

COMMUNITY CONSERVATION PLAN
for the
Cumberland Marshes Important Bird Areas

March 2001

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Executive Summary

This Community Conservation Plan for the Cumberland Marshes 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.

The Cumberland Marshes in east-central Saskatchewan to refer to a 4,600-km² lowland infused with many lakes and marshes, south of the Saskatchewan River and Cumberland Lake, east of 103 degrees longitude, west of the Manitoba boundary and north of Carrot River and Highway 55.

The Cumberland Marshes satisfy IBA criteria by virtue of having Tundra Swan, Mallard, Ring-necked Duck, Common Goldeneye, Redhead, and Canvasback use the area for breeding or on migration in "globally significant" numbers - at least 1% of global population size.

Promising conservation opportunities include the First Nations' culture and interdependence with the environment in the region, the land use plans and other conservation initiatives that are in place, Ecotourism and outfitting that relies on an ecologically intact landscape and the recognition of the ecological services the region provides.

Threats include the cumulative impacts of a series of small-scale developments, mineral

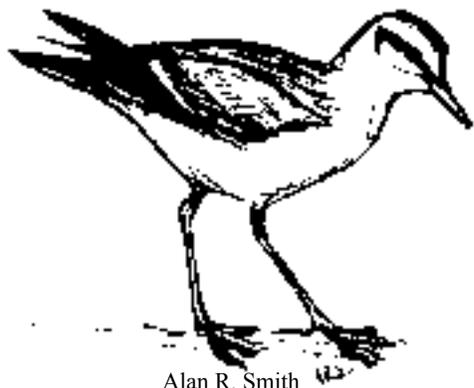
development, upstream water pollution, invasion of exotic species and diseases, accidents and disturbance.

This conservation plan draws attention to the importance of these marshes for birds, and discourages disruptions of the ecosystem. The plan recognizes that the marshes are most valuable in their ecological intact state and seeks to further encourage partnerships between the diverse stakeholders to protect this region in perpetuity.

Specific recommendations involve:

- monitoring of changes in local conditions
- co-operation to further encourage ecotourism and other non-invasive uses of the region for the benefit of local people
- education to highlight the value of birds and the ecosystem

The IBA Program was launched initially by BirdLife International in the UK. Today there are BirdLife Partners in over 100 countries. In Canada the national partners are the Canadian Nature Federation and Bird Studies Canada. In Saskatchewan, the conservation component of this program is being delivered by Nature Saskatchewan. Funding partners of the Community Conservation Plan for Chaplin, Old Wives and Reed lakes 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 for stakeholders to join together
in the protection of ecological integrity, and
biological and cultural diversity in the
Cumberland Marsh IBA**

1. Introduction

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

in addition to species and systems concerns, the conservation efforts will come 'full circle' and have gone well beyond the birds.

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

- i) explaining why the Cumberland Marshes are 'important;'
- ii) describing the marshes' ecosystems of which the birds are a part;
- iii) reviewing literature, considering what is known but also speculating on what is not known;
- iv) anticipating opportunities and concerns across as many elements of the natural system as possible; and
- 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 (www.ec.gc.ca/nature). These data signal a change in values by which we rank the worth of humans vs. 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.

1.2 Possible approaches to bird protection

Given the critical role which the Cumberland Marshes (Fig. 1) play for so many waterfowl, the marshes' ability to provide this function should be protected for bird and biodiversity conservation. The birds' use of the area is not an accident. Currently, the lakes provide breeding, roosting and feeding opportunities for waterfowl. Effective conservation will require ecological monitoring of potential changes.

The IBA planning process should be sensitive to the complex socio-economic forces

and could enhance bird-people coexistence, in three 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 finding alternatives where needed 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. Toward this end, the IBA process should enhance or protect an environment which by being healthy for birds will also protect the health of people.

Effective solutions for conservation should include all elements of the system, and in particular 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

Fig. 1

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 agreements such as the Biodiversity Convention (Anonymous 1995) and many others (Sect. 1.3).

1.3 Existing conservation measures

The ecosystems and birds of the Cumberland Marshes owe their persistence in large measure to their own ingenuity but also to past conservation values among people. In an inclusive sense, the way we as a society relate to our natural life support system is the combined result of personal values, laws, policies and traditions. The EuroCanadian tradition tends more toward controlling nature on the one hand and casting laws to protect it for our common good on the other. The aboriginal tradition tends to be gentler, without the sharp boundaries between individualism and statutory laws, and with less of an 'us vs. it' dichotomy.

Some of the major practices and initiatives that relate in a general way to the IBA program are outlined below. Specific local initiatives are mentioned in Section 6.4.

1.3.1 Aboriginal culture and tradition.

Saskatchewan is home to five distinct aboriginal cultures: Cree, Saulteaux, Dene, Assinaboine and Dakota/Lakota/Nakota (Appendix 5). In addition, there are various cultural blends exhibited by Métis and non-status Indians.

In his three-part CBC Ideas series entitled "Men and animals: Building a new relationship with nature," and his subsequent book, Herscovici (1984) describes in detail Cree cultural traditions, the philosophical roots of our current ecological crisis, and the emerging animal rights movement.

Herscovici's main sources on Cree culture were Thomas Coon and other members of the Grand Council of the Cree in Val d'Or, Quebec.

In his chapter, entitled the world of the Cree hunter, Herscovici (1984) describes a kind of reciprocity which unites animal and human domains in the sense that "...if you mistreat animals in the same way that you mistreat people, or if you mistreat animals in various ways, you're bound to provoke some kind of reaction which will not be in your own interest" (p. 57).¹

Many North American Indians derive guidance from myths - they do not believe, as Western society seems to teach, that nature is restricted to that which is observable. To Indian peoples, nature has a spiritual dimension. Herscovici (1984) writes "Hunters are united with their animals through the mystery of death: Killing animals reminds you not only of animal death but of your own death, and forces you to confront the fact of your own death. In Cree religion, our waking lives are not all reality. The realm of dreams and of life beyond death are equally a part of our

¹ My own EuroCanadian mind makes a parallel not so much to the animal, as to the ecological system. A Toronto infectious disease specialist discussing the recent Walkerton *E. coli* poisoning and resulting death of seven people concluded that "...things you can't see, can hurt you." A sense of reciprocity and need for respect is also inherent in the Deep Ecology movement. This movement invites a new psychology of self in which humans exist within nature and not above it; and our duty is to maintain the integrity of the ecosphere, not to be above it. The prevailing environmentalist ethos, which deep ecologists debate most directly, is that of Green Politics which assumes that science can know all of the ecological connections necessary for sustainability, that it is only a matter of imposing the right regulations and laws. Practice tells us that even if we could know these connections and impacts, our recognition of them tends to be one step behind the problem, and solutions at least two steps behind.

reality and experience, and the reciprocity between hunters and animals occurs across that threshold of death" (p. 61).

In the final paragraphs of the chapter (p. 66-67), Herscovici concludes:

"So, we find that reciprocity in the human community is intimately linked to an attitude of reciprocity between people and nature, and maybe there is a lesson in that for modern society in which we seem to have terrible environmental problems. We seem to have a lack of respect and understanding about nature, leading us into various kinds of problems. And perhaps those problems would be less severe if the relationship between people in our society were better and less exploitative, and more in a spirit of reciprocity. Perhaps that's one of the things that traditional hunting societies have to teach us.....

Today it is native groups who are fighting the hardest to defend the land from further devastation by hydroelectric dams, gas and oil pipelines, mines and their inevitable camp followers of roads, boom-and-bust towns, all-terrain vehicles and a population with little commitment to the land.....

Many in the ecology movement express admiration for the holistic spirit of the Indian view of nature, and it seemed for a time that the environmental movement might give us one last chance to profit from the ecological wisdom of Indian society: Maybe North America could become the setting for a fruitful marriage of European and Indian traditions."

1.3.1.1 Traditional Knowledge. A discussion of knowledge is relevant here because unquestionably believing ones proposition can lead to arrogance (e.g. Weeks and Packard 1997),

and aboriginal people tend to draw on their own unique traditional knowledge.

Traditional knowledge is "...a cumulative body of knowledge and beliefs, handed through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment" (Corsiglia and Snively 1997:22). Local knowledge may or may not include traditional knowledge, and is derived from unstructured and perhaps casual observations.

According to Fenge (1997), "Interest in traditional ecological knowledge has mushroomed in the last ten years. Academics now teach courses on it; the Government of the Northwest Territories has a policy on how it should be considered and used."

The 1987 Report of the World Commission on Environment and Development, as restated in the Canadian Biodiversity Strategy (Sect. 1.3.3), urges governments to "respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biodiversity."

Fenge (1997) provides an example where traditional knowledge was rejected as invalid in environmental assessment of resource development projects in Canada's North. The criticism was that traditional ecological knowledge has a spiritual foundation and its acceptance would lead to incorrect conclusions.

In Western culture, the scientific mindset is so prevalent that it is not only uncritically

accepted but also misunderstood. Science is clearly very important to humanity today, in both a practical and intellectual sense. However, when it is held that science is the only appropriate world view² - scientism - then science is intended to replace other ways of knowing rather than complement these.

Scientists, by and large, are not adequately trained in the foundations of different types of knowledge, including their own. They may know aspects of their discipline in detail but are unable to envision how conclusions in their discipline appear when viewed from outside the discipline. As a result scientists often make knowledge-chauvinistic assertions without realizing it. The belief in the value of science is often so strong and exclusive of other ways of knowing, that being unscientific is very nearly an insult.

To deduce knowledge exclusively from the logical observation of recordable events and objects is a fundamental notion in science. This notion apparently originated in Greek society over 2300 years ago. Once 'science' was transplanted to Europe, the natural philosophers in the Middle Ages came into conflict with the Church, and their survival pact with the clergy was to limit 'scientific' explanations even further to the observable, excluding therefore any reference to the spiritual. This historical accident, it is argued, is the reason why scientists shun

² For example, many well-trained (but perhaps not well-educated) scientists feel that the pros and cons of biotechnology today should be decided by molecular biologists, with, perhaps, and ethicist thrown in for good measure. This view is clearly inappropriate.

spiritual aspects still today. In the pre-industrial age, (scientific) knowledge came to be equated with power (Bauer 1992, Moore 1993).

