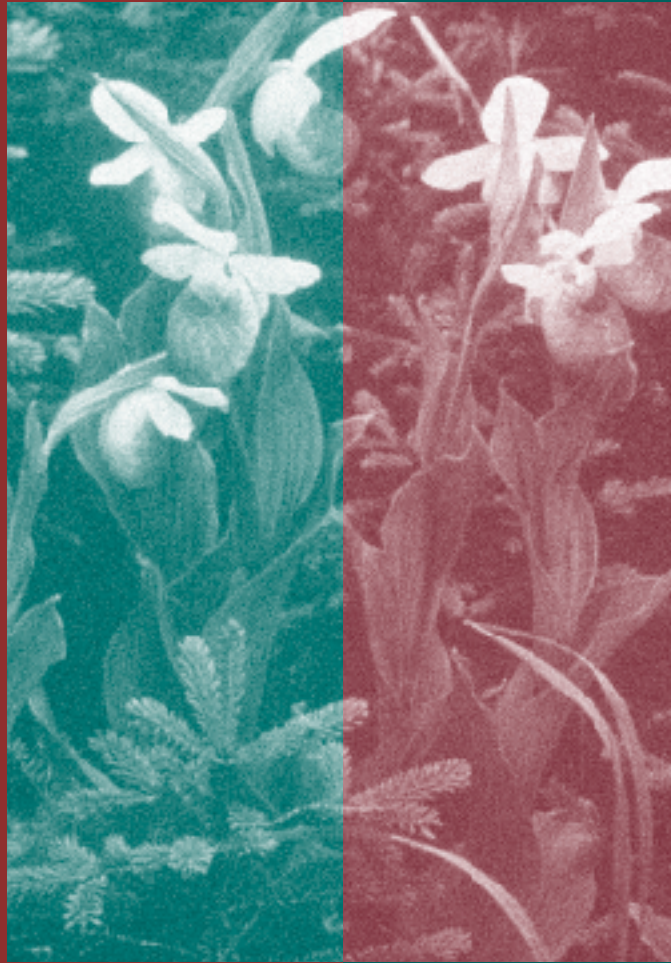


CONSERVING SASKATCHEWAN'S BIODIVERSITY:



A PROGRESS REPORT



Government of
Saskatchewan

February 1999

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EXECUTIVE SUMMARY

Saskatchewan has a rich legacy of biodiversity and is steward to a diverse and ecologically significant array of ecosystems. The province's identity is shaped by its landscapes, waterscapes and wildlife, the abundance of which underpins our economy and is a source of sustenance, as well as cultural, recreational and spiritual well being.

Responsibility for conserving and sustaining biodiversity lies with all sectors of society. Given our limited understanding of biodiversity and the knowledge and expertise that must be considered for resource and land-use decisions, the Government of Saskatchewan has a significant leadership role to play.

This progress report compiles initiatives undertaken with the involvement of the Government of Saskatchewan, in support of the five goals of the Canadian Biodiversity Strategy (CBS). Prior to Saskatchewan endorsing the CBS in 1995, Saskatchewan's Environmental Agenda (1994) recommended numerous initiatives including integrated long-term forest resource management plans, promotion of environmentally sustainable agricultural practices and the development of an energy strategy and a strategy to ensure environmental protection in the mining sector in support of biodiversity conservation. Since the CBS was released, the province has undertaken further initiatives touching many aspects of the conservation of biodiversity and the sustainable use of biological resources in Saskatchewan.

The initiatives listed in this document highlight the commitment of the Government of Saskatchewan and of the government in partnership with an array of other agencies and organizations to biodiversity conservation. Cornerstone initiatives towards implementing the Canadian Biodiversity Strategy include the:

- Representative Areas Network initiative planned for completion in the year 2000;
- Establishment of the Saskatchewan Conservation Data Centre as part of a hemispheric network of more than 60 linked conservation data centres;
- Prairie Conservation Action Plan completed in conjunction with several agencies including Saskatchewan Agriculture and Food, Saskatchewan Environment and Resource Management and the Saskatchewan Stock Growers Association;
- Creation of The Conservation Easements Act and amendments to The Wildlife Act and a new Forest Resource Management Act to improve legislation for biodiversity conservation;
- Development of the Ecoregions of Saskatchewan Map and associated products which are part of the national and international Ecological Land Classification system developed in partnership with the University of Regina, several provincial and federal government agencies and the Saskatchewan Research Council;
- Many action orientated initiatives directly impacting on Saskatchewan's natural resources including the implementation of Provincial Park Vegetation/Ecosystem Management Plans, Species Recovery Plans, SaskPower's Constructed Wetland, Soil Conservation Initiatives and SaskEnergy's Pipeline Reclamation Project; and
- Development and implementation of Saskatchewan Environment and Resource Management's Public Involvement Policy Framework and Aboriginal Affairs Policy Framework.

Collectively, these initiatives represent a significant contribution to changing the ways that we manage the landscapes to foster sustainability, and provide a basis for assessing where gaps exist so that future action can be directed to address the gaps.

Many challenges remain ahead in our efforts to conserve biodiversity. In order to respond effectively to the Canadian Biodiversity Strategy, there is a need to enhance capacity in a number of key areas. These areas include the need for better knowledge and information on biodiversity resources in the province and better decision-support mechanisms to support conservation efforts. This will allow government to better assess where we are today, and to evaluate future accomplishments.

ACKNOWLEDGEMENTS

The Committee Chairs extend their appreciation to the many people who shared their knowledge and time in the preparation of *Conserving Saskatchewan's Biodiversity: A Progress Report*. In particular, we are indebted to the many contributors, to the Saskatchewan Biodiversity Interagency Steering Committee and to Paul Garity for providing the artwork for this publication.

We also acknowledge Saskatchewan Environment and Resource Management and SaskEnergy Incorporated for covering the cost of publishing the report.

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(SMACH)

Saskatchewan Wetland Conservation Corporation (SWCC)

1. BACKGROUND

Saskatchewan's Environmental Agenda

The province of Saskatchewan adopted its current environmental policy in 1994. Saskatchewan's Environmental Agenda - Securing a Sustainable Future was intended to complement other major government policy initiatives including the Balance Budget Plan, Partnership for Renewal and the Wellness Model for Health Care.

The Environmental Agenda outlines five goals and associated actions designed "to achieve a sustainable environmental future for Saskatchewan":

- Protect primary resources of air, water and soil;
- Preserve biological diversity and ensure the sustainable use of renewable resources and ecosystems;
- Use non-renewable resources wisely;
- Meet our national and global responsibilities; and
- Develop a sustainable society.

The second goal dealing with biological diversity recommended a number of specific actions with implications for a number of departments and agencies (i.e. forest management planning, environmentally sustainable agriculture, wetland policy, protected areas strategy and endangered species legislation).

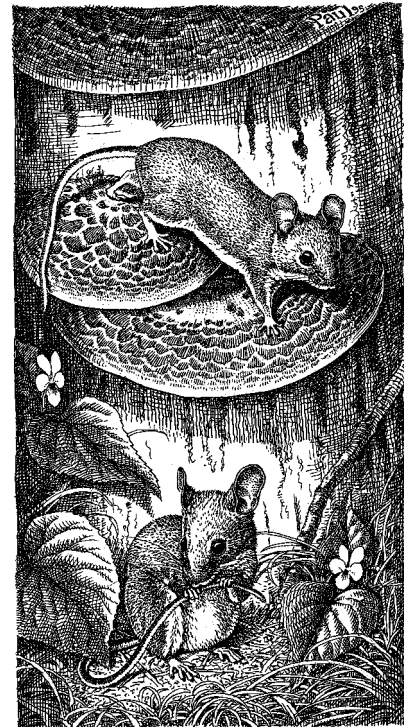
Canadian Biodiversity Strategy

Recognition of the world-wide impact of the decline of biodiversity inspired the global community to successfully negotiate the United Nations Convention on Biological Diversity in Rio de Janeiro in 1992. The groundbreaking treaty, opened for signature at the Earth Summit in June 1992, has now been ratified by more than 170 countries. On December 4, 1992, Canada became the first industrialized country to ratify the United Nations Convention on Biological Diversity. The unprecedented rate at which the Convention has been ratified into force is evidence of the importance attached by the international community to the alarming loss of global biodiversity.

Canada's primary response to the Convention was the development of the Canadian Biodiversity Strategy (CBS). Developed with the participation of the federal, provincial and territorial governments along with broad public involvement, the CBS is a national framework that puts the Convention on Biological Diversity into the Canadian context. It provides the framework within which each jurisdiction can determine its own priorities and actions. In May 1995, the Saskatchewan government endorsed the CBS.

Canadian Biodiversity Strategic Goals

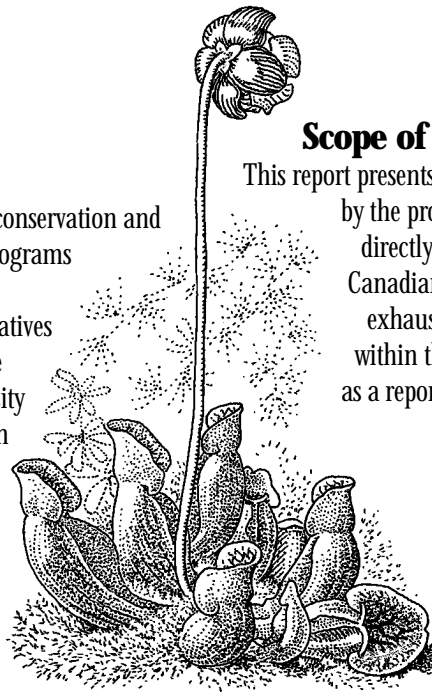
- i) Conserve biodiversity and use biological resources in a sustainable manner;
- ii) Improve our understanding of ecosystems and increase our resource management capability;
- iii) Promote an understanding of the need to conserve biodiversity and use biological resources in a sustainable manner;
- iv) Maintain or develop incentives and legislation that support the conservation of biodiversity and the sustainable use of biological resources; and
- v) 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.



Saskatchewan Biodiversity Action Plan

To date, there has been a broad array of conservation and sustainable use strategies, policies and programs related to land and resource use.

Saskatchewan is now bringing these initiatives under a common framework through the development of a Saskatchewan Biodiversity Action Plan. The proposed five year Action Plan will outline further actions towards implementation of the Canadian Biodiversity Strategy and will transform the strategic directions of the CBS into practical actions for the Saskatchewan government.



Scope of the Progress Report

This report presents the myriad of initiatives undertaken by the provincial government that touch directly and indirectly on the goals of the Canadian Biodiversity Strategy. This is not an exhaustive list of the many efforts underway within the province, nor is it intended to serve as a report card.

What is Biodiversity?

The Convention on Biological Diversity defines "biological diversity" as: "the variability among living organisms from all sources, including terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are a part; this includes diversity within species, between species and of ecosystems."

Biodiversity can be further defined in terms of genes, species, ecosystems and landscapes.

Genetic Diversity - variability in the genetic composition of individuals within or among species and their populations.

Species Diversity - the number and variety of species found in a given area.

Ecosystem Diversity - the variety of ecosystems found within a region, where ecosystem means a dynamic complex of plant, animal and microbial communities and their non-living environment interacting as a functional unit.

Landscape Diversity - the mosaic of interacting ecosystems. All of the above levels of biological diversity are integrated into landscapes. Ecosystems may be characterized by vertical relationships among organisms, air, water, soil and nutrients and ecological processes within a relatively homogeneous spatial unit; landscape diversity represents the relationship among such spatial units.

2. THE CURRENT STATUS OF SASKATCHEWAN'S LANDSCAPES

Saskatchewan people are the stewards of nationally and internationally significant biological and geographical diversity. Our diverse landscapes and watersheds of the southern prairies and northern forests support a rich and unique flora and fauna ranging from the more familiar mammals, birds, fish, reptiles, amphibians and vascular plants to the less visible, but highly important, invertebrates, non-vascular plants and microorganisms. Our landscapes encompass an extraordinary range of ecosystems, including native prairie grasslands, sandhills, wetlands, lakes, rivers, sparsely treed shield, bogs, fens and boreal forests.

Saskatchewan's great diversity of terrestrial and aquatic ecosystems reflects the nature and interaction of many physical, biological and human factors. This mosaic of diverse ecosystems possesses many unique natural features, many of which are of national significance and some of which are of world wide significance. One example is the Prairie Ecozone of Canada which is part of the North American Great Plains region. This region extends over the widest latitudinal range of any single ecological region on the continent. Although this ecozone represents five percent of the total area of Canada, Saskatchewan encompasses approximately 51 percent of this Ecozone. Also significant is that more than two-thirds of the Prairie Ecozone in Canada is altered by human activity and many of the remaining native habitats are small and highly fragmented. Ecologists estimate that as many as one-third of prairie species have been extirpated since European settlement and many more are at risk. Further north, along the forest fringe, many other species are at risk from the continuing conversion of boreal forest to crop land and fragmentation from resource development. Many of these forest species are unique, occurring no where else on Earth - once removed they are lost forever.



Geology

The shape of the Saskatchewan landscape is determined primarily by its bedrock geology and glacial history and, to a lesser extent, by geologic processes since glaciation.

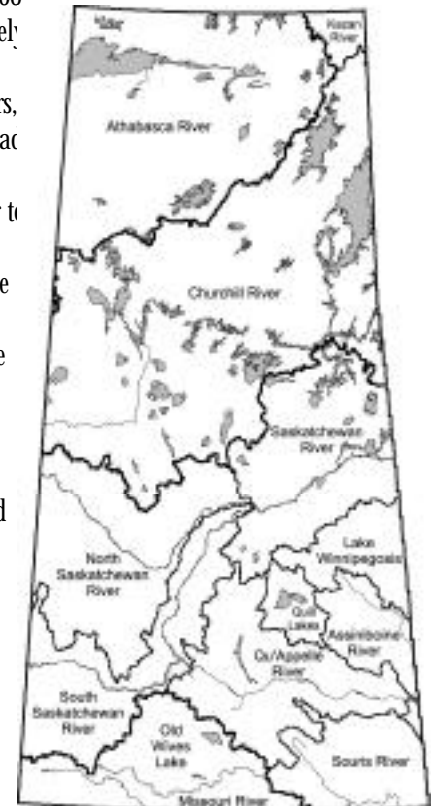
Saskatchewan has two main geologic regions, each underlain by a different suite of rock types. The Precambrian Shield, exposed in northern Saskatchewan, comprises crystalline basement rocks and sedimentary rocks that represent more than two billion years of earth's history. Younger sedimentary rocks cover the crystalline basement rocks in the Phanerozoic Basin, which occupies the southern part of the province. Continental glaciers have significantly influenced Saskatchewan's landscapes, eroding and re-depositing vast quantities of sediment.

This glacial landscape has undergone further modification since glaciation, primarily by the action of wind and water, but also through the force of gravity.

Water and Watershed Diversity

Saskatchewan has an estimated 81,600 km² of surface water, or approximately 12 percent of the total area of the province. This water is found in rivers, streams, lakes, ponds and human-made reservoirs. Local runoff of snow melt and rainfall is the major contributor to water in natural ponds and lakes, interprovincial flow contributes to the water supply in major reservoirs including Lake Diefenbaker, Codette Lake and Tobin Lake.

More than 90 percent of the precipitation returns to the atmosphere through evaporation and transpiration, with the balance returning to the oceans as stream flow or becoming part of ground water systems.



