse feeding strategies 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 or 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. Avocet¹³)

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

- spin-swimming (phalaropes 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). Thus, any change in the water dynamic of predictable flooding and drying eliminates some insects. Prolonged droughts as may be expected under climate change, or water manipulations that cause

during scything in this abrasive substrate and not retain its pincer-like feeding function.

prolonged droughts - or conversely prolonged floods - can be a threat.

Many insect resting stages die if they are exposed to the extreme and prolonged drying by the sun. Cultivating wetlands in their dry period exposes insects to the sun, as does trampling by cattle. A trampled shore also has an altered mud layer and also potentially reduces availability of insects to birds. Little is known about the ecology of those insects and this makes management and conservation difficult at best.

7.4 Water quantity and quality.

Although Piping Plovers rely largely on the dry band of the shore, in years when the lakes go dry there is reduced or no nesting. Conversely, flooding can destroy nests, but that is unlikely at Sandoff Lake. Appropriate water quality is important for birds, livestock and people (Coote and Gregorich 2000).

The water level at Sandoff Lake is clearly influenced by snowfall and melt water runoff. Heavy rains in spring and early summer could also contribute significantly at times. Given its saline nature, Sandoff Lake is likely also fed by ground water aquifers. The plovers' and migrant sandpipers' insect food is well adapted to the saltwater existence. Thus salt is unlikely to be a problem for insects or birds, but it could be for cattle (Appendix 4). The lake is surrounded by pasture land or by a fairly wide belt of vegetation that is likely effective in trapping most agrochemical runoff from surrounding fields.

In southern Saskatchewan, 44% of the land is treated with pesticides annually. 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).

7.5 Trampling by cattle.

Cattle gathering in large numbers on beaches can be detrimental to Piping Plovers. An even layer of moist soil attracts insects and allows the birds to probe for food in soft mud. Hoof impressions, however, alter the soil layers, creating ridges of dry soil interspersed with wet depressions. Also, when hoof prints are deep, recently hatched young can fall into them and eventually die (Richardson 1999). In some cases, management efforts have resorted to excluding cattle through selective fencing. This can also be disadvantageous by providing roosting sites for avian predators and altering vegetation structure with time. Perhaps the most effective scheme is to use herd management strategies to minimize impact, such as the timing of grazing, and the re-

location of salt blocks, rubbing posts and gates that are favorite cattle gathering sites.

Trampling by cattle at Sandoff Lake is a potential threat. Judging from a survey of the shores in August/September 2000, there are some shore areas where cattle gather (see Appendix 4).

prevent it from breeding. Sandoff Lake receives few visitors and this should not be a problem.

7.6 Predation.

Predation is clearly a natural process, but its balancing factors can be out of synchrony when ecosystems change. Sandoff Lake does not have persistent islands attractive to gulls for nesting, nor are there trees or shrubs that would attract crows, magpies or hawks. These predators are known to consume plover eggs or young. This open plain landscape should be maintained.

7.7 Accidents.

There is little threat from accidents at this site. A road passes close to the north end of the lake, but the likelihood of a chemical spill is probably low.

7.8 Disturbance.

Human and other disturbances can impact wildlife and cumulative impacts can be severe. The nature of the impact can be to interfere with an animal's natural escape from predators or the elements, to reduce an animals feeding time, or to

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). The purpose of this plan is to serve as a tool, by providing a description of ecosystem elements that are presumably critical for conserving the IBA birds, the IBA sites, the landscape and the people's quality of life. The plan also outlines some specific goals and actions.

To facilitate conservation of Sandoff Lake for Piping Plovers and other shorebirds, the lake and mud flat habitats, the riparian drainage system and the native pastures should be protected.

8.1 Management goals

Goal 1. Maintain the lake's ecological integrity including the native pasture perimeter.

Action 1. Encourage a strip of permanent grass cover around the lake as a buffer to reduce run-off and agrochemicals reaching the lake.

Action 2. Continue to support the Critical Wildlife Habitat designation of the lake and grassland near shores, and support the Lands Branch of Sk Agriculture and Food in their continued administration as a multiple use grazing lease, for cattle grazing and wildlife.

Goal 2. Minimize impact on the shore to sustain Piping Plover habitat.

Action 1. Work with landowners, lessees and Sask. Ag. & Food to manage cattle distribution and timing of grazing such that the shoreline remains intact and eggs or young plovers are not trampled (e.g. Appendix 4).

Goal 3. Be vigilant to potential changes at the site and the wider area and adapt management strategies based on research/monitoring results and bird or ecosystem trends.

8.2 Infrastructure goals

Goal 4. Provide infrastructure to facilitate herd management strategies that minimize trampling of shoreline, plover eggs and young (e.g. fencing, timing of grazing, salt block and water location; Appendix 4).

8.3 Educational goals

Goal 5. Provide schools with appropriate resource materials so that teachers can easily incorporate bird and lake ecology in their program.

Action 1: Invite teachers to workshops and other appropriate functions, and schedule these functions to allow teachers to participate.