The scientific approach became founded in reductionism, an attempt to make the observable system ever simpler and thus more easily studied. Wilson (1992:37) states: "Both theory and

experimental analysis in science are predicated on the assumption - the trust, the faith - that complex systems can be cleaved into simpler systems. And so the search proceeds relentlessly for natural units until, like the true grail, they are found and all rejoice."

But he concludes that "Scientific fame awaits those who discover the lines of fracture and the process by which lesser natural units are joined to create larger units.

Retreating to the observable and studying events primarily in their isolated detail are the core of a conflict in conservation. Extreme reductionism prevents a person from knowing or making decisions about the 'big picture.' Recently, the pendulum of reductionism which reached its peak swing perhaps in the 1950 and 1960s, is starting to swing back. Complexity theory, chaos theory, ecosystem management, and landscape ecology are recent attempts to turn the tide and come to grips with the big picture.

How can a reductionist scientist truly know the staggeringly complicated connection between a chemical released somewhere in the Saskatchewan River watershed and its full impact on fish, fish eating animals and people at Cumberland Lake? How can a scientist construct a study that shows an iron-clad and observable connection between a dam and declining sturgeon

populations downstream? These questions are difficult at best, if not impossible to answer. Many good conservation initiatives have been stalled by calls for more scientific information.

Science provides a very powerful way of knowing about simple systems, but it cannot be the only way of knowing about ecosystems. Science should not be the only guide to decide what are the proper actions for humans vis-à-vis the environment. A healthy dose of respect for natural systems would be prudent.

Because of the limited power of any single body of knowledge, some conservationists have called for a fundamental overhaul of the human-nature relationship (Merchant 1992). Deep Ecologists believe that all beings have intrinsic worth apart for their usefulness to humans (Angus 1997). Deep Ecologists have borrowed much of their inspiration from aboriginal cultural views. Understanding and wisdom does not rest with any way of knowing *per se*, but with the way in which this knowledge is applied.

Cartoon here

*Are you sure about this, Stan? It seems odd that
a pointy head and a long beak is what makes them
fly!*

1.3.2 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* and introduced the Representative Areas Network program (Sect. 1.3.4).

1.3.3 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, crop production, soil building/conservation) 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).

1.3.4 Saskatchewan's Representative Areas Network. Text in this section was provided by Nancy Cherney, Fish and Wildlife Branch, Saskatchewan Environment and Resource Management (see also Sect. 6.4.2).

Saskatchewan has established a network of ecologically important land and water areas across the province, through a system called the Representative Areas Network. 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 Representative Areas Network is to protect biodiversity - the richness and variety of life - by selecting and designating areas representative of Saskatchewan's natural ecological diversity. An objective and consistent method for assessing this diversity was developed to guide representative area identification. Notably, an enduring features approach to define the range of diversity in Saskatchewan was selected. Enduring features, such as specific rock, soil and land form patterns, are considered to be very stable over long periods of time and are likely to contain characteristic plant and animal communities. Classifying the province into different enduring feature groupings and measuring the level of protection already

afforded to specific landscape types (and associated plant and animal communities) highlighted deficiencies in terms of protection. Landscape types with little or no protection were rated a high priority for action in the Representative Areas Network.

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.

1.3.5 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.

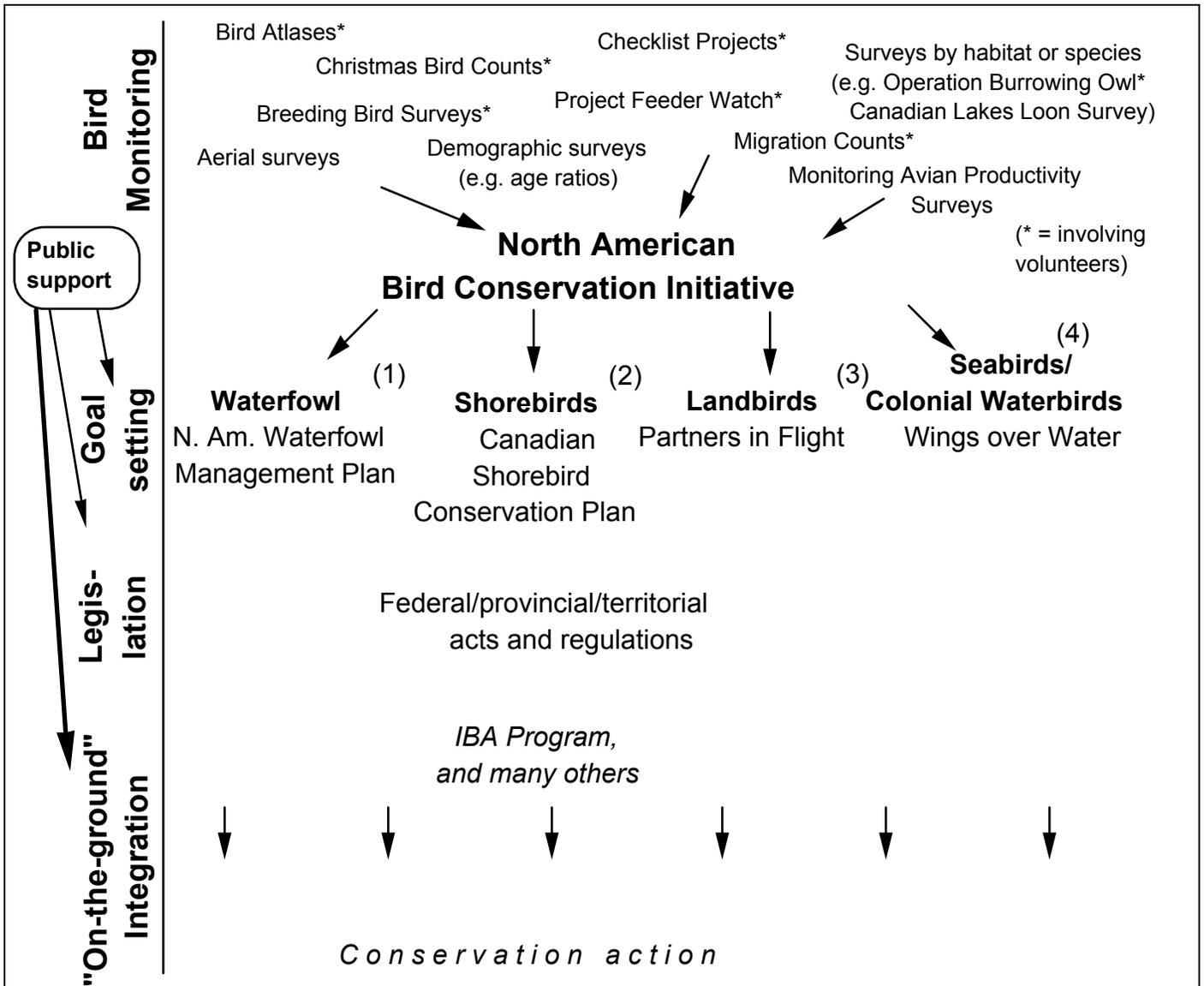


Figure 2. A schematic diagram to show the relationships among bird conservation plans and strategies. Combined with monitoring strategies, these plans are intended to lead to meaningful action. References: (1) North American Waterfowl Management Plan Committee 1998, (2) Anonymous. 1999, (3) Canadian Landbird Conservation Working Group 1996, (4) in preparation.

1.3.6 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, Important Bird Areas), 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 sites 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. 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). 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.

2.1 IBA Saskatchewan

Nature Saskatchewan is working with the Canadian Nature Federation and Bird Studies Canada to deliver the conservation planning component of this program in Saskatchewan. The conservation planning component of IBA Saskatchewan was launched on 1 February 1999, after site assessment was well under way. During the two year planning phase, 13 sites will be selected (Appendix 3) and plans will be completed by March 2001.³

³ About the author: Joe Schmutz was raised on a farm in southern Germany and immigrated to Canada as a teenager, hoping to experience abundant wildlife and wild places. He is internationally known for his research and conservation of prairie birds of prey and participated in a nationally sponsored interdisciplinary ecosystem and community-based research program. He was contracted by Nature Saskatchewan as IBA Community Conservation Planner.

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), 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.



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.

3 IBA Site Information

We use the term Cumberland⁴ Marshes in east-central Saskatchewan to refer to a 4,600-km² lowland infused with many lakes and marshes, south of the Saskatchewan River and Cumberland Lake, east of 103° longitude, west of the Manitoba boundary and north of Carrot River and Highway 55. The region lies in the Boreal Plains ecozone, the Mid-boreal Lowlands ecoregion and the Upper Saskatchewan Delta habitat subregion (#20.05; Poston et al. 1990).

The Cumberland Marshes extend up to the First Prairie Step, a series of uplifted plateaus with increasing elevation toward the Rocky Mountains.⁵ Bedrock is of Silurian to early Cretaceous origin. The landscape consists of a plain where glaciers retreated 11,000 years ago and current landforms resulted from modification by wind and water. Elevation at 200-300 m is among the lowest in Saskatchewan. South of the Carrot River lie the Pasquia Hills, reaching an elevation of 800 m above sea level (Fung et al. 1999).

The climate is categorized as subarctic, dry-subhumid, with a mean of -21° C in January and 17° C in July. Vegetation is characteristic

⁴ Named for Prince Rupert, Duke of Cumberland (Barry 1998).

⁵ The Missouri Coteau is the Second Step.

"...of the southern boreal forest with sedge fen⁶ and mixed wood of Balsam Poplar, Quaking Aspen and White Spruce. Because of the waterlogged soil in many areas, forest cover is relegated to well-drained sites and these are widely dispersed and difficult to reach. The plain is intricately bisected with levees, which are created by the numerous river channels which deposit the sedimentary material they carried from the higher elevation and faster flowing river segments farther west. These levees rise abruptly at river's edge and slope gently away. After a flood recedes, these ridged levees become dry and thus can support some of the most productive forest spots in the region. From a commercial timber point of view, the region is classified as non-timber producing land" (Fung et al. 1999).