Saskatchewan Watersheds

Landscape Diversity and Ecological Land Classification

Within the province, four ecozones have been recognized, corresponding roughly to the prairie (Prairie Ecozone), boreal forest (Boreal Plain Ecozone), shield (Boreal Shield Ecozone) and the northern subarctic (Taiga Shield Ecozone) regions. Eleven ecoregions are identified as subsets of these four ecozones. The Mixed Grassland, Moist Mixed Grassland and Aspen Parkland ecoregions are recognized within the Prairie Ecozone. In addition, the unique geology and vegetation of the Cypress Hills Upland helped to separate it as a fourth ecoregion within the Prairie Ecozone. In turn, the 11 ecoregions are subdivided into more than 150 Landscape Areas. Three ecoregions, the Boreal Transition, Mid-Boreal Upland and

the Mid-Boreal Lowland occur within the Boreal Plain Ecozone. The Churchill River Upland and the Athabasca Plain Ecoregions comprise the Boreal Shield Ecozone. The Taiga Shield Ecozone also consists of two ecoregions, namely the Selwyn Lake Upland and the Tazin Lake Upland.

Provincial Species Diversity

Aside from the more visible groups, the total species diversity of the province is poorly documented. The known native vertebrate fauna of the province includes 58 fishes, seven amphibians, 12 reptiles, 358 birds and 80 mammals. There are at least 2,333 native vascular plants documented as occurring here. To this must be added a similar number of non-vascular plants. The most diverse group is the terrestrial and aquatic invertebrates with an estimated 10,000 native species inhabiting the province. There are also numerous species of viruses, bacteria, protozoa and other microorganisms, for which no meaningful estimates of species numbers are available, although they also certainly number in the thousands.



Saskatchewan Natural Ecoregions

3. WHY ARE WE CONCERNED ABOUT BIODIVERSITY?

Why has the conservation of biodiversity resources become an issue within Saskatchewan? The media often has articles on the destruction of tropical rainforests and the loss of old growth forest, yet rarely is there information on the state of ecological health at home.

Ecosystems, species and genetic diversity are at risk in Saskatchewan, largely resulting from human activity. The cumulative impacts of industry, farming, forestry, expanding urban areas, development of transportation corridors, and high per capita consumption of resources has led to the degradation of ecosystems, habitats and the reduction of genetic and species diversity.

All of these changes collectively constitute risk to biodiversity at the level of whole ecosystems and threaten ecological services which make life on Earth possible. There is growing recognition in all sectors of the benefits of the maintenance and enhancement of biodiversity. Just as humans depend upon the products of agriculture and forestry for example, these industries depend upon the biological resources and ecosystems that provide the raw materials.

The present principle threats to the province's land and aquatic biodiversity can be summarized under four main headings:

- **Habitat Loss and Fragmentation:** When habitats are destroyed or modified during human activities, native species which cannot adapt are lost out of the system. If the remaining habitats are too small or too isolated from others, native species also continue to be lost from the fragments.
- **Non-native or Exotic Species:** Many species in ecosystems do not occur there naturally but were introduced either deliberately or accidentally by humans. Some of these can become invasive and displace native species through a variety of mechanisms.
- **Pesticides and Pollution:** Human activities often release toxic substances into the environment which can reduce biodiversity either through direct mortality, reduced reproduction or increased stress on the organism.
- **Overexploitation:** Humans use wild species for a variety of reasons, including the provision of food. Unless carefully managed, it is possible to exceed the

natural replacement rate of the population and the population can be eliminated.

Habitat Loss and Fragmentation

As human activity increases across the landscape, the gaps in natural areas become larger and more frequent. A highly fragmented landscape consists of a few remnant patches of natural habitat in a sea of converted land. In Saskatchewan, the effects of habitat loss and fragmentation have been most severely felt in the Prairie Ecozone, where 70 percent of the native grasslands and parklands and 50 percent of the wetlands have been converted mostly for agricultural cropland.

Prairie species must now cope in small habitat patches which makes these areas susceptible to disruptive external forces such as weed invasion and human use including oil and gas extraction.

Habitat loss and fragmentation in northern Saskatchewan is much less of a problem than in the south. However, there is concern over the increasing number of roads, power lines and other linear corridors built in order to facilitate the extraction of commercial timber and other commodities.

Roads are increasingly being recognized as a severe threat to sensitive wildlife and natural ecosystems. Southern Saskatchewan has the highest per capita road network in the world, these roads aggravate the isolation of native habitat parcels by acting as barriers to wildlife moving and as corridors for exotic plant species invasion. In the north, roads can expose large mammals to heavy hunting pressure, slope failure and erosion from roads can cause stream sedimentation putting fisheries at risk.

Non-Native or Exotic Species

The introduction of non-native, or exotic, species is also of serious concern. In general, most introduced species are relatively benign with respect to native ecosystems. However, some of them have become a threat to native biodiversity. For example, purple loosestrife and leafy spurge both out-compete and replace native vegetation unless they are controlled. Brome grass and crested wheat grass have been widely introduced as forage crops and both are invading native ecosystems.



Another example is the reduction in the number and diversity of native lady bugs in the province. The more aggressive European lady bug species are believed to be responsible for the declines in native species. In a recent study on native grasslands, it was found that non-native beetle species comprised eight percent of the total beetle diversity collected.

Fish provide a good example of the damaging effects of exotic species on native biodiversity. Eighteen percent of Saskatchewan fish species are non-native. Their impact on native ecosystems has not been evaluated, but the displacement by introduced species has been implicated as one cause of the decline of some native species. An example is competition from the introduced European carp which is believed to be playing a significant role in the decline of the native bigmouth buffalo fish.

A comprehensive list of all non-native species established in the province has not been compiled. However, their impact on provincial native biodiversity is greatest in the south where habitats have been more widely disrupted.

Pesticides and Pollution

Other than at a few point sources, pollution is not a serious threat to provincial biodiversity in Saskatchewan, because of the low human density and limited industrial development. However, the threat of global warming to biodiversity resources will be a major concern in this province and across Canada as increases in greenhouse gas levels in the atmosphere create a warming of the Earth's surface.

Herbicides, and to a lesser extent, insecticides and fungicides, are used quite extensively in the agricultural sector. The product registration system, and storage, training and application requirements are in place to minimize impacts on non-target species. If environmental or safety concerns arise, products are re-evaluated and may be removed from registration (example carbofuran). The past damage to birds of prey and fish-eating birds has been largely corrected following the elimination of organochlorine pesticides, although migratory species are still susceptible to Latin American sources of pesticides. However, with a few exceptions, the potential impacts of their replacements on native terrestrial or aquatic biodiversity have not been evaluated. Research has indicated there is a threat of damage to some native ecosystems.

The potential impacts of pesticides on provincial biodiversity are greatest in the south where their use is more widespread, but there are examples in the north including the control of the spruce budworm in the commercial forest which has resulted in an expanding spraying program.

In considering the impacts of pesticides on biodiversity, it is important to remember their most serious effects are often not immediately obvious. While some organisms may survive a pesticide application, they may be sufficiently weakened that other factors become decisive in their ability to survive and reproduce.

Overexploitation

The deliberate overexploitation of natural resources in Saskatchewan is generally a thing of the past. An often cited example is the hunting of bison to near extinction. However, the local overexploitation of some species does still occur in the province.

The biggest concern currently lies with the provincial commercial and sport fisheries. In general, the over-fishing of a lake by commercial fisheries can be avoided with careful management of the fishery. Future potential overexploitation problems exist for other species. There is a growing interest in the recreational and commercial harvest of native plants for medicinal purposes.

As a result of effective resource management many populations of wild flora and fauna and other wild organisms are harvested sustainably. Numerous programs are currently being implemented to maintain or restore populations of native species. Programs to manage species which are harvested for commercial, subsistence and recreational programs are also in place to ensure sustainable use of biological resources.

4. INITIATIVES FOR THE CONSERVATION OF BIODIVERSITY IN SASKATCHEWAN

This progress report presents an overview of the many policies, plans and programs which have been implemented or are underway that support the Canadian Biodiversity Strategy. The report has been structured following the five goals of the strategy. Each initiative has been presented under the goal for which it best contributes towards achieving that goal. Some of the initiatives have been grouped together to show the linkages in one program area and to allow the reader the opportunity to review all actions underway in a specific field.

4.1 Goal One: Conservation and Sustainable Use

To conserve biodiversity and use biological resources in a sustainable manner.

GOAL ONE initiatives outline actions required to conserve populations of native wild flora and fauna across their natural geographic range. Included are actions towards establishing and managing protected areas which contribute to biodiversity conservation; actions which restore and rehabilitate species and ecosystems; and policy and planning initiatives which support sustainable use of biological resources and reduce threats to species and habitats.

A. Wild Flora and Fauna and Other Wild Organisms

Many policies and programs have been established within Saskatchewan to manage both ecosystems and wild species. The direction and scope of population inventory and management has evolved over the last several decades with a transition from management focused on traditional fish and game species to a broader approach which includes all flora and fauna. Awareness that many species, not subject to direct harvest or use, may be adversely affected by human activities has influenced a number of natural resource management agencies including Saskatchewan Environment and Resource Management (SERM). In 1997, through amendments to The Wildlife Act, the definition of wildlife was changed to include all living wild biota. This has been reflected by the inclusion of plants, invertebrates, amphibians, reptiles and other non-game species in the development of inventory and

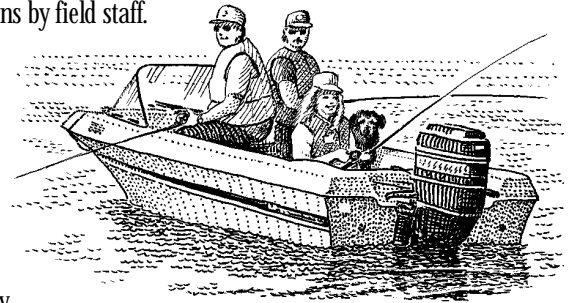
population management activities. Recognition of the dependency of wild species upon suitable habitat has generated a number of habitat protection programs which are key components of SERM's population management activities. These programs serve to protect landscapes, but where the primary intent is to help sustain wild populations the programs have been listed here.

New policies and programs will work to ensure populations at risk are identified and protected from severe decline and remain viable. For species of flora and invertebrates, this will entail protection of communities instead of protection of individual species. As programs continue to evolve, the maintenance of the diversity and abundance of native species and their habitats will become the highest goal of population management. Saskatchewan has identified the need to pass regulations to protect species at risk, take measures to monitor species status, improve public awareness and develop effective enforcement policy. Agreements commit all jurisdictions to establish complementary legislation and programs that provide for effective protection of wildlife at risk throughout Canada.

Fish and Wildlife Management

To maintain biodiversity, SERM must ensure utilization of the province's wildlife and fish is sustainable, by monitoring populations and controlling harvest of those populations. SERM collects information from resource users on hunting, trapping and fishing success as an indicator of population trends. This is supplemented with a variety of data collections by field staff.

Actual hunting, trapping and fishing opportunities are then managed to keep use of the population within sustainable levels. Season length, bag limits, limited entry seasons, commercial harvest quotas, catch and release areas, special area closures and control on harvest techniques are among the methods employed each year to keep harvest levels in balance with the population. While the role of fish and wildlife managers has now grown to actions related to the health of the ecosystem, this traditional task of managing hunted, trapped and fished populations remains essential.



Fish and Wildlife Development Fund (FWDF)

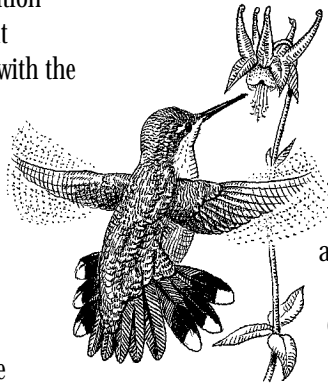
Supported by hunters, trappers and anglers through a portion of their licence fees, the FWDF components are used to secure and improve both fish and wildlife habitat throughout the province. The fund has secured a total of 70,147 hectares of important wildlife habitat to date. This includes joint purchases with the Saskatchewan Wildlife Federation, the Nature Conservancy of Canada and the Rocky Mountain Elk Foundation. Other expenditures include allocation of funds to resource education including Project WILD; habitat management expenditures including funding agreements with the Saskatchewan Wetland Conservation Corporation and the Saskatchewan Wildlife Federation; and endangered species program agreements with Nature Saskatchewan.

Wildlife Habitat Protection Act

Approximately 1.38 million hectares of agricultural Crown land in Saskatchewan are recognized as important habitat under The Wildlife Habitat Protection Act (WHPA). Lands designated under this Act must continue to be held under Crown ownership and cannot be altered in such a manner that habitat value is reduced. These lands cannot be sold to private owners, cultivation is prohibited and forestry developments are restricted. There are also smaller areas of significant habitat on other agricultural Crown lands throughout the province not designated under the WHPA.

Wildlife Tomorrow

Saskatchewan landowners have voluntarily agreed to set aside almost 161,880 hectares of their private lands for wildlife habitat. Under the Saskatchewan Wildlife Federation's Wildlife Tomorrow program, landowners execute agreements that promise to maintain existing wildlife habitats. The producer retains title of the land and receives recognition for his or her participation in the form of a gate or site sign. Since the program's inception in 1974, approximately 1,400 landowners have signed agreements.



B. Protected Areas

The first protected areas in Canada were established just after Confederation; to preserve outstanding scenic areas for outdoor recreation, tourism and to protect wildlife habitat. The first Wildlife Sanctuary in Canada was established at Last Mountain Lake in Saskatchewan in 1887 and Saskatchewan's first national park, Prince Albert National Park, was established in August, 1928. The Provincial Park System that now encompasses 1.3 million

hectares was initiated in 1931. Other parks with provincial involvement included the Regional Parks and Urban Park Authorities. Protected areas contribute a significant element to the ecological management of biodiversity resources, although they must be complemented by sound stewardship across the entire landscape. Protected areas are described by the United Nations Convention on Biological Diversity as "a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives." The purpose of protected areas varies, and so do the levels of protection afforded them. In some cases human activities and access are strictly limited and in others multiple land-use objectives are pursued.

In Saskatchewan, the current system of preserves, parks and wildlife habitat lands offers some protection to a variety of living things. However, there are not enough of these areas that are representative of and are able to safeguard our natural resources at levels that many have come to expect in Saskatchewan. In response to the need to conserve more areas in their natural state, the province has established a system of special sites to be called the Representative Areas Network. The network, that recognizes the contribution of existing protected areas as well as new sites, will serve as the cornerstone in the effort to protect representative examples of Saskatchewan's biological and landscape types.

Saskatchewan's Representative Areas Network

The Government of Saskatchewan, through SERM, is committed to the establishment of a system of protected areas, by the year 2000, representing the range of ecosystems across the province. This system is called the Representative Areas Network.

Saskatchewan's Representative Areas Network Milestone Accomplishments, March 31, 1998

- August, 1997** Final Action Plan for Saskatchewan's Representative Areas Network is released to the public.
- October, 1997** Partnership agreement with Ducks Unlimited Canada (DU) covering 364,230 hectares of marshlands and associated uplands managed by DU.
- Partnership agreement with Saskatchewan Wetland Conservation Corporation (SWCC) covering 10,522 hectares of wetlands, remnant prairies and riparian areas administered by SWCC.
- November, 1997** Recognition agreement with the Redberry Lake Pelican Project and its associated upland, totaling more than 6,585 hectares.
- January, 1998** Official launch of the Conservation Easement Program. Private landowners grant conservation easements in support of provincial Representative Areas Network totaling 1,012 hectares.
- February, 1998** Designation of 27 new parkland reserves in northeastern Saskatchewan totaling 76,488 hectares.
- Designation of two new ecological reserves and one new wildlife refuge within the Cold Lake Air Weapons Range, totaling 170,783 hectares.
- Partnership agreement with the federal Prairie Farm Rehabilitation Administration (PFRA) recognizing the contribution of PFRA's 728,460 hectares pasture network to the network.