Action 2: Produce lesson plans and/or provide teachers with other 'props' to facilitate teaching that is consistent with the conservation planning message entailed in this report and other similar initiatives.

Goal 6. Encourage where possible the sharing of information with local people on the Lake Alma upland to highlight the opportunities and threats to conservation.

Action 1. Offer to be present at a local social function to provide information on all facets of IBA conservation where desired.

Goal 7. Promote stewardship through education and encourage events, activities or tours that will attract people from diverse backgrounds (local community, ranchers/farmers, naturalist) thus promoting healthy exchanges of ideas and common goals.

8.4 Research and information needs

Goal 8. Continue to monitor plover numbers at Sandoff and nearby lakes and document the lake's use by migrant shorebirds.

Goal 9. Study the invertebrate communities at Sandoff Lake as a critical resource for shorebirds. Document which functional groups may drive community dynamics to better understand the invertebrate communities themselves, to provide a benchmark for future monitoring and possibly to anticipate changes related water dynamics (e.g. global warming) and other changes.

Goal 10. Test water for selected agrochemicals, and perhaps other substances.

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 are supporting 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 program moving, and continue 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 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 for this initiative.

For making IBA possible in Saskatchewan, we acknowledge the participation of our funding partners. Financial support for development of this plan has been provided by the Canadian Adaptation and Rural Development - 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 and Alan R. Smith.

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 people 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 the following people through providing input including a local perspective: Carol Bjorklund, Paul Goossen, Darlene Lund and Margaret Skeel. Gerry Beyersbergen, Cheri Gratto-Trevor and Dan Wood kindly provided photographs.

Darrel Cerkowniak, Sask. Land Resource Centre, Univ. of Sask., and Bill Sawchyn, Sask. Environment and Resource Management 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. 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 Sandoff Lake IBA. By letting their name appear here, these individuals have made no commitment beyond agreeing to be contacted when their participation is requested.

Kelly Ashworth, Ashworth Farms Ltd., Box 53, Ounger, SK, S0C 1Z0; 306-456-2749

Interests: Kelly and his family own grazing land southeast of Sandoff Lake.

Carol Bjorklund, 102--1833 Coteau Avenue, Weyburn, SK, S4H 2X3; Phone/Fax 306-842-8936 cmbb@sk.sympatico.ca

Interests: Carol is a member of Nature Saskatchewan, and an avid birder very familiar with the birds of the region.

Gregg Brewster, Ducks Unlimited Canada, Box 4465, 1606 4th Avenue, Regina, SK, S4P 3W7; 306-569-0424 g_brewster@ducks.ca

Interests: Gregg is a wetland and waterfowl biologist familiar with for the region.

J. Paul Goossen, Canadian Wildlife Service, 4999-98 Avenue, Edmonton, AB, T6B 2X3; 780-951-8679, paul.goossen@ec.gc.ca

Interests: Paul is a wildlife biologist and the chairperson for the Prairie Piping Plover Recovery Team.

Wayne C. Harris, Sask. Environment 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.

Wade Lund, Lake Alma, Saskatchewan, S0C 1M0

Interests: Wade is the lease holder at Sandoff Lake and the un-named lake to the south.

Margaret Skeel, Nature Saskatchewan, 1860 Lorne Street, Regina, SK, S4P 2L7; 306-780-9273 Fax 306-780-9263 mskeel@unibase.com

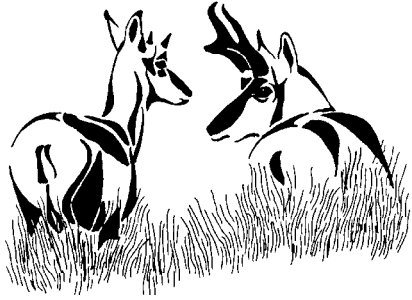
Interests: Margaret is the Program Coordinator for Nature Saskatchewan. In this role and with her strong interest in conservation, she helps deliver IBA-Saskatchewan.

Valerie Townsend-Fraser, Land Agrologist, Valerie, Saskatchewan Agriculture & Food, Weyburn, SK S4H 2Z9; 306-848-2378 VTownsend-Fraser@agr.gov.sk.ca

Interests: Valerie is the Land Agrologist for responsible for lands in the Sandoff Lake region.

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 is 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.unibase.com/~naturesk)

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.