There are at least seven named lakes, and two of which are considered salt lakes. The salty condition is natural and caused primarily by sodium, calcium and manganese ions. In Birchbark and Goose lakes, these salt particles comprise 4 and 29 parts per thousand, respectively. Water is considered fresh when it holds 0.5 or fewer salt parts per thousand (Hammer 1978).

Fishing for domestic use was common in Cumberland Lake for Mulletts, Pickerel, Pike and Whitefish (Fung et al. 1999) and still is to some

⁶ Fens are waterlogged areas where the coarse, grass-like sedges grow on peat. Peat is created by an accumulation of dead plants when plant growth exceeds decomposition. Decomposition is slow because of a shortage of air in the water soaked land. Marshes tend to be on higher ground or in well-aerated basins, and support sedges, cattails and grasses.

extent today. There is considerable concern for the Sturgeon population downstream of the E.B. Campbell Hydroelectric station, located 25 km upstream of the NW border of the IBA (Fig. 1). Such impacts, although perhaps not unequivocally linked to the dam (e.g. Sect 1.3.1.1) are not unexpected. When river flow is managed, periodically released and then held back again in short intervals, there are impacts. Stream flow may be suitable for breeding fish at one time, only to be converted to a dry stream border within hours.⁷

⁷ Several items of local knowledge (Sect. 1.3.1.1) were revealed to me at different times:

- 1) Typical escape behaviour by moose when pursued by wolves is to flee to a stream. A moose can effectively defend itself from several wolves while standing in water. Stream channels go unexpectedly (for the moose) dry when water is held back.
- 2) Beaver try not to be far from the safety of water while feeding. In the flat landscape of the Cumberland Marshes, a moderate amount of water held back can make fairly large areas go dry, making beaver more vulnerable to coyotes and wolves.
- 3) Decades ago, during the childhood of some residents, flood waters receded gradually through a summer season. The exposed flat harbored many shorebirds, a sight now rare in the managed waters of the region.

4 IBA species information

The Cumberland Marshes or Upper Saskatchewan Delta are ranked by Poston et al. (1990) as 'nationally' important for migratory birds, 'regionally' important for breeding ducks, 'nationally' important for moulting ducks and ducks short-stopping and replenishing energy on migration, 'locally' important for breeding and migrating geese, and 'regionally' important for summer concentrations of colonial waterbirds.

The species prominently represented and qualifying under the IBA criteria are shown in Table 1.

Table 1. Estimated numbers of birds that frequent the Cumberland Marshes IBA at different times of the year.

Species	Estimated #s	Season
<u>Globally significant</u>		
Tundra Swan	5,000	Fall migr.
Mallard	200,000	Fall migr.
Ring-necked Duck	72,000	Breeding
Common Goldeneye	14,000	Breeding
Redhead	36,000	Breeding
Canvasback	30,000	Breeding
<u>Nationally significant</u>		
Gadwall	19,000	Breeding
<u>Other species</u>		
Black Tern	>200	Non-breed.

In the past, the Cumberland Marshes were a common nesting ground for the now extinct Passenger Pigeon (Houston 1972). Also, a specimen of the recently extinct Eskimo Curlew

was collected at Cumberland House in 1819 (Smith 1996).

4.1 Natural history of IBA species

Bird surveys done in the 1970s strongly suggest that the Cumberland Marshes are important for breeding and migrating waterfowl. An early written record of common birds in the area was provided by Dirschl and Goodman (1967)

4.1.1 Tundra Swan. The Tundra Swan (*Cygnus columbianus*), formerly Whistling Swan, is one of two native and one feral swans in North America. Adult Tundra Swans show a yellow spot below the eye and have a concave upper border of the black bill and white head. Trumpeter Swans lack the yellow lore and have a wedge-shaped head. The feral Mute Swan holds its neck more curved than the two natives, and has an orange bill with a black base and black knob. The natural history of the Tundra Swan has been reviewed by Limpert and Earnest (1994), used as a source here.

The current breeding range of the Tundra Swan includes lakes, ponds and river deltas across the northern tundra, from the Aleutian Islands of Alaska to Quebec. In winter, the swans occupy disjunct areas. Swans breeding along the western

coast of Alaska winter along the Pacific Coast and some distance inland from Vancouver Island to central California. In addition, the swans winter inland far from the coast in British Columbia, and the Rocky Mountain states. The northern Alaskan and all of the Canadian breeders winter in a short coastal stretch including the Chesapeake Bay area, from New Jersey to South Carolina.

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

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

Populations of Tundra Swans are tracked through annual mid-winter surveys. An average

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

A moderate mortality other than through shooting was attributed to ingestion of lead shot and lead fishing sinkers. The greatest threats to Tundra Swans now come from oil and gas extraction in the Arctic, and a continuing loss of wetland stopover sites.

There is one record from Stony Lake (western parkland) of a pair of Tundra Swans breeding in Saskatchewan, from 1973-80 (Smith 1996). Most swans of the eastern population migrate through Saskatchewan, and as many as 20,000 individuals have stopped at one lake (Smith 1996).

4.1.2 Mallard. The Mallard (*Anas platyrhynchos*) can be found throughout the Northern Hemisphere from North America to Asia (Bellrose 1976). The wild mallard is apparently the ancestor for many races of domestic ducks.

The Mallard's biology as it relates to management is summarized by Bellrose (1976). The drake Mallard is distinguished by the green head, brown chest, violet-blue speculum (inner wing patch) and white outer tail feathers. The hen, having traded - in a biological sense - a colorful appearance for mottled-brown concealing coloration, can be distinguished in flight by her violet-blue wing patch surrounded by white.

In North America, Mallards breed from Alaska through the Canadian Subarctic to the maritime provinces and states, south to northern Texas and California. This wide distribution understates the importance of the species core breeding range in the Canadian prairies and parklands, and parts of North Dakota.

Mallards are highly adaptable, feeding on a great variety of plants in the habitats which this versatile duck occupies. Mallards, more than any other duck, have been able to make use of agricultural fields for feeding. Mallards are among the earliest migrants arriving on their breeding grounds in early April. Nests can be located in diverse habitats often far from water, the primary requirement being dense vegetation about 50 cm tall.

An average of nine eggs are laid one per day, and incubated by the female for 25 days. Only about 50% of the eggs survive to hatching, mortality being primarily due to bird and mammal predators among many other factors.

Males leave the incubating females' home range about mid-May, moving to larger lakes and marshes where they become flightless during moult. The grown and flying young and hens gravitate to these marshes by September.

4.1.3 Ring-necked Duck. This 500-900 g duck (*Aythya collaris*), occurs only in North America. Aspects of its natural history are summarized by Hohman and Eberhardt (1998), and used as a source here.

In the field, the dark (black) back and grayish-white sides make ring-necked drakes resemble two ecologically similar species, Greater and Lesser Scaup. The female can be distinguished from scaup females by the ring-neck's narrow, white eye-ring. Both drake and hen have a white ring near the tip of their bill.

Ring-necked Ducks nest across the continent from the aspen parkland northward in the boreal forest and forest-tundra edge. They winter in a broad band across the continent including southern British Columbia, sloping southward to include only the southern Great Plains and Mid-West States, New England states and south to include islands of the Caribbean and most of Mexico.

Ring-necked Ducks breed in freshwater wetlands especially marshes, fens and bogs that are shallow (<1.5 m) but with stable water levels.

Nests are constructed in flooded or floating vegetation emerging above the water surface, and usually within 200 m of open water where adults and young feed. The ducks seem to use similar habitats after breeding, but the sites used during moulting are not well known.

Foods taken include moist soil from which the ducks extract organic matter and small animals and plants, larger water plants, seeds, tubers and larger animals without backbones. Ring-necks take shallow dives but also dabble by tipping their body. Food can be swallowed during a dive or is carried up and then devoured.

Pair bonds form during migration in March-April and are maintained until incubation begins in June. An average nine-egg clutch is incubated for 26 days. After hatching, hen and young leave the nest, only sometimes returning there to brood young. The female takes its young to suitable feeding areas and most stay with their young until these are able to fly at about 50 days of age.

Estimates suggest that most ring-necks are hunted in the United States with an estimated bagging of 384,000 ring-necks. More than 50% of these are harvested in the Mississippi flyway with the remainder in the Atlantic (25%), Central (10%), and Pacific (<10%) flyways. Hunting in Canada amounted to 109,000 ducks with 56% shot in Ontario, 19% in Quebec, 8% in Manitoba and 7% in Newfoundland; with the remaining provinces accounting for less than 5% of the harvest.

Mortality sources other than hunting for adult ducks studied in Maine include incidental capture from muskrat trapping in spring, reported in Maine. Ingestion of contaminants is low in comparison to prairie nesting ducks, but this factor increases on migration. Collision with powerlines in Maine accounted on average for 2 of 31 deaths. Drowning in fishing nets has been documented in Illinois and Louisiana. Ring-necks were severely impacted by use of lead shot which they ingest more frequently than most other ducks. Of 24 ducks collected and analyzed on the Mississippi River, 17 had elevated levels of lead in their blood. In Nova Scotia and Prince Edward Island, 9% of the ducks tested had blood lead levels ≥ 0.2 parts per million. Although lead shot was banned for hunting waterfowl in the United States and Canada, the buried pellets will remain a problem for some time.

4.1.4 Common Goldeneye The Common Goldeneye (*Bucephala clangula*) is a compact 700-1,400 g sea duck, also called, 'butterball,' or 'whistler' owing to its fast flight and rapid wing beat that can be heard at good distances (Bellrose 1976). Males have white underparts, a green, round head and a round white spot before the eyes. Females are gray below, and have a green, round head.

According to Bellrose (1976), Common Goldeneyes nest in Canada's Aspen Parkland,

Boreal Forest and Eastern Deciduous Forest. These 'footballs-of-the-air' winter on both coasts with isolated individuals remaining inland where water stays open. Unlike the Ring-necked Duck, Canvasback or Redhead - collectively called bay ducks - which take shallow dives, the Common Goldeneye is a deep diver. Since it is difficult to defend feeding space deep under water, the goldeneyes defend no territory except for space around themselves. They often move in small compact flocks of 6-12 ducks.