In total, these initiatives have resulted in 1,335,510 hectares of new land being recognized as contributing to the Representative Areas Network in Saskatchewan.

Saskatchewan is made up of various landscapes. A representative area is a sample or piece of a particular landscape identified because of its important landforms, water bodies, wetlands, soils, plants, animal resources or cultural values. Representative areas are intended to be managed in a manner that will allow for natural processes to be maintained. They can also serve as test sites that can be studied or monitored to measure how well we are managing natural resources and ecosystems across the province.

The Representative Areas Network must include lands and waters that represent a broad range of ecological diversity. Saskatchewan's landscapes have been divided into 11 distinct "ecoregions", each characterized by its geology, soils, climate, plants and animals. One of the program's objectives is to preserve and manage examples of Saskatchewan's natural landscapes in each of these 11 ecoregions which will serve to protect biodiversity at the genetic, species and landscape levels.

Just as the reasons for choosing a particular site vary, so too, do the uses that are acceptable within new sites. All sites will be managed to retain or restore their ecological

integrity. In the majority of sites, land uses compatible with these ecological objectives can be accommodated. Suggestions and needs identified by local interest groups and users will largely determine the kinds and levels of compatible activities that may occur within a particular site.

Consultation and input from local users helps to determine the best option for each site. Through these discussions, specific needs, concerns or issues can be addressed on a site-by-site basis and outlined in a detailed management plan, monitoring plan or strategy prepared for each area.

Native Prairie Stewardship Program

The Saskatchewan Wetland Conservation Corporation (SWCC) works to evaluate and conserve privately-owned native prairie grassland through its Native Prairie Stewardship Program. Since 1995, existing prairie sites in approximately six million hectares of the prairie ecoregion have been ground-surveyed and assessed in areas where approximately one percent of the surveyed area remains as native upland prairie. As a complement to the inventory work, native prairie landowners are

encouraged to make voluntary agreements to conserve this native habitat. Since 1997, 213 landowners have made a "voluntary stewardship agreement" to protect close to 37,000 hectares of native prairie in southern Saskatchewan, and several have signed conservation easements on their parcels. These "voluntary stewards" are also encouraged to undertake management to deal with the widespread threats of exotic and woody vegetation invasion, overgrazing and/or idling.

In 1997, fact sheets and a program brochure were distributed to over 1,500 native prairie landowners in the province. In 1998, SWCC produced a management guidebook, *Managing Your Native Prairie Parcels: Your Guide to Caring for Native Prairie in Saskatchewan*. Voluntary stewards also receive a quarterly newsletter. All of these publications feature pertinent conservation information, management techniques and profiles of prairie management demonstration projects.

The Native Prairie Stewardship Program has been funded by Agriculture Institute of Management in Saskatchewan, Inc., Canada

Saskatchewan Agriculture Green Plan Agreement, Ducks Unlimited Canada, Environment Canada - Action 21, National Fish and Wildlife Foundation (US), SERM and Wildlife Habitat Canada.

Streambank Stewardship Program

Saskatchewan Wetland Conservation Corporation has established the Streambank Stewardship Program in partnership with SERM, Prairie Farm Rehabilitation Administration, Saskatchewan Agriculture and Food, Ducks Unlimited Canada, Meewasin Valley Authority and various volunteers and landowners. The program has initiated a variety of projects including an inventory of riparian habitat in 1996, which entailed a survey of almost 600 riparian sites. Data was collected on vegetation, hydrology, soils, land-use, animal and cropping impacts.

The program has also initiated technical training, landowner workshops and demonstration and enhancement projects to agencies and landowners on riparian management and enhancement topics. These as well as other public education initiatives provide materials and guides which will assist in stewardship of riparian areas within the province.

In addition, the program supports several riparian monitoring initiatives including a volunteer ecological monitoring program with the Partners of the Saskatchewan River Basin and a monitoring program for enhancement projects.

Old Man On His Back Prairie and Heritage Conservation Area

In 1996, SaskPower joined in a partnership with the Nature Conservancy of Canada and Saskatchewan Environment and Resource Management to create the Old Man On His Back Prairie and Heritage Conservation Area. The 5,300 hectare prairie, in southwestern Saskatchewan, is one of the finest shortgrass habitats in Canada. The preserve is home to a number of endangered species, such as ferruginous hawk, burrowing



owl, loggerhead shrike and swift fox. The preserve also contains a number of Aboriginal cultural sites, such as tipi rings and medicine wheels.

Provincial Park Lands

Parks have traditionally had a role in protecting natural landscapes and providing public access to wilderness. The park system encompasses 1.3 million hectares across the province. The role of protecting the integrity and diversity within park land boundaries is now expanding with projects that embrace the concepts of ecosystem management. Provincial parks are active partners in a number of initiatives which protect and maintain biodiversity.

Park Lands System Plan

The Parks Lands System Plan was released in 1990 and was based on the concept of representing landscapes defined by 31 natural zones and six broader natural

regions as well as providing outdoor recreation opportunities. Plan objectives included the following proposals: a subarctic Wilderness Park; Protected Areas in the Tazin Lake Uplands and Cumberland Lowlands; the Clearwater River and Athabasca Sand Dunes Wilderness Parks (these have both been designated) and Natural Environment Parks along the Upper Haultain River, the Sturgeon Weir River, at Wathaman Lake and/or in the vicinity of the Foster Lakes. It suggested that some park designations could result from management planning exercises associated with the nomination of the Churchill River as a Canadian Heritage River - namely Black Bear Island Lake and South Bay on Lac Isle-a-la-Crosse. Further south in the province, a series of protected areas was proposed to represent Natural Zones such as the Old Wives Lake Plain, the Sceptre Plains, the Qu'Appelle-Souris Plains, the Nisbet Plain and the Carrot River Lowlands. A Wilderness Park was recommended for the Swift Current Creek area to represent the Missouri Coteau and Natural Environment Parks were recommended for the Great Sand Hills, Lower Qu'Appelle Valley and the Bronson Forest. Some of these proposals have been incorporated in the Representative Areas Network and are being pursued under that program with the same intent of providing some protection of these landscapes and the biodiversity they support.

The Parks Act

Amendments to the Act in 1994 expanded Saskatchewan Landing Provincial Park and created the Clarence - Steepbank Lakes Provincial Wilderness Park and the Grasslands Protected Area. Legislative amendments in 1998 expanded Douglas Provincial Park by 1,300 hectares and created the MacDowall Bog Protected Area. Under The Parks Act, 27 new areas totalling 76,500 hectares have been designated as Park Land Reserve.

Saskatchewan's Provincial Parks: Directions for the 21st Century (Parks Tomorrow)

Based on the results of a public consultation initiative undertaken in 1996 on the future of the provincial parks system, a report was issued in July, 1997. The Saskatchewan's Provincial Parks: Directions for the 21st Century made a series of recommendations, including:

- Enhancing natural and cultural resource protection;
- Establishing different recreational experiences, facilities and services for different park lands;

- Establishing different interpretive/educational experiences and services for different park lands which emphasize the natural components and experiences on some park lands;
- Enhancing tourism and the economic benefits from tourism by enhancing resource protection and interpretive/educational opportunities; and
- A commitment to public involvement and park partnerships in park management.

To date, action on implementing the recommendations of this report has concentrated on the formation of local park advisory groups and the upgrading of park facilities, including the construction and rehabilitation of interpretive trails and visitor centres. Studies on the more detailed aspects of the Parks Tomorrow implementation process are currently underway including a Conservation Action Plan for park lands which will ensure the conservation of biodiversity within the park system and the conservation of its cultural heritage resources.

Provincial Park Vegetation and Ecosystem Management Strategies

Vegetation and ecosystem management plans are intended to provide direction for the management of the natural communities contained within provincial parks. They are aimed at ensuring that the parks natural environment is perpetuated and at protecting all species, ecosystems and natural processes, and that those portions of park land accommodating facilities and human use are sustainable. Vegetation management plans have been prepared for six provincial parks, with another four under preparation.

Canadian Heritage River System (CHRS) Program

This federal/provincial/territorial program gives national recognition to outstanding rivers for their natural, cultural and recreational qualities and strives to protect those qualities. A Rivers Systems Study identified 11 rivers as having the highest potential for nomination as Canadian Heritage Rivers, including, in northern Saskatchewan: the Sturgeon Weir; MacFarlane/Snare; Fond-du-Lac/Perch/Hawrock/Waterfound; Churchill/La Loche/Wheeler/Geike and the Grease/Straight. Also recommended for consideration were the North and South Saskatchewan, Qu'Appelle and Saskatchewan rivers and Battle Creek. The Clearwater River has already been designated and the Churchill was nominated in 1993.

C. Restoration and Rehabilitation

Circumstances arise where the protection and maintenance of biological diversity are no longer possible. Species or ecosystems may be lost and the challenge becomes one of restoration. Since ecosystems are highly dependent on their constituent components, restoration is often essential in order to prevent further degradation. Several programs are underway in Saskatchewan which are aimed at restoring once lost or damaged ecosystems and species.

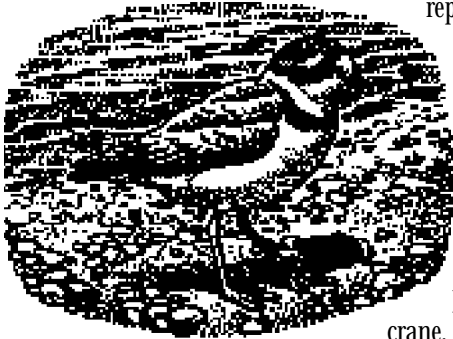
Species Recovery

Species-At-Risk Recovery Plans

Saskatchewan is involved with recovery plans for most of the species-at-risk which occur within the province. The program is fully integrated with national initiatives under the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and the National Accord for the Protection of Species at Risk in Canada. Recovery plans are prepared for species at risk, including species with low

reproductive rates, species dependent on vulnerable habitat type, or species very sensitive to human activities. This includes the development and implementation of recovery plans for the burrowing owl, swift fox, peregrine falcon, piping plover and whooping

crane.



Re-establishing the Swift Fox

The swift fox is a prairie grassland species that was officially declared extirpated from Canada in 1978. Ranchers in southern Alberta and Saskatchewan are contributing to the re-introduction of the swift fox by permitting the release of foxes onto their rangelands. Producers further contribute to the success of the program by providing informal sighting information. Approximately 700 foxes have been released since 1983. At this time, there are at least 40 pairs of foxes known to have re-established themselves as a result of the release program.

Burrowing Owls

The burrowing owl is an endangered prairie grassland species. Agricultural producers in southern Saskatchewan are actively contributing to burrowing owl conservation by maintaining nesting habitat, refraining from applying

insecticides and rodenticides around nest sites and by contributing to an annual burrowing owl census. Producer stewardship activities are co-ordinated under Operation Burrowing Owl led by Nature Saskatchewan. Approximately 500 landowners in the province participate in the program, receiving recognition in the form of gate signage and a nominal financial incentive if they have five or more pairs of burrowing owls on their property. Producers also have access to information on additional conservation activities they may choose to incorporate into their agricultural operations through Operation Burrowing Owl newsletters.

Enhancement of Ferruginous Hawk Nesting Sites

Declines in ferruginous hawk populations across the Canadian prairies have been attributed, in part, to a lack of isolated grassland trees, which provide elevated nesting sites for the birds. Producers in south-central Saskatchewan are helping to address this problem through their participation in the Ferruginous Hawk Nesting Platform Project, which started in 1992. The project objective is to create and protect artificial nesting platforms. Agricultural producers within areas targeted by SaskPower for above ground powerline conversion to below ground powerlines have the option to retain the outdated powerpoles on their lands. Nesting structures for the raptors are then installed on the poles. More than 50 landowners have entered into agreements with SaskPower and Nature Saskatchewan. In the future, producers are expected to further contribute to ferruginous hawk conservation by contributing census information on the birds. The participating agricultural producers appreciate the natural control hawks assert over Richardsons ground squirrel populations.

Restoration of Saskatchewan's Agricultural Crown Rangelands

Saskatchewan Agriculture and Food (SAF) administers approximately three million hectares of Crown rangelands. Sustainable management of these rangelands and conservation of their inherent biodiversity are important range management objectives. Livestock grazing is the major land use but surface dispositions may also be granted for petroleum, natural gas, sand or gravel extraction, or for public utilities or access roads.

SAF has adopted restoration guidelines to ensure that these lands are properly managed when requests are made for various types of developments. The Guidelines for Restoration of Saskatchewan's Agricultural Crown Rangelands communicate government requirements to developers. The development and restoration criteria are based on:

1. Environmental protection as part of the planning and development process.
2. Minimal land surface disturbance.
3. Restoration of disturbances to pre-development conditions.
4. The use of site specific native plant materials when reseeding.

Re-establishment of Rare Plant Species on Foothills Pipe Lines Ltd. Right-of-Ways in the Mixed Grassland Ecoregion of Saskatchewan

Re-vegetation of disturbed areas is crucial in the prevention of blow outs and active dunes in the light, sandy soils of southwestern Saskatchewan. Seed mixtures are required to germinate quickly to be able to establish a relatively dense ground cover and to be persistent under drought conditions. These requirements include an assumption that native species should be a part of, if not the entire mixture, of seed introduced into the disturbed site. In addition, the re-vegetated area must be able to allow for the continuation of natural processes such as species invasion and successional change.

In partnership with Foothills Pipe Lines Ltd., SERM will carry out a three to six year study to monitor the response and impact (on adjacent natural plant communities) of introduced vegetation on the disturbed pipeline right-of-way. Most importantly, individual or groups of rare and endangered plant species adjacent to the pipeline route will be monitored for recolonization of the right-of-way. Likewise, any harmful effects on rare and endangered plants caused by rehabilitation attempts such as increased competition or the invasion of exotics, will be noted.

Ecosystem Restoration and Rehabilitation

Wetland Habitats for Wildlife Species

The Quill Lakes area in Saskatchewan is internationally recognized for its biodiversity. Designated in 1994 as a Western Hemisphere Shorebird Reserve Network (WHSRN)

site, this complex of fresh and saline lakes, marshes, potholes and native prairie provides exceptional wildlife habitat. Nearly one million migratory birds use the area including several endangered or threatened species such as the whooping crane, burrowing owl and piping plover.

Four grazing cooperatives are participating in an initiative to conserve and enhance wildlife habitat for wetland dependent species around Big Quill Lake. Shorelines have been fenced and alternative watering systems installed in order to restrict cattle access to sensitive shoreline areas. Initiated in 1991, assistance for these activities is provided through the Prairie Shores Program, offered by SWCC.

Species and Habitat Protection and Enhancement

SaskPower has initiated or participated in several projects of direct assistance in maintaining species and habitat diversity.

Constructed Wetlands

Constructed in 1994 near the Estevan sewage lagoons, the wetland is one of the largest of its kind in Canada, and the only one in North America providing cooling water to a power station. The wetland provides up to 40 percent of Shand Power Station's yearly cooling requirements, while purifying the City of Estevan's secondary sewage wastewater and eliminating the need for semi-annual releases of Estevan's lagoons to the Souris River. An adjacent 117 hectare wetland created during construction of the Rafferty Dam provides a marsh nesting habitat for various wildlife and migrating waterfowl each spring.

Shand Greenhouse

Located next to the Shand Power Station near Estevan, the Shand Greenhouse supports biodiversity initiatives through the propagation of native vegetation. A variety of trees, shrubs and other plants are produced at the Greenhouse each year and distributed through "TREEmendous" Saskatchewan for conservation, reclamation and wildlife plantings. In 1997, a total of 305,800 seedlings were distributed, resulting in a cumulative total of over 1.3 million seedlings since 1992. The Greenhouse helps to preserve the environment not only through habitat offset, but by capturing some carbon dioxide released as the result of coal-fired electricity production.