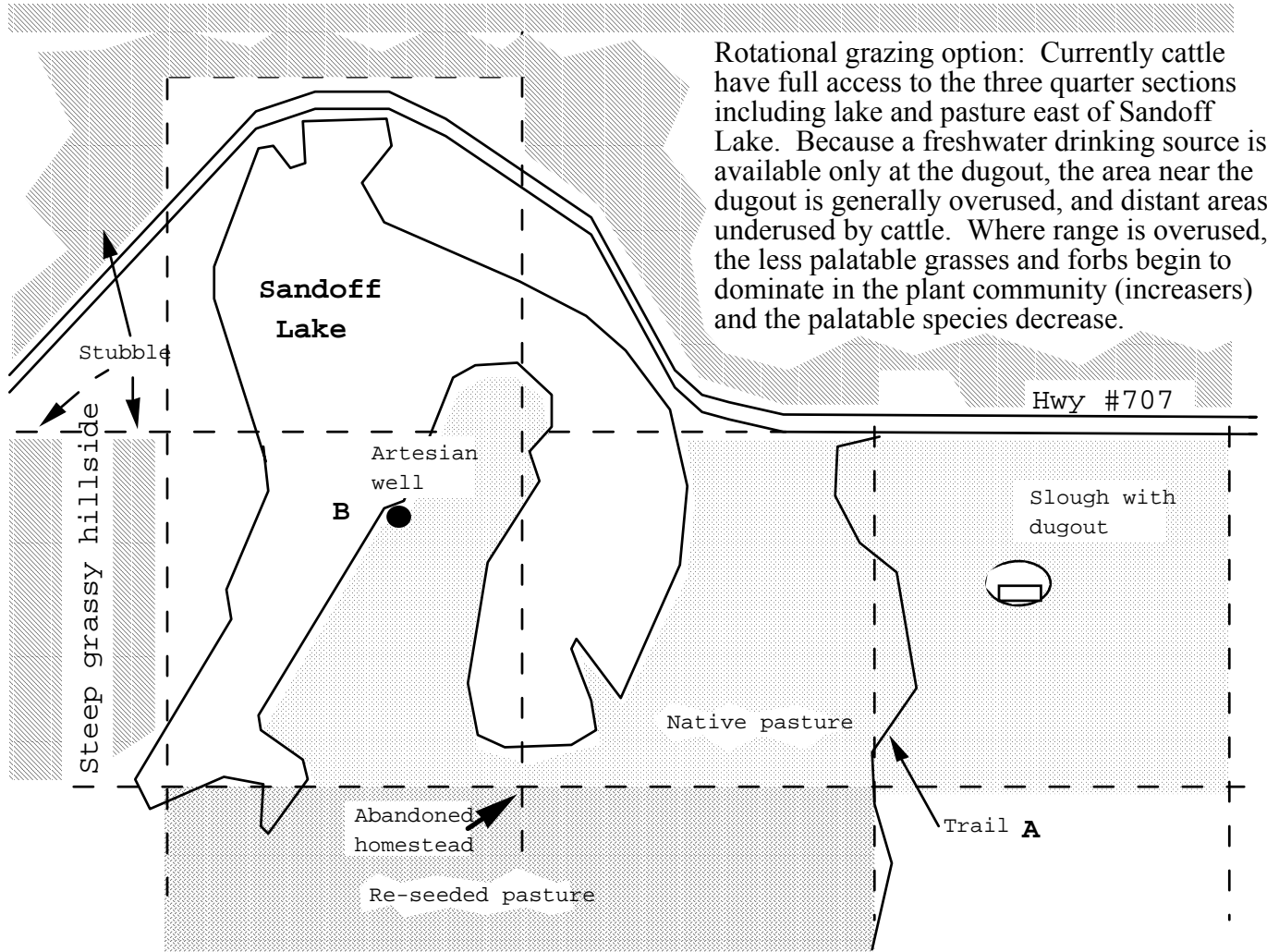
Research conducted or facilitated by Nature Saskatchewan is through support for monitoring at high priority sites and for threatened species. Nature Saskatchewan is conducting inventories of flora and fauna at its nature sanctuaries. The organization co-manages the Saskatchewan Conservation Data Centre 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. Proposed stewardship activities at Sandoff Lake. In view of the potential threat of cattle inadvertently trampling Plover nests or young, or making the shore otherwise unsuitable, The IBA program seeks to work closely with the lessee and Sask. Ag. & Food Crown lease program to manage cattle and Piping Plovers for their combined benefit. The layout of Sandoff lake, the surrounding pasture and cooperative management options are outlined below.



Rotational grazing¹ provides an attractive option for pasture management here. The pasture could be fenced down the middle, west of the trail (A). An alternative water source could be developed using the artesian well (B)² or electric fence in the shape of a V would low the cattle to use the dugout throughout.

¹Abouguendia, Zoheir and T. Dill. 1993. Grazing systems for rangelands in southern Saskatchewan. Grazing and Pasture Technology Program, Regina.

²Anonymous. 1999. The stockman's guide to range livestock watering from subsurface water sources. Prairie Agricultural Machinery Institute, Portage la Prairie, MB.

Cover: Piping Plover standing in front of Killdeer. Up to 20 species of shorebirds use Sandoff Lake at certain times of the year.

Top: Sandoff Lake on 20 October 2000

Bottom left: Seepage spring apparently provides water for most of the year. Yellow-green mats of algae are fed upon by bacteria, which in turn support terrestrial (e.g. brine flies) and aquatic insects. These insects are food for Piping Plovers and other shorebirds.

Bottom right: Trampling on the shore can destroy plover eggs and young. It also influences the shore's food chain. Algae and other decaying matter support abundant bacterial growth when wet. Broken algal mats and algal film dry out, removing food for brine flies and in turn for plovers.