Drakes and hens pair before arriving on their breeding ground in March-April. After incubation is underway, males depart like many other ducks do, to favourite lakes to moult. Common Goldeneyes nest in natural cavities and nest boxes. Nine eggs on average are laid in May. Ducklings remain in the nest cavity for 1-2 days and then jump or flutter to the ground when called by the hen. The hen then leads young to water, which can be over 1 km away.

Of 395 gizzards examined in the 1930s, 74% of foods were animal and the remainder plant matter. Of the animals, 36% were crabs, crayfish and amphipods, 28% aquatic insects, 10% mussels and snails and 3% fish.

4.1.5 Redhead The Redhead (*Aythya americana*) weighs 700-1,400 g (Bellrose 1976). The drab brown coloured female and the red head, dark breast, gray back and gray sides of the male

resemble a Canvasback. However, the Redhead's rounded head and lack of a wedge-shaped head and bill are distinctive.

Redheads, like Canvasbacks, breed on the northern prairie-parkland fringe of the Great Plains, with minor breeding areas in eastern Canada, the Rocky Mountain Interior and as far as Alaska. Redheads go south or east on migration to winter along the West Coast, the East Coast and Gulf of Mexico.

Redheads arrive in Canada in early April. Some pairing occurs on migration but most occurs on the breeding areas. Average estimates of clutch size range from 9-11 eggs. Nests can be in emergent vegetation of large marshes or near shores or on islands of large prairie ponds. Redheads are considered parasitic because some females lay their eggs in nests of others.

For some reason, Redheads are prone to deserting their clutch, which contributes to nest losses occurring from predation. Common nest predators are crows, magpies and skunks. Also, raccoon are particularly effective, because unlike skunks, raccoons readily swim.

Like ring-necks, Redheads feed in shallow water where some of the food can be reached by dabbling rather than diving. Pondweed was the primary food plant in a principally plant diet. In a study in Manitoba, animal matter predominated (Bellrose 1976).

4.1.6 Canvasback. The Canvasback (*Aythya valisineria*) is a fast-flying diving duck about the size of a Mallard. The Canvasback's distinctive head shape includes a wedge-shaped bill and head, on a long and stout neck. Males in breeding plumage can be spotted from large distances, where their dark grey back shows off against a cinnamon-brown head and chest. The biology of this species in relation to management has been summarized by Bellrose (1976).

The Canvasback is most at home breeding in the parklands bordering the northern Great Plains, but can be found from South Dakota to Alaska. Canvasbacks leave their Canadian Parkland nesting area gradually in early September-November. Migration proceeds southward in a broad front, but two major corridors guide birds to the Chesapeake Bay area of the Atlantic, and the mid-California region of the Pacific Coast. While most wintering Canvasbacks can be found on the coast, one prominent inland wintering area lies in the central Mexican highlands. Which route is used can vary over years, and brood mates can be found in very different migration corridors. Most Canvasbacks return to their Parkland nesting grounds in April, with a strong propensity to return to previously-used nesting areas.

Canvasbacks tend to use large and deep water bodies for feeding, resting and courting, but

use smaller and shallower sites for nesting on the prairies. Nests are rarely on land, but are over cattails. The 8-10 eggs are incubated for approximately 24 days in May/June. Canvasback nests are often parasitized by the ecologically similar Redhead (Sect. 4.1.5), who adds its eggs to a Canvasback's clutch.

Once incubation has started, male Canvasbacks form gradually larger flocks, and moult as early as June. Some females join these moulting flocks, sometimes leaving their two-third grown young to fend for themselves, and others remain on smaller waters. Females do not moult until late July, and become flightless in August for 3-4 weeks. In an early study of food habits in the 1930s, stomach contents revealed 80% plants, and 20% animal matter. Sago pondweed alone formed 30% of the food mass.

In southern Saskatchewan, Canvasbacks arrive early, in mid-April, shortly after Pintails and Mallards (Roy 1996). Depending on wetland availability, a relatively dry Parkland can encourage Canvasbacks to move to ponds on the grasslands (Smith 1996). Of a sample of 17 Canvasbacks banded in Saskatchewan, some were recovered in the province again and some also in 10 states of the U.S., including Atlantic and Pacific Coast states (Roy 1996).

4.1.7 Gadwall Leshack et al. (1997:1-2) summarize the natural history of the Gadwall (*Anas strepera*) as follows: "A medium-sized dabbling

duck that breeds throughout the north-central United States and prairie provinces of Canada, the Gadwall winters in the southern United States and coastal Mexico, the largest concentrations occurring along the Gulf Coasts of Louisiana and Texas. This species is monogamous; greater than 90% of females are paired by November, 4 to 5 months before breeding. During winter, individuals spend most of the day feeding on leaves and stems of aquatic vegetation in mixed flocks with other waterfowl and American Coots. Peak spring migration occurs in March, and most pairs arrive on the breeding grounds in early April.

Gadwalls nest in tall, emergent vegetation near water and prefer islands. Their breeding home range overlaps with that of other pairs, but males defend a 'moving' territory around a female. Because it nests in dense cover and often on islands, the Gadwall has higher nest success rates than do other species of prairie nesting ducks. Gadwall pair bonds dissolve during incubation, and males join moulting flocks while females continue to incubate. After their eggs hatch, females lead precocial⁸ young to brood-rearing habitat, where ducklings feed on a diet of invertebrates. Young are independent by 10 weeks of age, and their wings moult in preparation for fall migration.

Habitat degradation and drought conditions during the 1960s, 1970s and early 1980s led to declines of many populations of waterfowl in the United States. Gadwall numbers in the Great Plains region and prairie provinces of Canada, however, increased 129%

⁸ Leave nest soon after birth.

to record levels in the decade 1986-1996, owing to improved wetland conditions. In addition, this species has expanded its range into the northwestern United States and eastern Canada, establishing breeding populations in previously unoccupied habitat."

The authors suggest several reasons for the described increase in numbers. Gadwalls nest later than many other ducks, by which time the predation pressure on them is diluted by the presence of nests of other bird species. Gadwalls also prefer to nest on islands where available, which provides additional protection. Finally, on the breeding grounds the mid-1990s were quite wet, providing ample nesting opportunity.

Gadwalls are hunted in great numbers, with an estimated 1,188,500 in the United States in 1995. Most of these are shot in the Mississippi flyway, but some also in the central, Pacific and Atlantic flyways.

The main threat to maintaining Gadwall numbers is nesting habitat, which is determined by rainfall and spring runoff. Predation is exacerbated when many ducks are crowded into little remaining habitat. Other threats that have been documented include DDT, which was found in ducklings in Alberta and was presumed transferred from the hen through its eggs. Lead ingestion is low (1.8%) in comparison to other ducks. Gadwalls constituted 5.7% of 3,218 birds killed by colliding with power transmission wires at a marsh near Billings, Montana.

4.2 Other species

4.2.1 Black Tern Dunn and Agro (1995) describe the Black Tern (*Chlidonias niger*) as follows: "The Black Tern differs from other North

American terns in several respects. It is small, has a black head and underparts in breeding plumage, eats insects as well as fish, and nests in freshwater habitats. A colourful description is provided by Bent⁹ as a 'restless waif of the air, flitting hither and thither with a wayward, desultory flight, light and buoyant as a butterfly. Its darting zigzag flight as it mounts into the air to chase a fluttering moth is suggestive of a flycatcher or a nighthawk; as it skims swiftly over the surface of the water it reminds me of a swallow; and its true relationship to the terns is shown as it hovers along over the billowing tops of a great sea of tall waving grass, dipping down occasionally to snatch an insect from the slender, swaying tops.'

The Black Tern nests semi-colonially amidst emergent vegetation in food rich wetlands. Nests are flimsy, often floating, and are easily destroyed by wind or changing water levels. Reproductive success is highly variable. Adaptations to marsh nesting include frequent re-nesting, low site tenacity and eggshell morphology suited to damp conditions.

This highly social species often feeds in flocks. It migrates from the North American interior to winter along coasts of Central and South America. There it favors productive marine waters, especially off the Pacific Coast of Panama, and often concentrates where

⁹ Arthur Cleveland Bent is one of North America's classic naturalists who painstakingly described the natural history of many birds. His notes and those of others which he collected were compiled in a series of books, the Life histories of North American birds, with the first one published in 1919 by the U.S. National Museum.

predatory fish have driven small prey to the surface.

Populations of this tern in America and Europe have declined markedly, at least since the 1960s. Loss of wetlands on breeding grounds and migration routes is probably a major cause, but food supplies may have been reduced through agricultural control of insects and over fishing of marine waters."

4.2.2 Forest songbirds. The Canadian Boreal Forest supports many insect-eating songbirds who enliven the forest with their song in spring and summer. Many of these species winter in Central and South America where forests too are under threat.

The mixed habitats, including forest patches, scrub land and marshes, of the Cumberland Marshes support a diverse songbird community. Species that are characteristic of, and depend on, mature coniferous forest include Barred Owl, Boreal Owl, Three-toed Woodpecker, Black-backed Woodpecker, Winter Wren, Golden-crowned Kinglet, Cape May Warbler, Blackburnian Warbler, Bay-breasted Warbler and Western Tanager. Species characteristic of the peat lands include Nashville Warbler, American Bittern, Yellow Rail and Sedge Wren.

Through previous decades, songbirds of the Boreal Plain have remained stable with few exceptions (Downes and Collins 1999). With the increasing forest harvest in Saskatchewan in recent years (Brady and Appleby 2000), this trend

is fragile. Hence it is especially important to conserve lands which are not preferred timber harvesting areas, such as the Cumberland Marshes. This area lies within the Boreal Taiga Plains bird conservation region as identified by the Partners in Flight program (Canadian Landbird Conservation Working Group 1996; Sect. 1.3.5).