Torkelson Project

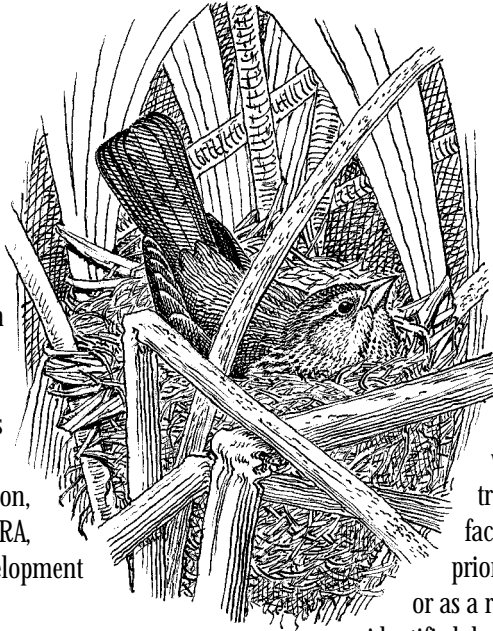
In 1996, Grades 5 to 12 students from Estevan, Oungre and Regina helped plant 85,000 tree seedlings on the Torkelson Ducks Unlimited site near Oungre, in southern Saskatchewan. Other project partners included Saskatchewan Wetland Conservation Development Corporation, Saskatchewan Pheasants Forever, PFRA, Saskatchewan Fish and Wildlife Development Fund and Shand Greenhouse.

Quill Lakes Solar Panels

Another project in the Quill Lakes area, Western Hemisphere Shorebird Reserve Network (WHSRN) is SaskPower's contribution of solar-powered pumps to provide water to four rangeland pastures which is critical to the success of the project, allowing shoreline habitat to be fenced off from neighbouring cattle. The project also utilizes cross fencing to encourage rotational grazing for the preservation of upland habitat. The Quill Lakes Solar Panel Project is operational every summer.

Decommissioning and Reclamation of Mining and Industrial Sites

Under current legislation, all mining companies are required to decommission and reclaim mine sites upon closure or as specific components of the site become worked out or are no longer required. Approved Decommissioning and Reclamation (D&R) Plans are required prior to new mines becoming operational. Also required are approved Financial Assurances to ensure that in the event of default by the mining company, monies would be available to implement the approved D&R Plans. The primary goal of D&R is to restore disturbed areas to an approved post mining land use. In most cases, this will result in a naturalized state compatible with surroundings in previously undisturbed areas. In previously developed areas, this may be some type of agricultural or other land use. Guidelines have been developed for D&R at potash mines; coal mines; sodium sulphate mines and northern mine sites (uranium, gold and base metal). Saskatchewan Agriculture and Food has distributed a document entitled "Restoration of Saskatchewan's Agricultural Crown Rangelands - Guidelines and Procedures for Developers".



Rehabilitation

In keeping with SaskPower's commitment to conduct independent audits and assessments of compliance with regulatory requirements and responsible environmental practice, a program was established to audit generation, transmission and distribution facilities. Site assessments are conducted prior to the sale or purchase of property, or as a result of potential contamination identified during an environmental audit. Site remediation, if necessary, is initiated once the assessment process has been completed. Major facilities undergo a formal decommissioning process which includes site assessment and remediation.

SaskEnergy is committed to maintaining biodiversity through many activities including the environmental auditing program. On a four year cycle, SaskEnergy and TransGas perform environmental audits at every one of their 1,100 corporate facilities. A component of the audits is to ensure that facilities are not impacting a larger area than necessary to facilitate operations. The use of mechanical over chemical methods of vegetation control is promoted. The audit program has also identified locations that may have been impacted by past operating practices. Operation practices have changed over the years and many of these sites have subsequently been remediated. At several locations, excavations from remediation work have naturally revegetated creating productive wetlands.

D. Sustainable Use of Biological Resources

Sustainable use of biological resources is crucial to the maintenance of biological diversity. Over exploitation of biological resources leads to their loss, which may in turn adversely affect other species and is always economically disastrous. Conscientious management of resources reduces reliance on costly mitigative measures and maintains resources for future generations.

Prairie Areas

Saskatchewan Prairie Conservation Action Plan

The first Prairie Conservation Action Plan (PCAP) was developed in the late 1980's through an initiative led by the World Wildlife Fund Canada and the Governments of Saskatchewan, Alberta and Manitoba. It was a blueprint for the conservation of native prairie ecosystems in western Canada. The plan was in effect between 1989 and 1994. It received wide support and over \$1 million was spent on 90 projects throughout the prairies.

To extend prairie conservation initiatives in Saskatchewan, a new Action Plan was prepared and released in 1997. The Saskatchewan Prairie Conservation Action Plan complements similar provincial efforts in Alberta and Manitoba and builds upon the first PCAP. This plan reflects agreement among representatives of 16 government agencies, and national and non-governmental organizations regarding conservation of the province's remaining native prairie.

Key areas of emphasis of Saskatchewan's new plan include the development of an ecological perspective, recognizing conservation of native prairie can only be accomplished within the view of sustainable management, requiring that we think, plan and act in terms of ecosystems. The new plan also outlines a detailed implementation program to address some special elements demanded by the prairie society, land tenure, agricultural development and fragmentation of native prairie. Implementation of the plan will be completed with involvement of private landowners, lessees, rural and urban municipalities, the provincial and federal governments, First Nations and a host of interest groups.

Saskatchewan Prairie CARE Lands

As part of the North American Waterfowl Management Plan (NAWMP), the Prairie CARE program was initiated in 1989 by Ducks Unlimited Canada (DU). In contrast to DU's Wetland Conservation Program, Prairie CARE focuses on land management by working with agricultural producers to promote soil and water conservation; to modify their land management practices or to offer the options of lease and purchase.



Saskatchewan Prairie Conservation Action Plan

Vision Statement:

"The native prairie is to be sustained in a healthy state in which natural and human values are respected."

Saskatchewan's Goals:

- To sustain a healthy native prairie grazing resource;
- To conserve the remaining prairie resource;
- To maintain Saskatchewan's native prairie biodiversity;
- To promote the sustainable use of native prairie to enhance the quality of life; and
- To promote education and develop communication programs regarding the conservation and sustainable use of native prairie.

The Prairie CARE program is primarily directed at private lands and to a lesser degree Crown lands such as community, provincial and federal pastures. The program is comprised of extension, modified agricultural use and intensive wildlife management. Extension activities are directed at producer adoption of soil and water conservation practices beneficial to agriculture and wildlife. Producers interested in modifying their agricultural practices undertake habitat projects that include: planned grazing systems, delayed haying, conversion of cropland to forage with delayed cut, hay flushing bars, underseed clover and interpothole habitat restoration. Through a management agreement of a minimum of 10 years, financial and technical assistance is provided to the landowner for cost sharing of seed, seeding and other capital costs. Intensive wildlife management secures critical wildlife habitat, particularly native lands by purchase and lease. In addition, drained wetlands are restored on leased and purchased wetlands.

Prairie CARE expenditures represent the principal component of the NAWMP expenditures in Saskatchewan. This program targets landscapes of high pothole density within the glacial moraines of the Moose Mountain Uplands, Pheasant Hills, Quill Lakes/Touchwood/Beaver Hills, Allan/Tiger/Minichinas Hills, Thickwood Hills, Cut Knife Uplands and the Missouri Coteau.

Partnerships with individuals, producer groups, provincial and federal agricultural agencies plus the Saskatchewan Wetland Conservation Corporation and the Saskatchewan Wildlife Federation have strengthened program delivery.

From 1989 to November, 1998, Prairie CARE projects include: 46,500 hectares of planned grazing, 2,600 hectares of delayed hay, 4,600 hectares of cropland conversion to forage with delayed cut and 1,500 hectares of underseed clover. Land purchase and lease of native uplands and cultivated lands converted to grassland amount to 28,800 hectares and 29,000 hectares, respectively. Securement of these upland acres additionally included 26,000 wetland hectares, typically in small wetland or pothole complexes.

Success of the Prairie CARE program is founded on producer interest. Program components will increasingly expand extension activities that will affect a much larger acreage of southern Saskatchewan.

Agricultural Areas

Soil Conservation

In the mid 1980's, there was a growing awareness across the agricultural community that a major effort was needed to improve soil management practices to reduce wind and water erosion, spread of soil salinity and reduced fertility. A series of soil conservation programs were initiated under federal/provincial agreements including Save our Soils, Soil and Water Conservation Program, Green Plan and Agri-Food Innovation Fund. These programs helped to expand soil conservation research and to raise producer awareness through demonstration projects, field days and extension information. This led to the establishment of the Saskatchewan Soil Conservation Association; a producer group dedicated to promoting soil conservation.

The benefits of conservation farming include lower production costs, enhanced crop yields, improved moisture use efficiency, reduced energy use, reduced erosion and increases in soil organic matter. The erosion risk has been reduced due to less summer fallow and reduced tillage, conversion of marginal cropland into perennial forages and the planting of tree shelter belts. Between 1991 and 1996, the area under zero tillage management increased from approximately 1.3 million hectares to 3 million hectares. As well, the area under minimum or reduced tillage increased from 3.4 to 4.1 million hectares or 33 percent of the total seeded area in the province. Summer fallow acreage decreased from 5.7 million hectares in 1991 to 3.9 million hectares in 1998.

These improvements in soil management practices have significant biodiversity benefits. Reduced levels of soil erosion mean less sedimentation of waterways and aquatic ecosystems. Higher levels of soil organic matter mean improved soil health, better water permeability and higher numbers and diversity of soil organisms. Leaving the stubble standing provides habit for many wildlife species as well.

The Grazing and Pasture Technology Program (GAPT)

The goal of GAPT is to improve and sustain rangeland and pasture resources. The Program is currently funded to March 31, 2000 under the Agri-Food Innovation Fund. It is jointly delivered by the Saskatchewan Stockgrowers Association and SAF with Rangeland and Forage Specialists located throughout the province.

GAPT's main objectives are to provide technical advice and training to producers involved in range/livestock production and to encourage multiple use of rangeland and environmental sustainability. Extension programs and projects include one-on-one and group producer consultation, meetings, tours, field days, trade shows, radio, development of a forage information CD, managing an Internet forage and range information site and publications. GAPT produces the Grazing Gazette, mailed to 9,000 producers throughout the province. The data-gathering component includes development of economic and agronomic guidelines, pasture rejuvenation recommendations, extended grazing season options, nutritive value of tame and native range plants, native range management and improvement guides and tame forage management guides.

Research studies conclude that rangeland biodiversity is maximized under good range management practices. As range condition improves, native species diversity tends to increase and numbers of potentially detrimental exotic species decrease.

Crop Development

The province supports funding for research in development of new and diversified crops and varieties with improved pest resistance. For example, core funding is provided to the Crop Development Centre (CDC) at the University of Saskatchewan. The CDC has played a major role in the development of crops like lentil which now is produced on approximately 300,000 hectares and chickpea which has increased to about 40,000 hectares and is expected to increase to 80,000 hectares next year. These crops provide alternatives to the major crops produced in Saskatchewan, allowing for increased crop diversity, longer rotations and more stable income for farmers. Crop diversity reduces the landscape level impacts of 'monoculture' agriculture and is therefore, beneficial to biological diversity.

Research work also provides varieties with increased resistance to plant pests. For example, the CDC has developed sources of resistance to ascochyta in lentil and is being used in the development of new lentil varieties. In the insect area, the CDC is working on Orange Wheat Blossom Midge resistance in wheat cultivars. Pest resistant varieties reduce the need for pesticides in crop production which reduces the detrimental effects to native biota.

Pasture Management Plans

The Saskatchewan Pastures Program under Saskatchewan Agriculture and Food promotes sustainable use of biological resources. Biodiversity values are conserved through planned grazing systems and the balancing of forage use with forage supply. Pasture management plans are an important tool used to achieve these objectives. As the plans are developed and implemented, pastures will be monitored to identify endangered species or habitats, to note plant vigor, soil erosion and the presence of noxious weeds and to assess impact of management practices. Pasture management plans are being developed for all 56 pastures in the provincial pasture system.

Precision Farming

Precision farming recognizes that soil resources, weather and prior management vary across space and over time.

Therefore, crop management decisions should be specific to time and place rather than being rigidly scheduled and uniform. Applications of technologies such as global positioning systems and variable rate application allow farmers to more precisely place seed, fertilizers and crop protection products. This enhanced precision results in higher yields, lower input costs and lower impact on the environment because inputs are more accurately targeted to the needs of a crop.

The province is working with producer groups, technology companies, the University of Saskatchewan and federal researchers conducting demonstrations and field trials to determine current capabilities of precision farming technology and to assess practical applications. Information is provided to producers through the media, workshops, tours and demonstrations.

Sustainable Agroforestry Program

Saskatchewan has been undertaking a number of activities to explore agroforestry opportunities. The concept of "agroforestry" includes the management of existing native trees on agricultural lands and/or the planting of trees on lands currently in cropland or forages. If agroforestry presents a viable diversification opportunity, it could lead to significant land use change, especially in the northern fringe areas of the agricultural zone. Good management practices will also enhance biodiversity of these areas.

Initiatives include the Sustainable Agroforestry Program funded under the Agri-Food Innovation Fund. This extension program, delivered by the Farm Woodlot Association of Saskatchewan, assists landowners to assess woodlot resources, to develop woodlot management plans and to adopt sustainable management practices. The province is also funding studies to research various value-added opportunities and to determine the overall economic feasibility of agroforestry activities. The province is also helping to sponsor conferences and workshops to raise awareness in the agricultural community on various agroforestry topics and issues.

Pesticide Applicator Training and Licensing

Pesticide use, distribution and handling are provincially regulated under The Pest Control Products Saskatchewan Act. Included in the Act is regulation of the training and licensing requirements for commercial pesticide applicators. The National Standard for Pesticide Applicators was developed by a national task force and adopted by Saskatchewan in 1995. The National Standard was developed to:

- increase the competency of pesticide applicators;
- allow for licensing reciprocity amongst provinces;
- manage and share resources amongst provinces;
- enhance communication;
- provide for the availability of certain pesticides only to licensed applicators; and
- strengthen public confidence in pesticide applicators.

Adoption of the National Standard is consistent with the emphasis Saskatchewan has placed on educating pesticide applicators to ensure pesticides are applied in a safe and judicious manner to maximize economic return while minimizing the risk to human health and the environment. Proper application practices form part of an integrated approach to pest management and minimize negative impact on non-target ecosystems and species.

A Private (farmer) Pesticide Training and Certification Policy was also implemented in 1995. This voluntary program for farmers meets the training and certification requirements of the National Standard.

Aquatic Areas

Community Watershed Management Water Quality Improvement Project

Sask Water, SERM and the Prairie Farm Rehabilitation Administration (PFRA) have established the first Community Watershed - Water Quality Improvement Project with funding from the Agri-Food Innovation Fund. Big Shell Lake Watershed, located in North Central Saskatchewan was selected. Funding from the Innovation Fund has been approved totaling \$145,000 over a four year period. The PFRA is administering the agreement with the "Big Shell Watershed Stewardship Association" formed in September, 1977. Membership of the Association includes representatives from three rural municipalities in the drainage basin, three resort communities adjacent to the lake and several members at large. To date, the

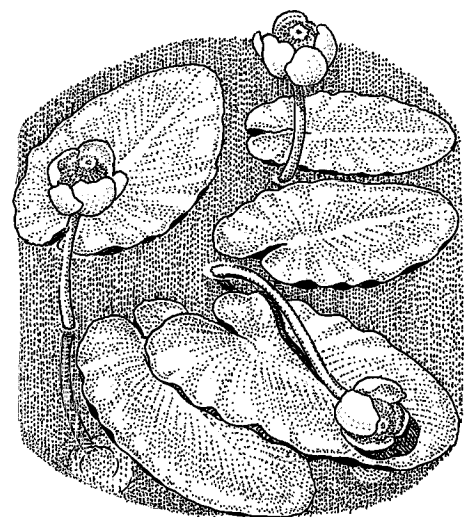
Association has been actively testing water quality in Big Shell Lake and adjacent well sites, conducting workshops and working with agricultural interests to secure livestock wastes and protect riparian areas.