5. Other elements of high conservation value

The Woodland Caribou is a symbol of the Boreal Forest. This 68-158-kg member of the deer family occupies peat land and mature conifer forest where lichen are its primary food. There is considerable concern about this slowly reproducing species. Data indicate that the species has been impacted by forestry practices directly (Godwin and Thorpe 2000). In addition, indirect impacts arise from community-level changes in forest ecosystems, such as predation. When a forest is opened up, as in a clearcut, wolves are more effective as predators. Also, this habitat change attracts deer and these in turn attract more wolves, a ripple effect which results in greater pressures on the caribou populations.

6 Human Context

6.1 Land Ownership

There are four Indian Reserves in the Cumberland Marshes region representing Cumberland House, Red Earth, Shoal Lake and The Pas First Nations.¹⁰ Many members of these First Nations are part of the Cree cultural group.¹¹ The First Nation reserves represent less than 5% of the IBA, but Treaty No. 5 (1875) land entitlement is still a contentious issue. A review of Treaty Land entitlement in Saskatchewan has led to land returned to First Nations that was once allocated and then taken away. The disagreement between what native oral tradition holds as promised when the treaty was signed and what was actually allocated is still under debate.

¹⁰ Treaty 5, signed in 1875 at Berens River Manitoba and an adhesion in 1876 at The Pas, involved three bands, the Opaskwayak (The Pas), Mosakohiken (Manitoba) and Cumberland House peoples. Red Earth and Shoal Lake people are descended from the Opaskwayak band (Barry 1998).

¹¹ When Helen Cote Quewezance spoke in her native Saulteaux language to Gilbert Flett of the Shoal Lake Band, his eyes lit up and he responded enthusiastically. He said jokingly, that when he slips into his Saulteaux tongue, his current community members accuse him of "talking funny."

6.2 Historical land use.

A cairn at the edge of the town of Cumberland House reads: "For a century after its founding in 1670 the Hudson's Bay Company was content to draw Indians down to trade; but in 1774, after Canadian "peddlers" on the Saskatchewan had begun to intercept this trade, Samuel Hearne was sent from York Factory to establish Cumberland House, the first of the Company's great inland posts. Under Hearne, Matthew Cocking and William Tomison, this became the nerve centre for competition with the North West Company until the union of the two companies in 1821. Thereafter, it remained an important trading establishment for many years."

The entire IBA is land which the First Nations people have used and are still using for cultural practices, trapping, hunting and fishing.¹² Trapping was apparently a major source of income until recent international fur boycotts essentially destroyed this means of a livelihood.

6.3 Current land use.

The Cumberland Marsh IBA lies immediately outside of what is considered agricultural land in Saskatchewan. The lowlands

in question are not suited for farming or ranching. The western boundary of the IBA coincides closely with the First Prairie Step, or the distant edge of the uplift that caused the Great Plains and Rocky Mountains many hundred million years ago. On the uplifted step, drainage improves and farming begins.

The Cumberland Marshes are classified as a largely non-timber producing area (Fung et al. 1999). Areas with softwood timber are highly fragmented, growing on levees and other strips of uplands, and are virtually impossible to reach by a land route. Hardwood exists only in strips along rivers and major creeks. The IBA falls under the Pasquia-Porcupine forest management agreement (Brady and Appleby 2000).

The IBA may have potential for mineral exploration. The geologist William McInnes explored the region in 1906-10 on behalf of the National Museum of Canada and considered it a promising area for valuable minerals (Fung et al. 1999). According to Fung et al. (1999), the IBA holds potential for peat, with a site containing graphite, oil shale and nodular manganese at the IBA's fringe, immediately south of the Carrot River.

Tourism development includes mainly outfitting for hunting and fishing, with six outfitter camps listed in the vicinity of Cumberland House, at the northern edge of the IBA. There are two campsites near the IBA's fringe, and a provincial historic site with several hotels/motels in the town of Cumberland House.

¹² Gilbert Flett said he used to be a good hunter, until he broke his leg in an accident, a severe break from which he has not fully recovered and which causes him great pain.

6.4 Conservation management achieved in the area.

In addition to broad scale acts and conventions (Sect. 1.3), there are specific management protocols in place that apply to the Cumberland Marshes IBA.

Taking conservation efforts into the schools, the Frontier School Division in northern Manitoba has introduced a Sturgeon in the Schools program in cooperation with Manitoba Conservation. Schools receive hatchery sturgeon in October and release them in May. Saskatchewan Environment and Resource Management is launching a similar program in the Cumberland House area (The River Current, Winter 2001, p. 1).

6.4.1 Pasquia/Porcupine integrated forest land use plan.

In the plan summary, the authors (Anonymous 2000) state "The Pasquia/Porcupine integrated forest land use plan provides the provincial government with direction of how to manage all lands uses and resources on provincial Crown land in the area [Fig. 3]. To insure that this plan is implemented in accordance with the intent of the plan, it is important to monitor the progress of implementation."

This planning process began in April 1995 and the current plan was approved by the Government of Saskatchewan in fall 1998. A regional advisory board include 28 people representing 20 organizations including Nature Saskatchewan. This committee, in collaboration with personnel from Saskatchewan Environment

and Resource Management, prepared a total of 109 action items. These wide-ranging issues include: i) the protection and sustainable management of forest resources, ii) sustainable allocation and monitoring of fish and wildlife, iii) effects of bait-hunting on ecosystem health, iv) managing grazing in forest ecosystems, v) cabin construction and commercial developments, vi) impacts of waste disposal, vii) access to mineral resources, viii) impact from all-terrain vehicles, ix) protecting streams and ground water supplies, x) promoting non-consumptive uses such as ecotourism, xi) encouraging aboriginal economic development, and xii) overall evaluation and monitoring.

The plan focuses on a region including a lower portion of the Saskatchewan River, the Saskatchewan River-Cumberland Lake Delta, the Cumberland Marshes, and Pasquia and Porcupine hills.

6.4.2 Representative areas network (Sect. 1.3.4).

The Cumberland Marshes IBA falls within the Mid-boreal lowland ecoregion . In the ecoregion as a whole, about 11% of the lands are under some form of protection. Negotiations are underway to increase this in the region through discussions with forestry companies and First Nations.

Saskatchewan Environment and Resource Management has worked closely with native peoples to encourage hunting regulation for First-Nations. In this way, an agreement was reached

to abolish hunting with lights at night. Another example of cooperative management are moose hunting regulations devised by First Nations based

Fig. 3

on Saskatchewan Environment and Resource Management's moose surveys and related management data.

6.4.3 Ducks Unlimited Canada. Ducks

Unlimited has a long and active presence in the Cumberland Marshes, and is considering a new project in the near future. The following text was taken from a billboard at the Ducks Unlimited field station WSW of Cumberland House:

"Cumberland Marshes -
Co-operation in conservation.

Ducks Unlimited is an international, private, non-profit, conservation organization dedicated to the perpetuation of North America's waterfowl resources through the restoration and preservation of wetlands in Canada.

The Cumberland Marshes Project was planned and is being managed on a multi-use concept in co-operation with the Government of Saskatchewan and the community of Cumberland House.

Facilities and management.

The objective of the management plan for the Cumberland Marshes is to insure a water supply and to provide control works capable of managing water levels on a series of 18 major lakes and marshes. A complex of water supply channels, dykes and control structures provide the facilities to duplicate the role of nature.¹³ Each marsh can be drawn down in

turn to allow a re-vegetation process, and then re-flooded to the depth which allows optimum habitat conditions to develop. Under such management, these fertile marshes are expected to provide a sustained yield of fur and waterfowl.

Reasons for development.

As a result of man's activities in recent years on the Saskatchewan River system, controlled river flows have altered the character of these marshes, which were previously dependent on periodic flooding. Without remedial works by man, the capability of these marshes to produce furbearers and waterfowl would have been seriously impaired. For this reason, Ducks Unlimited negotiated a 38-year agreement with the Saskatchewan government to develop and manage the Cumberland Marshes for the benefit of the wildlife resource and for the native peoples who are dependent on these resources as a basis for their livelihood.

National significance of the area.

The Cumberland and Siisiip marshes form a major part of the Saskatchewan River Delta. The area is the largest Ducks Unlimited water control project in North America and supports a wide variety of big game, furbearers, upland birds, amphibians, waterfowl and native plants.

As the loss and degradation of wetlands throughout the North American breeding grounds continues, it is essential to preserve and maintain marshes such as these so that future generations will be able to enjoy their wildlife heritage."

to reconsider this confidence, and Rowe (1990) and many others offer direction.

Starting in 1980, Ducks Unlimited Canada has shifted from an earlier focus on securing permanent wetland habitat to 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.

¹³ This text, drafted decades ago, reflects a kind of confidence in human ability to duplicate the inimitable causes and consequences of nature - an ethos that has been softened considerably of late, and some would say not softened enough. Our current environmental crisis begs us

Phillips (1985) summarized extensive data including duck densities (Table 2), habitat changes, muskrat densities, fish production and water quality during the early stages of intensive management in the marshes. According to Phillips (1985) intensive operations began in 1980, after 5 years of construction, to manage water levels in a 320,000 acre (1300 km²) wetland complex. One goal was to use drawdown and subsequently manage water levels to encourage emergent vegetation beyond its normal growth along the shoreline. During a drawdown, or draining of a portion or all of the lake, softstem bulrush was the most common colonizer in the first year after re-filling to depths less than 1 m. During the second year, cattails and aquatic sedge gained dominance over softstem bulrush. Cattail communities disappeared in years 4-6 through floating up and dying, and due to muskrat feeding. Thereafter, hardstem bulrush took over combined with yellow pond lily, the latter especially in the deeper waters. As emergent vegetation continued to decline, a second cycle of drawdown was necessary in year 8.

In summarizing the data on brood densities after water level management, Phillips concludes that "The average brood density of 0.93 broods/acre (0.299/ha; Fig. 4) which has been documented over the past three years of surveys exceeds the initial estimate of potential production (0.58 broods/acre) which was used to cost-justify the Cumberland Marshes development proposal. The current rate is also now approaching the estimated 0.10 broods/acre which was used to predict theoretical production rates with installation of bio-improvements throughout

the complex. There can be little doubt from the monitoring results to date that DU's initial investments in the Cumberland developments were well justified and have contributed significant benefits to waterfowl production at the project."