Lake Stewardship Initiatives

A pilot project has been initiated in 1997 by Sask Water to provide financial, technical and training assistance to encourage and assist local citizens involvement in protecting local lake water quality. Two projects have been initiated at sites where previous concerns about water quality have been identified to Sask Water. These include the Good Spirit Lake watershed in East Central Saskatchewan and Jackfish - Murray Lake watershed in northwest Saskatchewan.

Good Spirit Lake community has formed a group "Friends of Good Spirit Lake" and the Jackfish - Murray Lake group has formed the "Stewards of Jackfish and Murray Lakes" group. The activities of both groups are aimed at collecting useful data, providing a forum to share the information and to educate members and the public and to assist in the development of lake protection and enhancement projects.

"The Friends of Good Spirit Lake" have recently received funding to prepare an ecosystem based sustainable community development strategy, under the recently launched Sustainable Community Funding Program. The strategy will encompass ecosystem attributes in addition to the hydrology within the Good Spirit Lake watershed. A strong biodiversity conservation component will be included within the plan which will be completed in the year 2000.



Water Management Framework for Saskatchewan

The Government of Saskatchewan has developed an integrated Water Management Framework to define how the province's water resources will be managed.

The vision of the proposed framework is "safe and reliable water supplies within healthy and diverse aquatic ecosystems". Governing principles include stewardship, integrated management, value of water, sustainable development and best practices. Nine goals containing 58 recommended actions have been defined within the areas of protection, management and development and coordination and public involvement.

Partners FOR the Saskatchewan River

In 1997, the Partners FOR the Saskatchewan River established a volunteer watershed monitoring program. The program was expanded in 1998 with the inclusion of Saskatchewan Wetland Conservation Corporation as a partner. To date, the project has established 10 volunteer groups to monitor streams in their respective watersheds. The volunteers receive monitoring equipment and training and in turn they collect data on the health of the riparian area, test water samples for eight water quality parameters and conduct macro invertebrate sampling. The volunteer groups consist of cottage owners, school groups and local organizations who have agreed to participate for a two year period.

Forested Areas

The boreal forest comprises 36 million hectares or 53 percent of Saskatchewan. Of that area, 13 million hectares or 19 percent of the province is presently under Forest Management Agreements (commercial forest), although that area is expected to increase in coming years as new agreements are signed.

Forest management no longer focuses simply on supplying timber. Forest management affects all forest components and must balance the ecological, economic and social values of the forest.

Fire, insects and disease are natural disturbances of the boreal forest with fire being the most dominant force. For many years we have suppressed fires because of the risks to human health, property and the economic value of the forest. Fire is natural and its suppression can change ecosystems and alter biodiversity if no other disturbance takes its place.

Water Management Framework Nine Goals, 1999

Protection

- Maintenance, restoration and protecting the health of riparian and aquatic ecosystems and minimize the contamination of waterbodies.
- Outline objectives and actions to ensure the safety and sustainability of aquifers by protecting them from depletion and contamination.
- Objectives and actions to protect wetlands and provide effective control of drainage in accordance with regulations and public policy.

Management and Development

- Ensuring availability of safe and reliable drinking water through enhanced safety of municipal and domestic potable water supplies.
- Promote water developments with broad public benefits; promote economic diversification through sustainable use of water and related land resources; and prevent the bulk export of water.
- Establishment of innovative approaches for financing costs of developing, operating, maintaining and upgrading water and wastewater infrastructure.
- Planning developments in consideration of the potential effects of floods, drought and climate change.

Coordination and Public Involvement

- Integrated water management by clearly defining and fully integrating agency mandates and activities related to water; to manage water on a watershed basis; to recognize Aboriginal interests and to ensure adequate monitoring and research of water resources.
- Ensure enhanced public awareness and involvement in water management planning and decision making and recognize the intrinsic and economic value of water and the cost of its management.

New programs and policies embrace the idea of managing forests in a way similar to the natural disturbance regime. Managing the landscape in a manner similar to what fire would do should go a long way toward ensuring that the natural range of forest types and ages are maintained and therefore the associated diversity of plants and animals.

Saskatchewan Long-Term Integrated Forest Resource Management Plan (1995)

The Government of Saskatchewan is committed to the sustainable management of all the province's forest resources. This means that we will balance use of the forests for various economic, social, and cultural purposes with the need to protect the long-term health of forest ecosystems. The Saskatchewan government is responsible for forest resource management on provincial Crown land and recognizes increased knowledge and environmental awareness means our forest resource management practices must change. Planning is necessary for sustainable resource management activity to ensure the desired variety of benefits is attained without damaging the health of the forest ecosystem.

The Saskatchewan Long-Term Integrated Forest Resource Management Plan was prepared by SERM in cooperation with the Canadian Forest Service. The preparation of the plan demonstrates Saskatchewan's commitment to the National Forest Strategy.

Integrated forest resource management or ecosystem based management is defined as managing the whole forest ecosystem, including soil, water, trees, animals and plants, to meet a variety of objectives. It allows for a broad range of resource uses and gives all affected parties the opportunity to be informed and involved in management planning.

This plan is a blueprint for the implementation of Saskatchewan's Forest Management Policy Framework, over five, 20 and 100 year time frames. Many of the

actions have already been taken to improve forest management; however, other changes require long term commitments which SERM is working toward, to deliver a long-term strategy for sustainable forest management.

Review of Forest Management Plans

As part of a Forest Management Agreement, companies are required to submit a 20 year management plan, to show how they intend to manage the forest. Plans must meet approval by SERM to ensure that the forest in the license area is sustainably managed. Management plans project beyond the 20 years, to show the impacts of present activities up to 200 years into the future and therefore ensure that harvesting practices of today do not threaten the sustainability of the forest in the long term. Companies must submit plans for approval every 10 years.

Integrated Land Use and Resource Management Planning

In 1996, Saskatchewan approved the Manitou Sand Hills Integrated Resource Management Plan as government policy for land use and resource management in the hills. The Plan reflects agreement among representatives of 22 government, industry and public agencies and organizations. The Manitou planning process is used as a model, adapted for the uniqueness of other areas, for integrated land use planning on Crown resource lands in the province. There are several steps to the planning model: initiation, development, finalization, implementation and monitoring of the plan.

Public participation in the planning process is critical and is sought early in the initiation step of the process. Ensuring the people most impacted by development are represented and have an effective say in the planning process is a huge challenge. Planning projects currently underway have consensus based advisory boards that recommend alternatives for addressing concerns and issues in the planning areas. The balancing of local needs for development and protection with provincial or global demands is an often expressed concern. One major challenge for integrated land use planning, as it evolves in Saskatchewan, will be to integrate ecosystem-based management concepts and principles into the existing provincial economic, social and environmental structure.

A key component of the planning process is the identification of protected areas. Areas to be protected from development or disturbance are set aside in the plan

Land Use Planning Goal

To develop and implement a land use plan which will manage use of land and of the renewable and non-renewable resources of the planning area on an integrated and environmentally sound basis to ensure ecological, economic, social and cultural benefits for present and future generations.

through consensus agreement. These sites then become part of the Representative Areas Network for Saskatchewan. Management plans will be developed for the sites with input from users of the area.

SERM has led or co-led two major integrated land use planning processes: Pasquia-Porcupine Integrated Forest Land Use Plan and Manitou Sand Hills Integrated Resource Management Plan. SERM, with participation from other departments, communities and impacted forest resource users, is working on Amisk-Atik Integrated Forest Land Use Plan, La Ronge Integrated Land Use and Development Plan, Prince Albert Model Forest Ecosystem Based Management Plan and Dore-Smoothstone Integrated Forest Land Use Plan.

An Integrated Resource Management Program led by SAF, has also been completed for the Fowler-Murphy Lake area, along with another in progress for the Whitehood area.

E. Biosafety: Harmful Alien Organisms and Living Modified Organisms

The Government of Saskatchewan is working with the federal government to draft and adopt new policies which govern the use of both exotic (non-native) and modified organisms. Examples include the federal Fisheries and Oceans' National Policy on Introductions and Transfers of Aquatic Organisms and National Policy on the Use and Culture of Transgenic Organisms. Agencies such as Ducks Unlimited Canada continue to provide education and management programs for harmful exotic species such as purple loosestrife.

F. Atmosphere

From local air quality to global climate change, atmospheric issues have significant impacts on biodiversity. Both industry and government are participating in initiatives which are aimed at reducing emissions. An interagency committee, "The Intergovernmental Climate Change Group", is being led by SaskEnergy to ensure information exchange within government.

The Prairie Adaptation Network

Climate change will affect each region in Canada. In turn, each region will be affected differently fostering the need for a comprehensive and integrated evaluation of existing knowledge and potential adaptive responses.

The Prairie Adaptation Network, created in 1996, will improve our understanding of climate impacts and adaptation responses. Currently, it is a partnership of the Government of Saskatchewan, the Saskatchewan Research Council and Alberta Environment.

Air Quality

As a member of the Voluntary Challenge and Registry (VCR) program, SaskPower takes voluntary actions to limit or reduce carbon dioxide and other emissions.

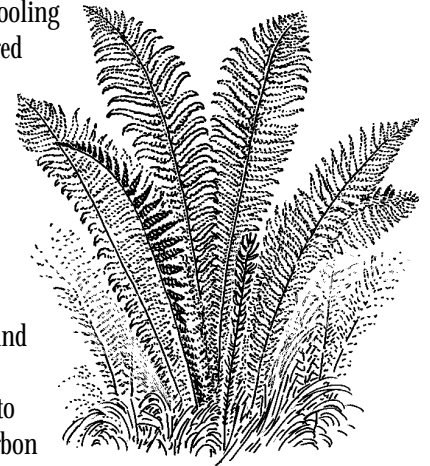
SaskEnergy remains committed to reducing Green House Gas emissions within its transmission and distribution pipeline systems. System improvements are continually being made to pipelines, compressor stations and associated facilities throughout the province. As a member of the Canadian Gas Association, SaskEnergy and natural gas companies across the country are combining efforts to meet Canada's target for reductions.

Condie-QE

Completion in 1997 of the 230 kV transmission line between Regina and Saskatoon has significantly improved the reliability of the province's transmission system by linking much of the generating capacity in the southern part of the province with the growing demand for electricity in the northern regions. The line is expected to reduce transmission energy losses by 120 GW.h per year, reducing emissions by 96,000 tonnes of carbon dioxide per year.

Power Station Condensers

Constructed reservoirs, which depend on spring runoff and rainfall for their supply, provide the cooling water for most of SaskPower's coal-fired power station condensers. Reservoirs are subject to seasonal cooling water limitations such as high temperatures, poor quality and insufficient lake levels, which in turn affect condenser performance. A monitoring and regular cleaning program minimizes heat rate losses and reduces carbon dioxide emissions. SaskPower has an ongoing program to clean the condenser at each unit. Carbon dioxide reductions resulting from this program are estimated at 86,000 tonnes per year.



SCADA System

Upgrades to SaskPower's existing System Control and Data Acquisition (SCADA) system are reducing system losses and making more efficient use of power production. The new system is expected to reduce system generation requirements by 45 GW.h, equivalent to a carbon dioxide emission reduction of 35,000 tonnes per year.

Boundary Dam ESPs

SaskPower is committed to managing particulate emissions so that SERM's current ambient air regulations are consistently met, and so that potential future standards governing fine particulates and toxic substances should be satisfied. SaskPower will install electrostatic precipitators (ESPs) designed to control particulate emissions to 0.1 lb/MMBtu on Boundary Dam Units 1-5. Installation of the first ESP will be completed in 1999 on Unit 4, with further installations occurring at a rate of one per year until all ESPs are in service.

G. Human Settlement

Human settlement, both urban and rural, can have significant impacts upon biological diversity. Careful planning and management can reduce impacts and in some cases promote retention or restoration of biodiversity. Such activity is not only good for the environment, but often adds to the esthetic value of urban settings.

SERM/City Partnership Agreements

In 1992, SERM implemented a strategic initiative to encourage major Saskatchewan cities to cooperatively begin to address environmental and resource conservation and protection issues. To date, SERM has partnership agreements with three major urban centres of the province (Regina, Saskatoon, and Moose Jaw), coordination committees meet regularly to discuss strategic issues faced by the cities and SERM in matters of sustainable environment and resource management. Subjects covered include solid and hazardous waste management, water conservation, air quality, climate change and urban forest management.

These coordinating committees provide a forum to directly encourage cities to take measures to conserve urban biodiversity. Their focus has been on managing issues related to the physical environment (air, water and municipal waste issues) with some indirect benefits to the existing urban biodiversity.

Community Environmental Management Steering Committee

Since 1992, SERM has led the Minister's advisory committee, the Community Environmental Management Steering Committee, comprised of members of rural and urban municipalities, to advise the department on a variety of environmental matters including ways in which Saskatchewan communities can be enabled to better care for their own environment.

In 1994, on the advice of this committee, SERM launched three pilot "Planning for Sustainable Communities" projects in the province. The projects were a test of community based integrated planning processes as a way of engaging communities to raise local awareness about environmental and resource conservation issues and to build community capacity to address the identified issues.

Based on the results of these pilot projects, SERM and Environment Canada have now entered into an agreement to provide funding to interested communities to undertake "sustainable community" planning and implementation. The sustainable community plans are expected to have a strong local natural resource management component. SERM intends to encourage those communities that receive funding for sustainable community planning to include local policies and actions for local biodiversity conservation.

4.2 Goal Two: Ecological Management

To improve our understanding of ecosystems and increase our resource management capability.

GOAL TWO focuses on enhancing our ecological management capability by emphasizing management and planning at the landscape and waterscape levels.

A. Improving Our Ecological Capability

Improving our understanding of ecosystems is essential to increase our ability to use the ecosystems sustainably. Establishment of the Saskatchewan Conservation Data Centre (SKCDC) has increased that knowledge gathering capability and provides an effective information storage and retrieval system for key biodiversity data.

Saskatchewan's ecological land classification, by providing a common framework that all data can be related to, is a second very important addition to our ecological capability. The Saskatchewan Forest Science Cooperative has increased ability to conduct ecological research in Saskatchewan by stimulating cooperation and integration. A variety of research projects such as the prairie biodiversity survey or research on a specific endangered species, continue to expand our ecological knowledge.

Knowledge does not come exclusively from science. Local and traditional knowledge also have much to contribute

to the conservation of biodiversity. Co-management Boards (discussed in section B) are one technique being used to capture this local knowledge and incorporate it into decision making.

Saskatchewan Conservation Data Centre (SKCDC)

SKCDC was established through agreement between the province, The Nature Conservancy of Canada and The Nature Conservancy (USA). Its mission is "To serve the Saskatchewan public by gathering, interpreting, and distributing standardized information on the ecological status of provincial wild species and communities".

Saskatchewan Conservation Data Centre Information On Ecological Status

Ranking by Priority Elements of Biodiversity

Elements of biodiversity (animal and plant species, and natural plant communities) are mapped, digitized and ranked so that sites can be compared for their relative contribution to biodiversity at three levels of distribution - provincial, national and global scales.