Based on muskrat house counts, Muskrat populations declined during this management. This was not entirely surprising, since Muskrat populations are strongly tied to food availability. It was expected that during this management phase a temporary decline would happen. This report did not go far enough in time to expect to see the recovery, which was shown in some of the lakes where drawdown occurred earliest (Phillips 1985).

Table 2. Species of ducks on the Cumberland Marshes and their estimated densities in 1984. The estimate of "indicated" breeding pairs (IBP) combines surveys from different stages in the breeding period.

Species	IBP/ha
<u>Divers</u>	
Lesser Scaup	0.1573
Ring-necked Duck	0.1091
Ruddy Duck	0.0400
Canvasback	0.0325
Common Goldeneye	0.0229
Redhead	0.0201
White-winged Scoter	0.0149
Bufflehead	0.0080
<u>Dabblers</u>	
Blue-winged Teal	0.1234
Mallard	0.0969
American Widgeon	0.0267
Northern Shoveler	0.0189

Green-winged Teal	0.0173
Gadwall	0.0118
Pintail	0.0061

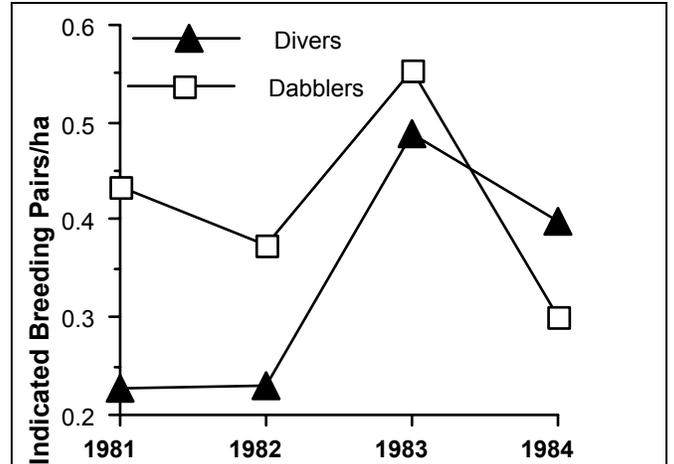


Figure 4. Estimates of the density of breeding pairs of diving and dabbling duck species on the Cumberland Marshes, SK. Various survey periods are combined, hence called "indicated."

7 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.

7.1 Aboriginal peoples living close to the land.

At least three groups, Status Indians, Non-status Indians and Métis people have deep roots in the Cumberland Marshes. Some residents obtain a livelihood from the land through hunting, trapping and guiding.

An opportunity may exist to work with local youths and Elders, sharing information about birds. Traditional and "scientific" knowledge surrounding birds could be shared and their distinction made explicit. Information about the birds when they are away from the Cumberland Marshes may also be of interest.

7.2 Diverse and poorly accessible habitat in the landscape.

The Cumberland Marshes hold diverse habitats and resources, but because these exist in a complicated mosaic they have not seen the usual tradition of use and overuse. For instance, some patches of land likely have agricultural capability and others support productive forests. However, because these resources are difficult to reach, they have enjoyed considerable protection. It is not that these resources are not useful in their natural state. On the contrary, they provide ecosystem services that are often not measured, including natural water purification, wildlife habitat, air quality and so on.

7.3 Crown land.

Other than First Nation lands, the majority of the land is Crown-owned. This should represent a conservation opportunity because any new resource use is likely to be reviewed with wide stakeholder involvement, as is the case through the Pasquia/Porcupine integrated forest land use plan (Sect 6.4.1). This land use plan has led to a change in Saskatchewan Environment and Resource Management's policy, whereby requests for purchasing crown leases within the planning area will be denied, except for waste disposal sites and existing subdivisions.

7.4 Ecotourism and outfitting.¹⁴

Tourism, ecotourism and outfitting for hunting and fishing have different potentials and different impacts on the environment and on people.

The roads that border the Cumberland Marshes are not major thoroughfares and hence experience largely local travel. Attractions in the region include the Cumberland House Provincial Historic Park, three campsites, and a dog-sledding site. There are seven fishing and hunting outfitter camps and no more than five facilities for overnight stay (Fung et al. 1999).

The Pasquia/Porcupine plan encourages the non-consumptive use of the region through ecotourism. Given the importance of birds in driving tourism activities, the bird resources in the region represent an opportunity.

According to their web site "www.ecotourism.sk.ca/" "The Ecotourism Society of Saskatchewan, is a non-profit organization founded in 1992 as the Saskatchewan Watchable Wildlife Foundation. Our membership consists of: individuals who enjoy nature, ecotour providers, conservation organizations, economic development and tourism agencies, regional tourism and tourism sector associations, and supporters of rural

¹⁴ "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).

development." An Ecotourism 2000 Conference was held on 23-24 October 2000 at the Travelodge Hotel in Saskatoon, under the slogan Growing the Gold - Guarding the Green.

7.5 Forest songbird conservation.

An opportunity exists in the Cumberland Marsh to conserve waterfowl and forest birds. Much has been written about the threat to forest birds. The Canadian Boreal Forest supports many insect-eating songbirds which enliven the forest with their song in spring and summer. Many of these species winter in Central and South America where forests too are under threat.

Forest birds are covered in the "Partners in Flight" initiative (Fig. 2). Conservation and funding priorities are allocated in a way that aims to link bird regions such that efforts for forest birds, for instance, are coordinated throughout their breeding, migration and winter ranges.

7.6 Ecosystem services as a Common Good.

The lakes, marshes, forest fragments and scrub land of the Cumberland Marshes are largely connected and form an integrated mosaic. Here, animals and plants can disperse naturally, without leaving native habitat on which they may depend. Nature conservation requires both habitat and ecological processes such as ability to move or disperse. Both of these are possible in this region.

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. Eugene P. Odum (in Rowe 1990) suggested that 40% of the U.S. state of Georgia should be preserved in its natural state, allowing 30% for food production, 20% for fiber and 10% for industry. This kind of ecoscape conservation is possible and urgent (Sect. 8) here at the Cumberland Marshes¹⁵.

This ecosystem integrity is not threatened in a major way by the soft-impact uses which one might equate with native and other hunting, or with ecotourism. However, because of the soggy land, the ecosystem is vulnerable to industrial uses, such as forestry, peat harvest, gravel extraction, and mining. The Cumberland Marshes should be allowed to provide the kind of ecological service which nature provides without charge. Costanza et al. (1997) estimate that the

total ecological service (17 categories in total, not including ecological goods) provided by 1 ha per year is \$ 302 for temperate forests and \$14,785 for wetlands.¹⁶

¹⁵ Apparently, Odum's rule of thumb is close to, if not already, being exceeded in Saskatchewan. The Grassland and Parkland areas of Saskatchewan comprise 37% of the province and virtually all of these ecosystems are drawn on extensively for food and other production. A further 27% of the province in the Boreal Plain is used for agriculture in the southern quarter and extensive forestry operations exist throughout. The forest industry appears poised to move into the Boreal shield as well, for a total of 92% of the province by ecozones under invasive industrial use including roads and other traffic. Within these areas, there are subsystems that still exhibit ecological integrity, and the Representative Areas and other conservation approaches including IBA should receive uncompromising support to ensure that future Saskatchewan residents have a healthy, productive and satisfying place to live.

¹⁶ Salzman (1998) writes: "Perhaps surprisingly, at the moment ecosystem services are rarely included in agency cost-benefit analyses or policy debates. We explicitly value and place dollar figures on 'ecosystem goods' such as timber and fish. Yet the services underpinning these goods have no value - not because they are worthless but rather there is no market to capture and express their monetary value directly.

Replacement costs offer the clearest method to provide dollar values for ecosystem services. Thus, when New York City was faced with drinking water that failed Environmental Protection Agency standards, it chose to invest \$ 1-1.5 billion in the natural restoration of the Catskills Mountains watershed rather than construction of a \$ 6-8 billion water treatment plant."

8 Threats

Threats listed below are either perceived now or possible given ecological conditions in the area. The order in which these are presented does not reflect a perceived priority.

8.1 Cumulative impacts.

The Pasquia/Porcupine forest land use plan recognizes quite appropriately the potential impact of many small disturbances as a serious concern. For instance, the plan imposes restrictions of the use, nature (temporary or permanent) and construction of new cabins in the region. The plan also halts the sale of land except in isolated circumstances, but allows leases of a limited term and with the added requirement of remediation after use (e.g. sand and gravel quarries).

Restrictions of the types described are often met with criticism by individual proponents. This is understandable because each individual impact may be small, but the cumulative impact is much greater. It is a sign of our time when the cumulative pressures on the planet are so pervasive (global warming) and impacts so difficult to measure (water quality) that education is required to convince people of the need for all to tread lightly on the planet.

Technological and social ingenuity should be re-directed away from mega-industrial projects to employ 'smart technologies' to achieve a quality

of life for people, birds and the planet. There are some encouraging signs in this regard (e.g. recycling, alternative energy sources) but this change will not happen quickly enough without both a "carrot and a stick."

8.2 Forest, peat and mineral development.

The forest patches in the Cumberland Marshes are broadly considered part of 'non-timber producing land.' This is useful to encourage sustainable uses for the land, but a certain vigilance is also required to ensure that these forest patches receive the attention and regulation they require. These forests could easily be 'whittled away' with a series of minor permits.

The Cumberland Marshes, according to Fung et al. 1999, have major peat potential. The mining of peat and its transport from the area would create a considerable impact on the local environment. The benefits to individual operators and possible alternatives to the use of peat must be critically weighed against the tremendous public good provided by the land through a non-invasive use in a close to natural state (Sect. 7.6).

According to Fung et al. (1999), there are no mineral deposits or oil and gas resources in the Cumberland Marsh IBA *per se*. There are, however, graphite, oil shale and/or nodular manganese deposits just south of the Carrot River.

8.3 Water quality and health.

The Cumberland Marshes are on the receiving end of a series of major prairie rivers that have passed through hundreds of kilometres of land chemically altered through agriculture. The chemical burden that is carried in surface and ground water is a potential health factor for people, birds and ecosystems (Coote and Gregorich 2000).