This process ranks by priority, each element of biodiversity based on the number and quality of occurrences of that element, population size and trends, threats to the element and other factors. Through the ranking process, the province can concentrate its data collection and management on the rarest, most threatened species and natural communities. Further, the best examples of common natural communities are targeted for data collection. This is a coarse filter - fine filter approach to conservation priority setting.

Saskatchewan Conservation Data Centre's Species and Plant Community Inventories

Data Centre inventories a variety of rare and endangered species and/or plant communities. Specialities include species taxonomy, plant community composition, ranking species/community risk factor and information management in a digital environment. Inventories are in two types:

- identification of any rare and endangered species where development is planned so the species may be protected; and
- a desire to know more about an area's biological diversity and location of rare elements. Inventories have been used to help develop management plans in provincial parks, to identify the location of traditional or rare and endangered species in petroleum and forest developments, to derive estimates of rare species abundance on federal Crown land and to update and improve knowledge on the distribution and abundance of rare species.

Biological and Conservation Database (BCD)

BCD is the common database used by Conservation Data Centers/Natural Heritage Programs across North America and Latin America. BCD contains a list of elements (ie. plants, animals and plant communities) found within the province. These elements are ranked according to their abundance with S1 being rare and S5 being common or secure. Those elements that have been assigned ranks of S1 to S3 are "tracked" by the database, in that their status and location are maintained as up to date as possible. In Saskatchewan, approximately 20 percent of the known taxa for vascular plants and vertebrate animals fall within the sensitive range S1- S3.

In addition to the files that record the elements and their locations, there are other files that are used to record biological information important in the management of those species. There are also files on specific sites, protected and managed areas, and other locations of importance such as bird and bat colonies and snake hibernacula.

SKCDC maintains expertise in the fields of botany, zoology, plant community ecology and information management. Biodiversity information is collected from a variety of sources which include the literature, collections, knowledgeable individuals and field surveys carried out by SERM staff. Information is stored in a dynamic database which is distributed to industry, government and the general public. SKCDC is part of a hemispheric network of more than 60 linked conservation data centres.

Ecological Land Classification

The Ecological Land Classification (ELC) system for Saskatchewan was developed as part of the national system and is compatible with those of other provinces and territories of Canada. SERM was the lead agency in the development of this system in collaboration with several provincial and federal government departments and agencies, the University of Regina and the Saskatchewan Research Council. The ecological land classification system provides a process for classifying and delineating ecologically distinctive areas of land using a hierarchy of classifications.

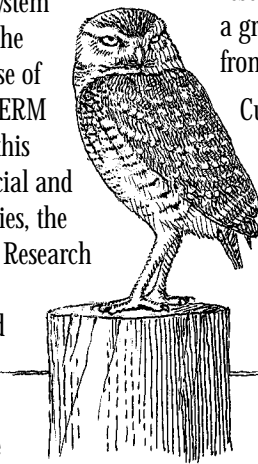
At the broadest level, four large ecozones are recognized in Saskatchewan: the Prairie, Boreal Plain, Boreal Shield and Taiga Shield ecozones. These broad ecozones have been further subdivided into 11 ecoregions to incorporate increasing levels of detail which, in turn, have been divided into 157 landscape areas or ecodistricts.

Saskatchewan Forest Science Co-operative (SFSC)

The SFSC is a partnership of members who are committed to the development, provision, and application of scientific, technical and professional knowledge that will contribute to the implementation of natural resources practices which will ensure the ecological and economic sustainability of Saskatchewan's renewable resources.

The SFSC will facilitate collaborative research and technology development ventures among its members by:

- Identifying the research and technology transfer needs of its membership;
- Building linkages between academic institutions, research facilities, governmental agencies, natural resource industries and other organizations concerned with the sustainability of our natural resources;



- Serving as a forum for an exchange of ideas;
- Identifying and securing funding for cooperative projects; and
- Providing continuous learning opportunities for its membership.

As a cooperative, SFSC allows members to share staff on projects, pool financial resources, ensure integration and tackle comprehensive studies beyond the ability of individual members. Results obtained from collaborative research conducted are easier to bring into policy because a group of members have been involved in the process from the beginning and thus accept the results.

Current signing members of the SFSC are Saskatchewan Environment and Resource Management (SERM), Saskatchewan Energy and Mines (SEM), Canadian Forest Service, Environment Canada, Saskatchewan Research Council and Mistik Management.

Research

Our ability to manage our utilization of ecosystems to maintain ecosystem health while supporting our society is limited by our knowledge and understanding of the ecosystems and ecological processes.

Governments, universities, the Saskatchewan Research Council, corporations and others have conducted research to broaden our knowledge base. This research may be specific and applied to a certain management problem or pursue a broader ecological question. The sidebar gives several examples of the types of research recently conducted which assist biodiversity conservation.

Prairie Biodiversity Survey

SKCDC, in partnership with the Canadian Plains Research Center, University of Regina and funded by the Canada/Saskatchewan Agricultural Green Plan, studied plant community biodiversity on native grasslands of the province's Mixed Grassland Ecoregion.

The Prairie Biodiversity Survey met four principle objectives:

- Investigate the relationship between community diversity and key enduring features (specifically, origin of soil parent material, local surface form of the land, and texture of soil parent material) on which the Ecoregions of Saskatchewan poster map is based;

Saskatchewan Biodiversity Research Projects

Species Diversity of Grassland Spiders and Beetles in a Fragmented Southwestern Saskatchewan Landscape

Knowledge of native grassland biodiversity is still quite rudimentary and incomplete especially for invertebrates. Invertebrates such as insects and arachnids constitute most of the Earth's biota and play an integral role in ecosystem processes such as decomposition and pollination. Intensive flora and fauna surveys were conducted from May to August 1995 to determine the impacts of pasture size and quality on grassland biodiversity. Beetles and spiders were trapped throughout the active season. Birds, vegetation and range condition were also surveyed. One hundred and fifty-eight beetle species and 117 spider species were identified. At least 12 exotic beetle species and many new spider and beetle records were identified for Saskatchewan. Both beetle and spider assemblages differed according to pasture size and estimated range condition. Bird and vegetation data were also related to range condition and area although not as strongly as invertebrates.

Geochem Surveys

Geological research is often directly relevant to biodiversity. As an example, geochem surveys have documented background levels of heavy metals in the environment. Most of this metal has originated from natural sources but some may have been introduced by man. Information on the background geology and background metal contents allow identification of the sources of heavy metal in the environment. In particular, man-made sources can be identified and managed to reduce their risk to biodiversity.

Land Use

Saskatchewan Research Council, in partnership with industry and several government departments, used satellite images to create vegetation cover maps for all of southern Saskatchewan. These maps provide a new and relatively up to date picture of all land use across southern Saskatchewan, a key indicator for biodiversity. Analysis of the information provided by the maps is just beginning.

Burrowing Owl Productivity

A five year study on productivity of the endangered Burrowing Owl was conducted from 1994 to 1998 in the Regina Plains. The goal of the study was to determine if food shortages during the breeding season were responsible for the population decline, and if productivity enhancement via food supplementation and predator exclusion could slow or stop the decline. Biologists were successful in increasing the number of young that fledged, but these measures did not appear to be effective in halting or reversing the long term population decline. In 1997, high meadow vole populations in the study area had a positive effect on productivity for the year. In response, 1998 witnessed the first population increase on the study area in over a decade. This project was funded by TransCanada Pipelines (TCPL), TransGas Limited (SaskEnergy), Enbridge Pipelines Inc., Foothills Pipe Lines Limited, and World Wildlife Fund - Endangered Species Recovery Fund in partnership with Nature Saskatchewan, University of Saskatchewan and SERM.

SaskEnergy's Research Initiatives

SaskEnergy is supporting a research project within the Manitou Sandhills aimed at evaluating the success of re-vegetation efforts on the disturbed areas of pipeline rights-of-way after construction. As well as quantifying vegetation cover and density, the project also focuses on the diversity of plant species over several years.

SaskEnergy is currently evaluating the effect of seeding native grass species on pipeline rights-of-way within forested areas in the Boreal Transition Ecoregion. The prime focus of the study is to determine the vegetative diversity in seeded versus non-seeded portions of the right-of-way and differences in utilization by ungulate species. The research has been on-going since 1995.

- Begin a survey of grassland plant communities within prairie Saskatchewan focusing on plant species diversity;
- Develop methods for surveying plant species and community diversity in the native grasslands of prairie Saskatchewan; and
- Communicate about the survey needs and objectives, seek viewpoints on what is known and what needs to be known about the biodiversity of native prairie in Saskatchewan.

Analysis of the distribution of sampled plant communities revealed no consistent relationships between community diversity and mapped enduring features landscapes. It was not possible to predict which plant communities were likely to occur on the various enduring features landscapes. The detailed analysis of plant community distribution does support the conclusion that representative areas encompassing every type of enduring feature landscape within the Prairie Ecozone are required to cover the full range of plant community diversity found in Saskatchewan native grasslands.

B. Increasing Resource Management Capability

Increasing our ability to manage resources requires access to available knowledge and integrated planning and decision making processes which ensure the best available biodiversity information is applied to appropriate decisions. The SKCDC and the Saskatchewan Land Resource Centre have greatly increased accessibility of many types of information to decision makers.

Industries, such as SaskPower, have developed processes to ensure biodiversity and other environmental constraints are identified early in the planning of new projects.

Government is also adopting ways to ensure more integrated planning and decision making. SERM's adoption of ecosystem management and use of the ecoregion boundaries to organize programs facilitates this type of

decision making and facilitates land use planning, as is mandated under The Forest Resources Act.

Co-management boards and the Prince Albert Model Forest are examples of programs which integrate information and concerns of many community interests into ecological decision making.

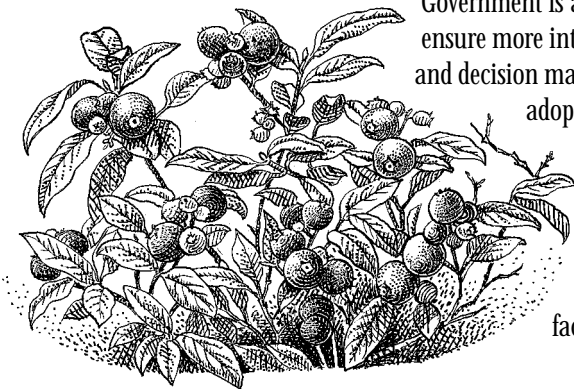
Environmental impact assessment is another technique in wide use to ensure development planning includes ecological, economic and social concerns.

Sustainable Planning Development at SaskPower

To ensure compliance with provincial and federal legislation and to ensure new projects are developed in a manner which supports sustainable use, SaskPower reviews all generation, transmission and distribution projects. Several of the principal tools developed include a comprehensive environmental database, GIS-generated environmental and archaeological constraint maps and an employee-oriented environmental screening training course. Combined, this enables SaskPower to identify potential environmental impacts early in the project planning process and to incorporate the appropriate environmental protection measures into the project design.

An important component of biodiversity and sustainable development is public and private sector partnerships to achieve more innovative and effective ways of conducting business in an environmentally responsible manner. SaskPower has formal partnerships with Saskatchewan Environment and Resource Management (SERM), Saskatchewan Wetland Conservation Corporation (SWCC) and Ducks Unlimited Canada (DU).

The formal partnership agreement with SERM created a joint committee to consider environmental issues associated with SaskPower's facilities and operations. This allows a cooperative approach to develop long-term environmental protection plans. Priority has been placed upon addressing the issues associated with air emissions from thermal power stations in the southern part of the province, particularly from Boundary Dam Power Station. A working group has also been formed to address the issues of water quality and fish habitat associated with the Saskatchewan River.



Through its partnership with SWCC, SaskPower provided support to the Chaplin/Old Wives/Reed Lakes Western Hemisphere Shorebird Reserve Network (WHSRN) project in the spring of 1997. Co-ordinated by SWCC, the project area received a "Hemispheric" designation, the highest possible in the WHSRN, and has been recognized as a vital part of the network which secures a bright future for many thousands of North American birds.

SaskPower is proud to be the first corporation in Canada to sign a Diamond Legacy Sponsorship with Ducks Unlimited Canada in Saskatchewan. This partnership is a key commitment to sharing the responsibility of sustaining our biologically-diverse environment for future generations and is a welcome addition to the habitat offset program. Funding was provided for a three year research study on raptor ecology and the relationship to waterfowl production on the prairies. The study is concentrating on great horned owls and red tailed hawks, which are thought to be significant predators of duck broods.

All new transmission pipeline and select distribution pipeline projects are reviewed prior to construction to determine any environmental impacts and the measures required to mitigate these impacts. All projects must comply with applicable legislative requirements and SaskEnergy's internal policies on environmental protection.

The Environmental Assessment Act

Responsibility for environmental management is shared under the Canadian constitution between the federal and provincial governments. Saskatchewan, in 1997, signed a sub-agreement on environmental assessment as part of a Canada-Wide Accord on Environmental Harmonization. The Accord, which was entered into by all provinces/territories and the federal government, has as its vision, governments working in partnership to achieve the highest level of environmental quality for all Canadians. The Environmental Assessment Act, which came into effect in 1980, protects the environment by causing appropriate environmental protections to be incorporated at the planning stage of projects. The ultimate authority of the Act resides with its ability to prevent a project from proceeding should it prove to pose too great an environmental risk.

Any and all projects (or changes to an approved project/development) may be subject to the environmental assessment process. Projects are subjected to a screening process to determine whether or not, by definition, it should be considered a development which requires an Environmental Impact Assessment (EIA) and Statement (EIS) to be written. The Act does not have a list of projects which are automatically subject to an EIA/S but rather each project is measured against six criteria. Each

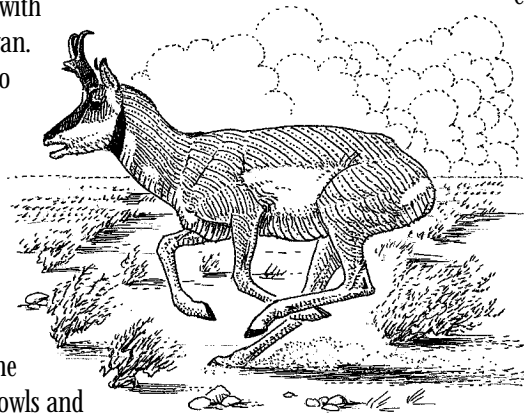
criteria acts as an independent trigger for possible application of the EIA/S requirement.

The basis for conservation of biodiversity and ecosystems within the Act stems from the six criteria which determine what is or is not a development. One of these criteria speaks to the project having an effect on any unique, rare or

endangered feature of the environment. Further, the Act defines environment, in part, to include plants, animals and land. These two things together afford strong protection to the ecological landscape of Saskatchewan. The application of these elements of the Act to a project will identify those which may be detrimental to the conservation of biodiversity. Such projects are required to produce an EIA/S for full evaluation by both technical experts and the public.

In a typical year, SERM would give initial review and clearance to 450 to 600 project proposals, cause another 100 to 125 proposals to undergo an environmental screening and subject 10 to 12 to the full EIA process. The ultimate level of technical and public scrutiny, reserved for those projects with potentially very significant environmental and social impacts, can be achieved through a public inquiry. This has been a rare occurrence to date.

Any change to an approved project/development is also subject to this environmental review procedure.



Saskatchewan Soil Survey and Land Resource Centre

Saskatchewan has supported soil survey and related database development for over 40 years. This data source formed the basis in southern Saskatchewan for defining ecoregions and landscape areas for development of the "Ecoregions of Saskatchewan" map.

Recently the province has also encouraged establishment of the Saskatchewan Land Resource Centre through SAF. The Centre has taken on provincial responsibility for the collection, maintenance, research and distribution of spatially related land information.

The Centre provides spatial soil information as a necessary component of decision-making processes relating to the management and conservation of soil and land resources. It also coordinates the effective use of soil information in planning and environmental monitoring in areas such as water quality, sustainable agriculture, land use and land

suitability, new crop planning, soil quality and soil erosion. The Centre has linkages to other land, environment and economic information databases. As well as the soil inventory data, the Centre has integrated pertinent climate data, and land use and management data from the Census of Agriculture. This integrated database will aid in guiding agriculture activities while being sensitive to the environment and biodiversity. Promotion of diversity of crops, livestock and sustainable management practices also encourages wildlife biodiversity.

EcoRegion Administrative Boundaries

In 1996, SERM redefined its approach to environmental protection and resource management through the implementation of an ecologically-based administrative and decision-making process.

The department is committed to using an ecosystem approach to resource management and environmental protection. The ecosystem approach requires that we view the basic components (air, water, land and organisms - including humans) and functions of ecosystems in a broad context, integrating environmental, social and economic concerns. This approach to planning and management means the department has shifted from traditional sectoral approaches to an emphasis on integration. The ecosystem approach focuses on the integrated management of ecological systems and human activities to maintain the health and integrity of an ecosystem.

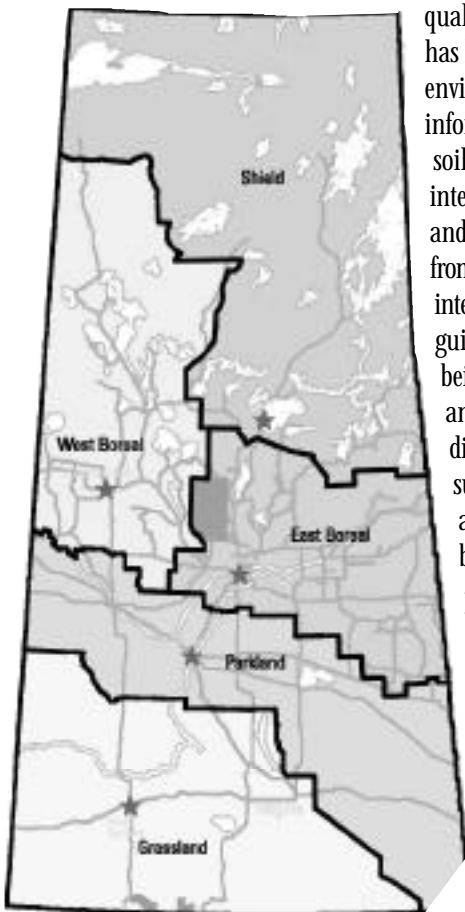
SERM's core mandate is to ensure the healthy functioning of Saskatchewan's ecosystems and to encourage sustainable development in the province. The new ecologically-based ecoregions are designed to allow us to create specialized knowledge bases tailored to protect unique ecological processes and to shift from species or site-specific programs to those that allow us to better manage and protect ecological systems and overall environmental quality.

The map outlines SERM's new administrative boundaries which adjust former administrative regions to more closely correspond with the natural ecoregions of Saskatchewan.

The Taiga and Boreal Shield areas have been combined into the Shield administrative area. The Boreal Plain has been subdivided into Eastern and Western Boreal administrative areas due to the extensive commercial and Aboriginal land use which is concentrated in the boreal forest. The Prairie EcoRegion has been subdivided into the Parkland and Grassland administrative areas.

Co-Management and Aboriginal Involvement

In Saskatchewan, co-management (co-operative renewable resource management) is a tool to achieve sustainable, integrated resource management. It is a process that involves representatives of all resource user groups who have a stake in how the environment and resources are managed. Membership includes First Nations and Metis groups, as well as commercial, recreational and other interests. Co-management provides local people with the opportunity to have meaningful input into planning and decisions that affect them and



EcoRegions Within SERM

their environment. Co-management boards base their recommendations to SERM on consensus. SERM has established several co-management boards in various communities throughout central and northern Saskatchewan. As well, a number of co-management boards deal with the management of particular animals, such as fisheries co-operatives and the Beverly Kaminuriak Caribou Management Board which provides a coordinated management approach to a caribou herd whose range extends into Saskatchewan, Manitoba and the Northwest Territories.

SERM believes that achieving sustainable environment and resource management in Saskatchewan depends upon direct and meaningful involvement of Aboriginal people in decision-making. As well as co-management arrangements, SERM is involved in a number of bilateral partnership arrangements with First Nations and Metis groups. Their objectives include maintaining a good working relationship, consulting where necessary on department or community initiatives, ongoing communication and joint project development and implementation. In addition, co-management and partnerships provide a forum for sharing, integrating and applying local and traditional knowledge, along with scientific knowledge, in the process of managing resources.

Prince Albert Model Forest

The Prince Albert Model Forest (PAMF) is part of the federal sustainable forest management initiative. The Prince Albert Model Forest Association Inc. is a partnership of government, industry, First Nations and professional groups. In Phase 1 (1993-1997),

the PAMF conducted new research relating to the Boreal Forest area in Saskatchewan. Over 40 documents report the research and work planning for Phase 1. During Phase 2 (1997-2002), PAMF is concentrating on the implementation of sustainable forest management through use of research and traditional



knowledge. Five working groups will integrate their activities to achieve the Model Forest's objectives. The working groups are: Ecosystem Health, Forest Values and Benefits, Integrated Resource Management, Communications and Knowledge Exchange and Local Level Indicators.

Prince Albert Model Forest

Vision:

The Prince Albert Model Forest will demonstrate sustainable forest management as a process to enhance the protection of all the values inherent in a healthy forest and to maintain the well being of traditional, non-industrial and industrial users and communities.

Goals:

- To ensure a sustainable and predictable supply of forest based ecological, social and economic benefits through the management of forest ecosystems.
- Raise awareness and demonstrate commitment to the concepts of sustainability, integrated resource management, and ecosystem management among forest users, researchers and managers at the local, regional, national and international level.

Objectives:

- Maintain the Prince Albert Model Forest as a healthy ecosystem.
- Maintain all of the resources of the Model Forest as a renewable and sustainable source of cultural, economic and social benefits including the generation of employment and revenue opportunities.
- Develop inventories, planning tools and a planning process for the implementation of integrated resource management.
- Exchange knowledge, technology and skills among resource managers, landowners and forest users.
- Promote understanding of sustainable forest management and improve the credibility of resource management.
- Identify and apply local criteria and indicators linked to the Canadian Council of Forest Ministers criteria and the Prince Albert Model Forest goals and objectives.

The Integrated Resource Management group is preparing an ecosystem based land use plan that will serve as the integrating mechanism of each partner's existing plans, mandates and policies. The planning process is open and has a broad public participation strategy.

C. Monitoring

Agencies in Saskatchewan have for years monitored the status of particular species or resources which are of economic and social importance. Timber resources have been inventoried, populations of waterfowl, game fish and big game are monitored, as are quantities of water flowing down rivers and indices of water quality at key locations.

As we have become more aware that the health of our economy and society is ultimately dependent on the health of the ecosystems we live in, the need to monitor the health of that ecosystem has been recognized. SERM and other agencies are designing and initiating monitoring programs which will look at the health of the ecosystem as a whole. The Forest Ecosystem Monitoring Program is the most advanced of this new generation of monitoring actions. A key component of monitoring is reporting. Saskatchewan's State of The Environment Report is designed to report on the health of our ecosystems to government and the Saskatchewan people.

Forest Ecosystem Monitoring Program (FEMP)

The FEMP was established to develop a provincial monitoring program of forest management activities on the long term health of forest ecosystems. The objectives of the program are: 1) To improve knowledge of ecosystem process and function and hence allow better forest ecosystem management, and 2) to provide an early warning system of forest ecosystem change to allow anticipation and prevention. The program will apply to all of the provincial forest affected by forest management activities.

Managed forests are considered healthy if they have biodiversity similar to fire origin stands of equivalent ecosite classification at a specific age and their viability, resiliency, water balance, productivity and nutrient cycling have not been impaired.

To date, five criteria and 47 indicators have been selected and modified from the CCFM document "Criteria and Indicators of Sustainable Forest Management in Canada". The Criteria and Indicators may change through process of adaptive management and public consultation as our knowledge and understanding of the forest ecosystem improves. Implementation of the program in the field is set for 1999.

State of the Environment Reporting

Reporting is intended to inform the people of Saskatchewan about the current status of environmental conditions and natural resources in the province. This process also includes information about the impacts of human activity upon the environment, status of the health and integrity of important components of the ecosystem, and upon trends and emerging concerns related to socioeconomic and ecological issues.

The State of the Environment Report (SOE) is prepared biannually by the provincial government. Each of the four ecozones and the province as a whole is assessed and reported upon once during each 10-year reporting cycle. Reports have already been prepared for the Boreal Plain and Prairie Ecozones with the next report scheduled for completion for the Boreal Shield Ecozone in 1999. The Taiga Shield Ecozone report will be completed in 2001. As new long term ecological monitoring programs and new indicators of ecosystem health, including measures of biodiversity are collected, they will be used to further evaluate the health of each ecozone in future reports.



4.3 Goal Three: Education and Awareness

To promote an understanding of the need to conserve biodiversity and use biological resources in a sustainable manner.

GOAL THREE identifies the significance of involving the public in biodiversity education and community awareness. The loss of biodiversity is a global problem requiring solutions based on individual and community participation and commitment. To succeed, individuals and communities must understand and appreciate the value of biodiversity.

Education and Awareness Programs

Through Project WILD, Project WET, Focus on Forests and related educational programs the amount of “biodiversity education” reaching children in the school system has been increased significantly. These include materials developed by, and especially for, the large First Nations component of our population. These supplements are popular aids which teach about wildlife, forests and the environment while aiding in teaching core curricula. Interpretive services in provincial parks and new galleries in the Royal Saskatchewan Museum provide more public education which aid understanding of biodiversity issues. The Ecosystems of Saskatchewan CD-ROM and poster map plus a variety of publications add to the educational opportunities of biodiversity.

Provincial Park Interpretive Services

Park interpretive services provide opportunities for the public to become involved in experiential learning through both staff conducted programs and self directed facilities. Interpretive programs and facilities help to bridge the emerging gap between people and the environment by putting people directly in contact with the environment within a natural setting. By enhancing visitor’s understanding and appreciation of biodiversity, visitors build a foundation for making informed and sustainable decisions with regard to conservation of biodiversity. Interpretive programs and facilities are able to raise environmental awareness, and inspire understanding and sensitivity towards the environment.

Staff conduct natural environment interpretive programs in 12 provincial parks. Examples of these programs include guided walks, evening campfire presentations and school and youth education programs. Self directed interpretive trails are located in 17 parks. Visitor centres, which provide displays and activities promoting conservation of biodiversity, serve 11 provincial parks. The Parks Tomorrow project has re-confirmed that interpretation and education will continue to be a major function of the park system.

Royal Saskatchewan Museum

The Royal Saskatchewan Museum offers interpretive exhibits and curriculum-based educational programs on Saskatchewan’s natural and Aboriginal history to the general public and school children. Two of the museum’s galleries; the Earth Sciences and the First Nations galleries, each of approximately 560 sq. metres, have been recently renovated, while the 1,100 sq. metres Life Sciences Gallery is scheduled to open in 2000.

The Earth Sciences gallery examines the geological and palaeontological history of Saskatchewan with particular emphasis on paleo-ecosystems of the past 450 million years. The First Nations gallery examines the cultural history of Saskatchewan’s First Nations. Of particular significance is the gallery’s emphasis on the world-view possessed by these peoples and their sustainable use of the area’s resources.

The “Flagship” Life Sciences gallery uses a large relief map and dioramas to examine the flora, fauna and landscape of the province’s ecoregions. In conjunction with these exhibits, six internet-compatible interactive computer displays will allow visitors (real and cyber) to explore topics such as Adaptations of Plants and Animals to Winter, Reproductive Strategies, How Plants and Animals Obtain Energy and Nutrients, etc. The link between Saskatchewan and remote, tropical rainforest and arctic ecosystems is also investigated in displays which look at migration and global weather patterns and feature exhibits of the MacKenzie River Delta and the Costa Rican Rainforest. The gallery concludes with an intensive look at the role of humans in the modern global ecosystem. In addition to such topics as environmental pollution, global warming, population growth, non-sustainable resource utilization, etc., this Human Factor section of the gallery looks at concepts such as our ecological footprint, the appropriation of the Earth’s productivity for humans to

the detriment of other species and the misappropriation of resources among the world's people. The gallery concludes with suggestions of solutions to our environmental problems and offers alternate world views such as "Home Place" which envision humans as an integral part of the global ecosystem whose survival depends upon compliances with the Earth's environmental restraints.

Ecological Land Classification Suite of Products

The Ecoregions of Saskatchewan poster map was published in 1994. A more comprehensive description of the ecological classification system and the ecozones of the province were published in March of 1998 as a reference text with companion CD-ROM as The Ecoregions of Saskatchewan. The CD-ROM provides both colourful images of important features of each ecozone plus verbal and written narratives which enhance the understanding and appreciation of the information. This CD-ROM was distributed to all Saskatchewan schools.

Focus on Forests Saskatchewan

Many people in Saskatchewan are concerned about what happens to our forests, but the complexities of forest ecology and forest management are not widely understood. Focus on Forests Saskatchewan is a forest management curriculum resource for students from kindergarten to grade 12 and is an effective way to provide much needed learning opportunities in these areas for young people. It fosters awareness of sensitivity to forest resources among Saskatchewan's youth. Forestry is used as the educational vehicle, but the activity guide satisfies everyday curriculum needs of classroom teachers.

Project WILD, Project WET and Project SOILS

These complementary programs provide in-service education for teachers and informal educators about terrestrial and aquatic ecosystems, and provide hands-on, activity-focused, educational resource materials for use with young people. These learning activities teach the numerous biodiversity related concepts in provincially

mandated school curricula and also in youth programs like Girl Guides and Scouts Canada. Delivery of Project WILD has been extremely successful in Saskatchewan since it was introduced in 1985 with almost 80 percent of elementary teachers trained in use of the program. Training in Project WILD is included in teacher training programs at both Saskatchewan universities and all four Aboriginal teacher education programs. Since 1989, as part of the Project WILD program, SERM has annually provided the National Wildlife Week/Habitat 2000



educational resource kits to all schools in the province. Project WILD is delivered by SERM through a partnership with the Canadian Wildlife Federation.

Project SOILS is a Saskatchewan developed program presented to teachers through workshops coordinated by SERM. Recently Project SOILS activities have been incorporated into additional sustainable agriculture education materials and is offered in the teacher education programs at both universities. Like Project WILD, Project SOILS is available in French and English. Project SOILS was developed and is delivered in partnership with the Saskatchewan Soil Conservation Association.

Saskatchewan was the first jurisdiction outside the United States to implement Project WET. Saskatchewan is hosting the first National Project Wet Educational Strategy meeting in February 1999. Saskatchewan Water Resources Association, SERM, Sask Water and a group of other water and education related agencies work together to deliver Project WET in Saskatchewan.

Practicing the Law of Circular Interaction: First Nations Environment and Conservation Principles is a multimedia educational resource kit developed by the Saskatchewan Indian Cultural Centre with assistance from SERM staff and delivered as a First Nations Supplement to Saskatchewan's Project WILD program.