Insects that live in rivers provide food for top predators including fish, and these insects can be greatly influenced by pollutants and other watershed changes (Lehmkuhl 1979). This sensitivity by aquatic insects has been used to examine the health of river systems, where insects are biological indicators of the river's health (Lehmkuhl et al. 1984). Lehmkuhl (1970) has shown that mayflies are conspicuously absent in two segments of the South Saskatchewan River. Downstream of Gardiner Dam, he attributed the flies' absence to deep water layers that are released from the dam and are too cold for the flies (Lehmkuhl 1972). Downstream of the city of Saskatoon sewer system it was attributed to pollutants (Lehmkuhl 1970).

In her analysis of trace elements, including toxic metals, on lands surrounding the South Saskatchewan River in the Beechy and Swift Current areas, Song (1997:10-11) writes:

McDuffie et al. and Raja et al. found that a significant three- to five-fold increase in risk

for non-Hodgkin's lymphoma can be associated with drinking water from shallow wells, as compared with deep drilled wells in the Saskatchewan Prairie area. ... The study suggested that drinking water may be contaminated from various sources including runoff from adjacent fields with widespread use of pesticides. Irvine et al. conducted a geochemical study of soils and ground waters near Henribourg, north of Prince Albert... They suggested that enrichment of these elements may have a bearing on the high incidence of multiple sclerosis in the Henribourg area."

Song (1997:2) further suggests that "Modern chemically intensive agricultural practices involving application of inorganic fertilizers and pesticides, manure derived from sewage, and even irrigation waters, represent low level, nonpoint-sources of trace metal to agricultural land, and are receiving increasing attention. Many trace elements are needed in small quantities as micro nutrients for plant, crop, and animal growth; however, chemically intensive agricultural practices may introduce toxic elements, or elements that accumulate in the environment to anomalous levels, that become toxic to ecosystems. Even if the original additions are not at concentrations high enough to be initially toxic, critical levels may be built up with repeated applications, especially in regions of intensive farming such as North America and Europe..."

In a study in southern Saskatchewan, Donald et al. (1999) found that in early July the average number of types of pesticides detected in wetlands ranged from 1.8 in areas with less than 21 mm of rain during the previous 15 days, to 3.2 in areas with more rainfall. High rainfall lead to greater erosion. As many as 60% of the wetlands had at least one pesticide in amounts that exceeded Canadian guidelines for the protection

of aquatic life. Lindane and triallate exceeded these guidelines most often (Donald et al. 1999).

Tests for the presence of pesticides and pollutants in drinking water are very costly to conduct. Even when funds are available for studies of pesticide exposure through drinking water, the task is difficult at best. Environment and water quality experts in Canada and around the World are given the difficult task of deciding whether a given chemical or practice is safe or not safe. The public demands answers in a simplistic science-based yes-or-no evidence style (e.g. Sect.1.3.1.1). The hard-data approach is hopelessly mismatched to the complex natural system in which the chemical finds itself. A yes-or-no conclusion is impossible because once a synthetic pesticide leaves the sprayer nozzle, it becomes virtually impossible to track. Furthermore, when a given concentration of a pesticide is studied for impact on a certain life stage (e.g. adult but not embryo) of a plant or animal in the controlled microcosm of a laboratory, this does not automatically reveal its impact on different life stages in nature, its impact under the simultaneous exposure of two or more pesticides, or the impact of multiple exposures (Donald et al. 1999).

Detecting effects is furthermore complicated because symptoms of organopesticide exposure, for example, are often similar to and dismissed as the flu; because they selectively impact children (Duehring 1996); and because they can interact in unexpected ways with other body functions (Fairchild 1999).

Given the scenario outlined above, how can a community avoid being paralyzed with uncertainty and fear? From a planning point of view, more and 'better' studies alone are unlikely to contribute new insight. Alternative ways of knowing, combined with community inspired and co-operative actions, may be more fruitful (e.g. Roberts et al. 1999). Often simple logic and the precautionary principle critically applied can be a good guidepost for action.

8.4 Exotic species.

With the advent of increased transportation around the globe, and intended and unintended imports of species, the "homogenization" of the World's species brings both benefit and harm. This challenge, with examples of serious damage in some cases, is living proof of the validity of community ecology, or of the contention that species rarely exist or function in isolation of other species in the community to which they belong. Species can play an integral part in one community and be a serious pest in another.

According to Catling (1997) "A list is presented of 180 taxa (mostly species) of woody plants which have been introduced into Canada from another country, or introduced from one region of Canada to another, and have been reported as spreading in their newly colonized Canadian range. Some of these woody aliens

have proven very aggressive, forming single-species stands, displacing native plants and animals, and changing native communities, with the ultimate result being the loss of native biodiversity."

Common weeds and other introduced species are widespread in the grain belt of Saskatchewan. Canada thistle, for instance, is widespread in the forest ecozone and it is assumed that it was transported there initially inadvertently as part of the horse feed used for logging with horses. Currently, weed seeds are introduced into the forest through bait hunting practices where "screenings" from seed cleaning plants are hauled by truck to bait hunting areas and distributed at baiting sites.¹⁷

David Pimentel and others have summarized the dilemma of alien species, as described in the following report (full report available at http://www.news.cornell.edu/releases/Jan99/species_costs.html).

A few bad actors among the more than 30,000 non-indigenous species in the United States cost

¹⁷ Nature Saskatchewan, the Saskatchewan Fair Chase League and IBA Saskatchewan met with the Hon. Buckley Belanger, Minister of Saskatchewan Environment and Resource Management on 31 July 2000, the Hon. Clay Serby, Minister of Saskatchewan Agriculture and Food, on 21 February 2001, in Saskatoon. The groups voiced concern over the widespread use of weed seeds for commercial bait pile hunting in Saskatchewan's forests, a practice which risks weed infestation and contravenes the Weeds Act. Similarly, the use of decaying animals for baiting also may pose a health threat, in addition to other concerns. The group advocated a return to quality experiences and ethical hunting (e.g. White 2000, Appendix 3) potentially offered by outfitters and ecotourism operators. Quality hunts would provide more jobs for experienced guides, in a higher guide-to-hunter ratio. Quality hunts would also improve the declining image of hunters in Canadian society.

\$123 billion a year in economic losses, Cornell University ecologists estimate.

"It doesn't take many trouble-makers to cause tremendous damage," Cornell University ecologist David Pimentel says of a list that runs from alien weeds (cost: \$35.5 billion) and introduced insects (\$20 billion) to human disease-causing organisms (\$6.5 billion) and even the mongoose (\$50 million). Aside from the economic costs, he adds, more than 40 percent of species on the U.S. Department of the Interior's endangered or threatened species lists are at risk primarily because of non-indigenous species.

Pimentel, who presented his findings today (Jan. 24, 1999) at the annual meeting of the American Association for the Advancement of Science (AAAS) in Anaheim, Calif., noted, however, that "most introduced species of plants, animals and microorganisms have become widely accepted and even beneficial participants in our lives."

The researchers also acknowledged that 98 percent of the U.S. food supply comes from such introduced species as wheat, rice, domestic cattle and poultry with a value of more than \$500 billion a year.

Invaders can also be animals. Raccoons, for instance, are a recent addition to the predator mix of Redheads and other ducks. The invasion of raccoons into the prairie pothole duck nesting region is illustrated by fur records in Manitoba. Fur buyers received no raccoon pelts between 1924-46, From 1947-53 they purchased an average of 61 per year. This average rose to 663 pelts for the period 1959-63 (Bellrose 1976).

8.5 Diseases.

Fishing and hunting activities are regulated by Saskatchewan Environment and

Resource Management. Concerns have been raised about bait hunting¹⁸ *vis-à-vis* disease spread from game animal concentrations,¹⁹ disease spread and weed invasion arising from the bait itself, the interference of bait stations with people's enjoyment of the outdoors and the potential of a backlash against hunting in general arising from this non-traditional, market-oriented hunting practice. The Pasquia/Porcupine integrated forest land use plan (Sect 6.4.1) calls for a study to determine the effect of baiting on the integrity of the ecosystem.²⁰

8.6 Accidents.

Accidental fires are a possible concern even though the liberal amount of water in the region should naturally stem fire expansion. Other accidents may involve chemical spills carried long distances in water ways and below ground aquifers.

¹⁸ The Saskatchewan Fair Chase League has collected much evidence to illustrate these observed and potential impacts. The League advocates guided hunts that could employ more people, provide for a balanced quality experience and adhere more closely to traditional practice.

¹⁹ E.g. Scott Bestul. 1999. Deer disease linked to extensive baiting. *Field & Stream*, January Issue, pp. 72-73.

²⁰ "Feeding wildlife...Just say no!" is a Wildlife Management Institute (Washington D.C.) copyrighted publication that mentions Tuberculosis, Brucellosis, Chronic wasting disease, Aflatoxin and Blackhead.

8.7 Disturbance.

Increased tourism can bring with it increased disturbance. This needs to be managed. Human disturbance can reduce an animal's occupancy of cover to escape from predators or the elements, an animal's feeding time, and it can prevent an animal from breeding. These impacts are often very difficult to detect and thus to avoid. A wildlife viewing code is presented in Appendix 4.

9 Conservation Goals and Objectives

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

9.1 Management goals

Goal 1. Be vigilant to future changes in the Cumberland Marshes that threaten the birds, the ecosystem's ability to function naturally, or the sustainable use of the marsh complex by people.

Action 1. Persons listed in the appendix, might inform Nature Saskatchewan and others of any ecosystem changes and impending threats.

Goal 2. Find a mechanism whereby different stakeholders can communicate and help facilitate each others' goals.

Action 1. Plan annual gatherings as part of existing festivals or functions.

Goal 3. Monitor water quality in the region.

9.2 Infrastructure goals

Goal 4: Facilitate eco-tourism potential in the region (Appendix 4 & 5). Develop tourism as a quality experience with an educational feature.

Action 1: Design a festival or other event that can become an annual event at the same time and possibly same place each year.

Action 2: Monitor tourism activities and adapt as necessary to conform to minimum impact, long-term sustainability and overall success and reward for people involved.

9.3 Educational goals

Goal 6: Guide field trips and nest box programs to encourage youths to know and take an interest in their local birds.