GOAL FOUR initiatives address legislation and incentives which contribute to achieving the conservation of

4.4 Goal Four: Incentives and Legislation

To maintain or develop incentives and legislation that support the conservation of biodiversity and the sustainable use of biological resources.

biodiversity and the sustainable use of biological resources.

Provincial Legislation

Policies and legislation have major effects on biodiversity conservation. Saskatchewan has recently revised or enacted several major pieces of legislation which are very significant to biodiversity, especially The Forest Resource Management Act and The Wildlife Act. Working relationships with the federal government have been improved and overlap reduced through environmental harmonization agreements, especially the agreement on handling of environmental assessment. Policy can also protect biodiversity. An example is the Game Farm Policy jointly developed by SAF and SERM. SERM has adopted an ecosystem approach which formally makes protection of the health of the environment on which our society and a sustainable economy depend its central goal.

Forest Resource Management Act

The Forest Resource Management Act replaces a 30 year old Act that dealt only with timber values. The new Act deals with managing all forest values and ensuring that the public are involved in setting management objectives. The Act provides a legal commitment to do land use planning which forest license agreements will fit into. Under the Act, sustainable forest management will be required and forest biodiversity should be maintained.

Following the Act are Regulations which will set the stage for management of the forest. The new Regulations allow for flexibility in management in that they are adaptable to new science and new management practices as they become available. This flexibility will allow for changes in standards and guidelines, where necessary.

Agricultural Operations Act

This legislation balances environmental and social responsibilities with the realities of

agricultural production. It provides a mechanism for resolving nuisance disputes between agricultural producers and their neighbours. It protects water quality by requiring proper management of livestock manure and waste products.

a) Agricultural Nuisance Provisions

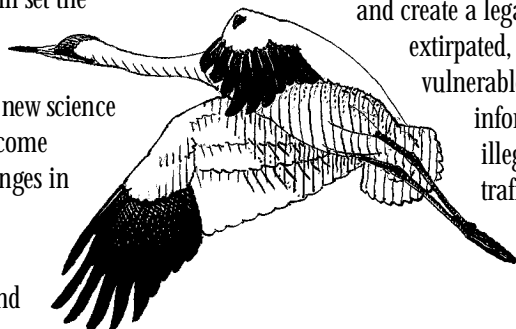
These provisions provide an effective way to resolve nuisance complaints about farm practices and to bring about beneficial changes, without the confrontation and expense of court action. The Agricultural Operations Review Board reviews complaints about odour, noise, dust, smoke or other disturbances that adversely affect the use and enjoyment of neighbouring property. If the Board determines normally accepted agricultural practice is not being followed, it may make recommendations to cease or modify the practice causing the disturbance.

b) Intensive Livestock Provisions

These provisions protect surface and ground water quality by requiring the proper storage and management of livestock manure. The Act requires certain classes of intensive livestock operations to obtain approval of manure storage and manure and dead animal management plans. It works in conjunction with other planning, environmental and health laws and municipal bylaws to achieve proper siting and manure management practices.

Enhanced Legislation for Endangered Species

The 1997 amendments to The Wildlife Act protect endangered species through facilitating a cooperative approach with landowners and conservation organizations, increased educational awareness and support for species at risk recovery programs. Provisions in the Act allow for the preparation and implementation of recovery plans to protect and conserve wild species at risk and create a legal designation and listing of extirpated, endangered, threatened and vulnerable species based on scientific information. The Act makes it illegal to kill, capture, harvest, traffic in or export wild species at risk.



Conservation Easements Act

The Saskatchewan Legislature passed The Conservation Easements Act on March 22, 1996, providing government and various non-profit corporations with authority to hold easements on privately owned land. There are currently 13 agencies registered to hold Conservation Easements in the province. A Conservation Easement is a voluntary agreement between a grantor, the landowner and a holder - the conservation agency, to protect special features of the land for purposes such as:

- protection;
- enhancement of natural ecosystems;
- wildlife habitat;
- habitat of rare, threatened or endangered plant or animal species; and/or
- for the retention of significant botanical, zoological, geological, historical, archaeological or paleontological features.

The easement agreement is registered on the land title at the Land Titles Office and binds future landowners to the agreement.

SERM signed its first Conservation Easement in December of 1997. By December 31, 1998, 12 Conservation Easements have been signed by SERM providing protection to almost 2,000 hectares. Nature Conservancy Canada had signed three Easements on approximately 140 hectares and Nature Saskatchewan had signed one covering 65 hectares.

Saskatchewan Game Farm Policy

The Saskatchewan Game Farm Policy was developed during 1998 and involved consultation with agricultural and wildlife stakeholder groups. The policy provides the basis for revision of the regulations governing game farming. The policy contains several provisions that protect biodiversity in Saskatchewan.

By not allowing game farming on lands designated under The Wildlife Habitat Protection Act, wildlife species have continued access to critical wildlife habitat. Requirements for game farm fencing ensures separation of wildlife from their farmed counterparts. Unique game farm animal identification, game farm licensing and record keeping requirements plus control of imports under science based import protocols minimize risk of disease and allow for a quick response to tracking diseases if the need arises. Also under the policy, Saskatchewan does not allow the importation or farming of species that could interbreed with native species or displace native wildlife from their habitat.



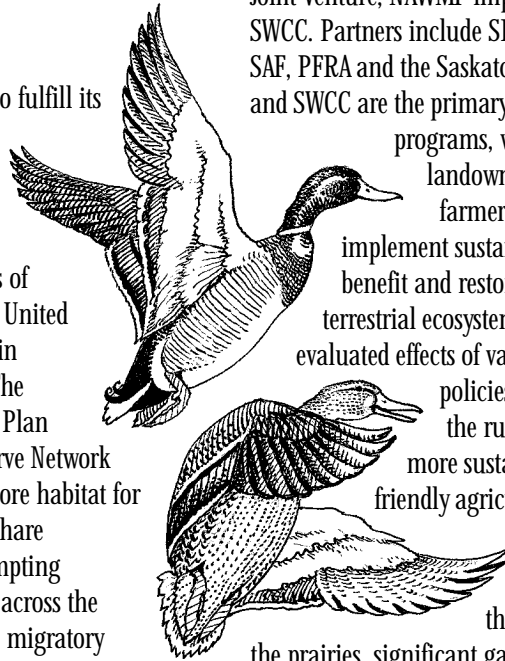
4.5 Goal Five: International Cooperation

To 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.

GOAL FIVE includes activities which demonstrate a commitment by Saskatchewan in efforts to coordinate and enhance the international effort to conserve the planet's biodiversity.

International Efforts

Saskatchewan endorsed and is working to fulfill its obligations under the Canadian Biodiversity Strategy. International conservation efforts are primarily the responsibility of the federal government, but Saskatchewan participates in a series of international initiatives, mostly with the United States. These are particularly important in protection of shared migratory species. The North American Waterfowl Management Plan and Western Hemisphere Shorebird Reserve Network are two initiatives which protect and restore habitat for migratory birds across their ranges. We share ecosystems with the adjacent states, prompting initiatives such as ecoregional planning across the Northern Great Plains Steppe. Data from migratory bird monitoring programs are pooled with those of other jurisdictions, especially the United States, to allow more effective analysis and conservation.



The North American Waterfowl Management Plan

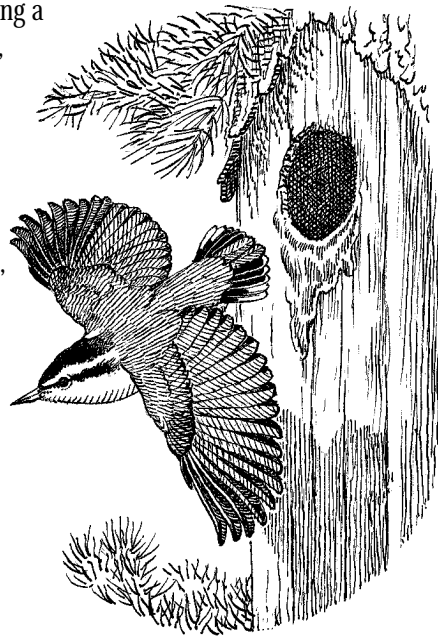
The North American Waterfowl Management Plan (NAWMP) is the largest habitat conservation initiative in Saskatchewan and in North America. Saskatchewan's goal under the Prairie Habitat Joint Venture and the NAWMP is to restore, under average environmental conditions, waterfowl populations to the levels of the 1970's through the management of wetland and upland ecosystems while benefitting other wildlife. Since its inception in 1986, over \$90 million dollars have been spent in support of this goal.

The NAWMP is a joint effort among various levels of government in Canada, United States, Mexico and private non-government organizations. Under the Prairie Habitat Joint Venture, NAWMP implementation is coordinated by SWCC. Partners include SERM, DU, Environment Canada, SAF, PFRA and the Saskatchewan Wildlife Federation. DU and SWCC are the primary delivery agents of NAWMP programs, working with private and Crown landowners including individual farmers and ranchers to identify and implement sustainable agriculture options that benefit and restore wetland and associated terrestrial ecosystems. NAWMP partners have also evaluated effects of various agricultural policies and possible policy changes on the rural environment to seek a more sustainable and environmentally friendly agricultural policy base.

The project was initiated in Saskatchewan in 1986. With the return to wetter conditions on the prairies, significant gains have been made toward meeting the goal of 9.2 million breeding birds under average environmental conditions. The program has provided long term protection and securement of 181,000 hectares of habitat. Lands purchased as well as wetlands under long term securement have been committed to the Representative Areas Network through a partnership program between SERM and DU. Funding of more than \$14 million annually is provided by a variety of partners including the United States Fish and Wildlife Service, DU, Government of Canada, Wildlife Habitat Canada, individual U.S. states, non-government organizations and the Government of Saskatchewan.

**Northern Great Plains Steppe
Ecoregional Planning**

Conservation Data Centres (CDC) across the Americas have adopted a strategic framework designed to effectively address the continuing decline of species and natural habitats. It approaches the problem of conserving species and natural communities by assembling a portfolio of sites that capture multiple, viable examples of each. This approach is centered around ecologically derived boundaries and represents a shift from more conventional strategies based upon political boundaries such as provinces,



states or nations. Also, there are strong links with other ecoregional planning processes, such as Saskatchewan's Representative Areas Network. The Northern Great Plains Steppe was one of the first ecoregions selected for designing a portfolio of sites for

conservation action. Current partners include CDC's

from Alberta, Montana, North Dakota, South Dakota, Colorado, Wyoming and Nebraska with The Nature Conservancy as the coordinating agency. In

Saskatchewan, other partners include Saskatchewan Research Council and SaskGeomatics.

5. FUTURE CHALLENGES

The next step to meet our commitments under the Canadian Biodiversity Strategy is to ensure effective and coordinated implementation of the strategy in accordance with Saskatchewan's priorities and fiscal capabilities. This Progress Report will allow us to assess existing actions and identify gaps that are still required. The Government of Saskatchewan will use this report as a base for development of a Saskatchewan Biodiversity Action Plan. The Action Plan will identify the specific actions that still need to be undertaken to conserve the province's biodiversity.

The task ahead is ambitious, but essential in light of the many challenges that still need to be addressed. Foremost is the issue of improving our ability to support our society without degrading the health of the ecosystems which support us. Humans are part of the ecosystem. Therefore, we need to move from the single species approach and adopt a broader ecosystem management approach when considering biodiversity. If human disturbance can be designed so that, as much as possible, it emulates natural disturbance, any negative impacts on biodiversity can be greatly minimized. This not only makes good ecological sense, but often makes good economic sense too. The grazing of native grasslands by cattle is a reasonable substitute for the grazing by native bison that occurred before European settlement. With good rangeland management practices the grassland's biodiversity is thus maintained while humans derive the economic benefits of grazing.

Another example is the adoption of conservation tillage by farmers that rebuilds soil organic matter including the number and diversity of soil organisms, increases the integrity of the ecosystem and reduces the reliance on inorganic fertilizers. A third example is the recent move to emulate the natural disturbance of the forest by the forestry industry. Greater efforts need to be made to educate everyone of the benefits of such ecosystem thinking.

Fundamental tools to achieving these goals include inventory of resources, ecological classification and monitoring. Most of the province's biodiversity remains unidentified and resources need to be directed to an ongoing provincial biodiversity survey. While progress is being made with forest ecosite and landscape classification, the province lacks a classification system for its threatened prairie plant communities. Very little of the province's biodiversity is monitored for trends in time and space and monitoring programs need to include consideration for biodiversity at all scales. The critical role of representative areas as benchmarks in monitoring programs should be strongly emphasized.

It is also important to remember that protected areas and programs to restore species at risk are, by themselves, not sufficient to maintain biodiversity over the long-term.

The final major challenge will be predicting and managing the effects that climate change will have on the province's biodiversity. This will be especially critical for aquatic, forested and prairie systems in which habitats have been badly fragmented thus eliminating the opportunity for species to move in response. The Saskatchewan Biodiversity Action Plan will address these and the many other concerns that revolve around conservation of our natural heritage.

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APPENDIX TWO - SOURCES FOR ADDITIONAL INFORMATION

Agency:

Environment Canada

Biodiversity Convention Office
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351 St. Joseph Blvd., 9th Floor
HULL PQ K1A 0H3
Telephone: (819) 953-4374
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Email: boc@ec.gc.ca

Saskatchewan Environment and Resource Management

3211 Albert Street
REGINA SK S4S 5W6
Telephone: (306) 787-2700
Facsimile: (306) 787-9544
Email: www.gov.sk.ca/govt/environ/

Saskatchewan Agriculture and Food

3085 Albert Street
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Saskatchewan Energy and Mines

1914 Hamilton Street
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Saskatchewan Intergovernmental and Aboriginal Affairs

1919 Saskatchewan Drive
REGINA SK S4P 3V7
Telephone: (306) 787-1643
Facsimile: (306) 787-7317

Saskatchewan Wetland Conservation Corporation

202 - 2050 Cornwall Street
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SaskEnergy Incorporated

Environmental Affairs
1100 - 1945 Hamilton Street
REGINA SK S4P 2C7
Telephone: (306) 777-9136
Facsimile: (306) 525-3422
Email: Khanley@SaskEnergy.sk.ca

For Information on the following subjects:

- Canadian Biodiversity Strategy
- Ecological Land Classification
- Integrated Land Use Planning
- Fish and Wildlife Programs
- Saskatchewan Environmental Assessment Process
- Provincial Forestry Programs
- Project WILD, Project WET, Project SOILS
- Clean Air Strategy
- Reclamation/Recovery Programs
- Provincial Parks
- Grazing and Pasture Technology
- Soil Conservation Programs
- Precision Farming
- Agroforestry
- Pesticide Application Training
- Crop Development
- Soil Survey
- Reclamation & Recovery of Mining Sites
- Canada-Wide Accord on Environmental Harmonization
- Remnant Prairie Conservation Program
- Nature Prairie Stewardship
- Streambank Stewardship
- Project Development Services
- Site Remediation

SaskPower

2025 Victoria Avenue
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Facsimile: (306) 566-3428
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- SaskPower Enhancement Programs
- Rehabilitation of SaskPower Facilities

Sask Water

111 Fairford Street East
MOOSE JAW SK S6H 7X9
Telephone: (306) 694-3900
Facsimile: (306) 694-3944

- Water Policy and Legislation

Ducks Unlimited Canada

1606 - 4th Avenue
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Email: du_regina@ducks.ca

- North American Waterfowl Management Plan

Saskatchewan Prairie Conservation Action Plan

Box 4752
REGINA SK S4P 3Y4
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- Native Prairie Conservation

Prince Albert Model Forest Association Inc.

PO Box 2046
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Facsimile: (306) 763-6456
Email: tams@pamodelforest.sk.ca

- Boreal Forest Research



Government of
Saskatchewan