Action 1. Take supplies and tools to a reserve and invite community members to help build and erect bird boxes.

Action 2. Invite Elders to participate.

Action 3. Explore birds and ecology both from a traditional knowledge and biological knowledge point of view.²¹

Goal 7: Provide schools with appropriate resource materials so that teachers can easily incorporate bird and regional 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 plan and similar initiatives.

Goal 8. Publicize the value of the birds and the ecosystems, stressing the ecosystem services, such as water quality, provided by the ecosystem.

²¹ Educators at the University level are keenly aware that proportionately few aboriginal students attend universities, and fewer yet study science. Can birds serve as a vehicle to make science more relevant to students in the IBA.

9.4 Research and information needs

Goal 9: Continue to monitor the timing and extent of use of the Cumberland Marshes by birds.

Action 1. Agencies with a responsibility for wildlife management should draft a long-term plan for monitoring (CWS, DUC, NS, SWCC, SERM).

Goal 10. Document the diverse plants and animals that exist in the region.

10 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.

11 Acknowledgments

This conservation plan owes its existence to BirdLife International, and to the joint initiative by the Canadian Nature Federation and Bird Studies Canada for launching this program in Canada. The Important Bird Areas program is part of the Natural Legacy 2000, 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. Ducks Unlimited Canada also provided financial support for the IBA program

For making IBA possible in Saskatchewan, we acknowledge the participation of our funding partners. Financial support for development of this plan has been provided by the Canadian Adaptation and Rural Development in Saskatchewan (CARDS) program. 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 person's listed here who have agreed to participate in this conservation planning in their professional or private capacity (see Appendix 1).

This report has been greatly improved by the following people by providing thoughts, information, input over the telephone, and by carefully reviewing versions of the manuscript: Mo Alain, Gregg Brewster, Solomon Carrier, Nancy Cherney, Helen Cote Quewezance, Kim Eskovich, Rory Head, Darryl McCallum, Ian McGilp, Bruce Noton, Sheila Setee, Cyril Head, Todd Olexson, Colleen Rickard, Margaret Skeel.

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, contact information and general interests of individuals in connection with the Cumberland Marshes IBA. By letting their name appear here, these individuals have made no commitment beyond agreeing to be contacted when their participation is requested.

Mo Alain, Box 632, Hudson Bay, Saskatchewan, S0E 0Y0; 306-865-3266

Interests: Mo is a member of the Pasquia/ Porcupine Forest Management Advisory Committee.

Allyson Brady, Box 1372, Saskatoon, SK, S7N 3N9; 306-665-1915 gfwsk@link.ca

Interests: Allyson is a member of Global Forest Watch - Saskatchewan Chapter, and the Saskatchewan Environmental Society.

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.

Solomon Carriere, Box 304, Cumberland House, Saskatchewan, S0E 0S0; 306-653-4606

Interests: Solomon is part-owner of C & C Hand-crafted Log Homes, he participates in a local outfitting operation, he is a champion canoeist and a member of Nature Saskatchewan's Advisory Board.

Terry Chamulak, Sask. Water, 111 Fairford St. E., Moose Jaw, SK, S6H 7X9; 306-694-3746 tcha@saskwater.com

Interests: Terry is a hydrologist familiar with the region and its water-related issues.

Nancy Cherney, Sask. Environment & Resource Manage., 3211 Albert Street, Regina, SK, S4S 5W6; nancy.cherney.erm@govmail.gov.sk.ca

Interests: Nancy is a primary participant in SERM's Representative Areas Network.

Helen Cote Quewezance, 208 Wallace Street, Kamsack, SK, S0A 1S0, tenash@sk.sympatico.ca

Interests: Helen is a sociologist and teacher with an interest in aboriginal culture and sustainability options.

Kim Eskowich, Ducks Unlimited Canada, Box 2139, Melfort, SK, S0E 1A0; 306-752-2791 k_eskowich@ducks.ca

Interests: Kim is the biologist responsible for the Cumberland Marshes area.

Gilbert Flett, Shoal Lake First Nation.

Interests: Gilbert is an Elder.

Cyril Head, Red Earth First Nation.

Interests: Cyril is an administrator for Red Earth First Nation.

Rory Head, Shoal Lake First Nation.

Interests: Rory is a Grade 10 Student at Shoal Lake. He is interested in hunting, fishing and playing golf.

Ian McGilp, Tourism Saskatchewan, 101 - 230 22nd Street E., Saskatoon, SK, S7K 0E9; 306-933-5746 ian.mcgilp@saktourism.com

Interests: Ian is in the Product Development Branch of Tourism Saskatchewan with a special interest in tourism in the region.

Todd Olexson, Sask. Environment & Resource Manage., Box 3003, 800 Central Avenue, Prince Albert, SK, S6V 6G1; 306-953-2586 olexson@derm.gov.sk.ca

Interests: Todd is an Integrated Land Use Planner with responsibility for the Pasquia/Porcupine Integrated Forest Land Use Plan

Colleen Rickard, Canadian Parks & Wilderness Association, 1625 Argyle Ave., Saskatoon, SK, S7H 2W6; 477-2889 cpaws.sask@getthe.net

Interests: Colleen is the executive director of the Saskatchewan Chapter of CPAWS.

Sheila Settee, Cumberland House First Nation, Box 220, Cumberland House, SK, S0E 0S0; 306-888-2116

Interests: Sheila is the Administrator for Cumberland House First Nation.

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.

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

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

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

For further information about the Americas BirdLife Program, check the following web site: <http://www.birdlife1.org.ec/ingles.html>.

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

The Canadian Nature Federation (1 Nicholas Street, Ottawa, ON, K1N 7B7; <http://www.cnf.ca>)

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

organizations, government and industry, wherever possible.

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

Bird Studies Canada (P.O. Box 160, Port Rowan, ON, N0E 1M0; <http://www.bsc-eoc.org>)

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

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

Nature Saskatchewan (1860 Lorne Street, Regina, SK, S4P 2L7; www.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 area 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 sponsorship 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 for which conservation plans have been completed or are in various stages of completion, are shown in the figure below. 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, Chaplin, Old Wives and Reed lakes) or portions of watersheds.

Appendix 4. Codes of conduct for nature viewing and hunting.

As **wildlife viewers**, our goal is to watch animals behaving in natural ways in their natural habitats. We respect the needs of wild animals for space, natural vegetation, and ecological community. We recognize our responsibility to know the consequences of wildlife viewing .

We follow these guiding principles:

We will view or photograph from a distance that respects the needs of the wildlife, using proper equipment such as binoculars, spotting scopes and telephoto lenses. Before approaching wildlife we will first learn the spatial needs of each species and to recognize their alarm signals.

We will avoid noises or actions that might stress wildlife or cause animals to waste energy in unnecessary flight.

We will be patient, remembering that we are guests in wildlife habitat.

We will not trample or damage vegetation, both for the sake of the wildlife it supports, and for its intrinsic values.

We will not approach animals that are breeding, nesting, brooding or raising young because parents and young are especially vulnerable at these times. We will learn the places and times to avoid these situations. We will not approach young or baby animals.

We will not feed wildlife, recognizing that feeding usually leads to problems such as unnatural food dependency, habituation to humans, disease or even death.

We will keep pets on a leash around any wildlife, and avoid bringing pets into sensitive wildlife habitat.

We will respect the rules and regulations of protected areas. Trails, roads, closure areas and

other management features are designed for safety and welfare of visitors, natural vegetation and wildlife.

We will be respectful of others including property owners, and other wildlife watchers.

We will give back to nature for the gifts of wildlife viewing we receive, through conservation work for wildlife and native vegetation and through helping others learn the ethics of wildlife viewing.

A hunter's code of conduct. Drafted by private conservation organizations (the main proponent was the Izaak Walton League) and wildlife management agencies. Hunters are considered a backbone of wildlife conservation, but they must also safeguard the future of their sport by behaving responsibly.

- Respect the environment and wildlife
- Respect property and show consideration for non-hunters
- Hunt safely at all times
- Know and obey the law
- Support wildlife and habitat conservation
- Pass on an ethical hunting tradition
- Strive to improve outdoor skills and understanding of wildlife
- Hunt only with ethical hunters

Ethical hunting is the true measure of the hunt.

Appendix 5. Elders' guidelines for aboriginal themed tourism products in Saskatchewan. These guidelines were developed through a series of formal consultations with First Nation's Elders in four forums during the period July 1995 to February 1996.

Consultation process

Individual Elders were approached in unstructured informal discussions to further clarify and provide more specific focus on certain issues which were addressed only in terms of general application in the larger forums.

A survey questionnaire was developed by the interview team to guide discussions and the positions expressed in these guidelines have received general Elders' consensus.

General Elders' responses

There is general support and enthusiasm among the Elders towards developing a commercial tourism market around First Nations' cultural and historic products.

A broad spectrum of types of tourism and tourism categories were discussed during the Elders interviews and the following advice and guidance was provided:

Ecotourism/Adventure tourism

The First Nation's products and enterprises which can be developed in ecotourism are broadly endorsed by the Elders with no specific suggestions for separate guidelines other than those of general application and common sense which are commonly accepted in the industry and by the general public.

In summary, the specific advice provided by the Elders focused on

- * adventure tourism and "living off the land" is an excellent opportunity to showcase traditional lifestyles and practices of First Nations peoples;
- * tourists must be sensitive to the environment - respect for wildlife and no human pollution;

Cultural Tourism

This was a primary focus of the Elders discussions. The Elders feel strongly that all aspects of First Nations cultural tourism should be managed by a "process," as opposed to an overall governing "authority," because of the different traditions and practices of the national groups within Saskatchewan.

Within Saskatchewan there are five distinct Nationalities -Cree, Saulteaux, Dene, Assinaboine and Dakota/Lakota/Nakota.

Each of these rations have different perspectives on cultural exploitation and the appropriateness of tourist participation/observation in the products which may be developed around First Nation's products and attractions.

The Elders feel very emphatically that all aspects of the management, preservation, custody, conservation and stewardship of cultural exploitation must be fully controlled by First Nations with extensive Elders participation