

Status Report for the South Saskatchewan Planning Region

Preliminary Assessment 2011

This report describes the status of biodiversity in the Grassland Natural Region (Grassland Region) in the South Saskatchewan Planning Region (SSPR).



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Report summary

The South Saskatchewan Planning Region (SSPR) is home to 45% of Alberta's population and accounts for nearly 13% of Alberta's total land area. Ranging from agricultural and energy production to urban living and tourism, the SSPR is positioned to play a significant role in Alberta's economic sustainability. Much of this future success will rely on the billions of dollars in ecological services generated from the region's ecosystems and biodiversity. These services include the provisioning of clean water and air, fishing and hunting opportunities, and habitat for thousands of wildlife species.

The Alberta Biodiversity Monitoring Institute (ABMI) measures and reports on the state of land, water, and living resources across the province, using scientifically credible indicators of environmental health. The ABMI is designed to generate reports for a number of geographic and administrative regions, including watersheds, municipalities, and land-use planning regions. This report describes the status of human development, species, and habitat in the SSPR.

Forty-nine per cent of the SSPR has been directly altered by human development. This development includes 41% cultivation; 4% residential, commercial and energy infrastructure; 2% transportation infrastructure; and 1% forest harvesting.

The ABMI uses a tool called the Intactness Index to report on the ecological health of Alberta. The index ranges from 100% intact to 0% intact—for example, an area with little evidence of human impact is 100% intact; a downtown parking lot surrounded by big-box stores is 0% intact.

The ecological health of the SSPR depends, in part, on the thousands of native species of birds, vascular plants, and armoured mites that live in this area. The ABMI assessed the status of 85 of these species in the Grassland Natural Region (Grassland Region) of the SSPR and found them to be 54% intact. In general, the intactness is lowest for grassland-associated species such as Sprague's Pipit, Narrow-leaved Milk Vetch, and Prairie Crocus. These species appear to be disproportionately sensitive to human development in the Grassland Region of the SSPR.

Non-native weeds are also important to the SSPR's ecological health. Non-native weeds were detected at 100% of the sites surveyed in the Grassland Region in the SSPR. An average of 9.5 non-native weeds was detected at each ABMI survey site. Seven of the 10 most broadly distributed vascular plant species in the SSPR are non-native.

Habitat is fundamental to maintaining healthy ecosystems and is also the component of biodiversity where most industrial planning and management occurs—humans most often manage habitat. The ABMI assessed the status of habitat on the SSPR and found that 6.3% of the SSPR is managed as protected areas; however, those protected areas are not evenly distributed across different natural regions and subregions. The SSPR holds greater than 90% of the provincial responsibility for three of Alberta's natural subregions: the Foothills Fescue, Mixedgrass, and Foothills Parkland. Respectively, 1%, 1%, and 3% of these subregions are managed as protected areas within the SSPR.

This information provides regional ecological baseline conditions for several key groups of species and habitats that can be used as a foundation for evaluating future outcomes of resource management in the region.

Over the next few years, the ABMI will broaden the assessment of biodiversity in the SSPR to include status and trends reporting for mammals, fish, lichens, mosses, and wetlands. These same assessments will be available for other planning regions as well as other regions of interest in Alberta.

How does ABMI measure ecological health?

Albertans are familiar with a range of well-accepted indicators-ones that describe the condition of our economy and others that measure the state of our own health. There are no such broadly accepted indicators to describe the condition of the province's lands, waters, and living resources.

Alberta is the only jurisdiction in Canada, and one of the few in the world, to set up an integrated program to measure and report on the state of land, water, and living resources.

The ABMI monitoring program is a world-class system that:

- · Tracks many species and habitats across the province
- · Generates value-neutral, independent, publicly accessible data
- Informs government, industry, and the public about what is happening in our environment so we can plan for the future

The ABMI provides comprehensive indicators that act as a common yardstick for establishing clear management goals and tracking performance against those goals.

The ABMI is not a management agency and does not make management recommendations. The goal of the ABMI is to present scientifically sound knowledge in a value-neutral format. Where possible, the ABMI will identify the relationship between human land-use, habitat, and species to help inform environmental stewardship initiatives.

Alberta, divided into its seven (7) planning regions

figure 1



Biodiversity indicators in this report

The ABMI measures many indicators to support the management of biodiversity, wildlife, and the environment. This report, in particular, profiles the status of:

- Human development
- Species
- Habitat

We present levels of human development for the entire SSPR and all ecosystems within the SSPR. The ABMI defines "human development" as "the visible conversion of native ecosystems by humans to support temporary or permanent residential, recreational, or industrial uses." This report also describes the status of many species and habitats in the entire Grassland Region within the SSPR.

Finally, this report spotlights the status of human development, species, and habitats in "prairiedominated landscapes" only (i.e., prairie that is not dominated by urban or cultivated lands). This spotlight on prairie-dominated landscapes can be found starting on page 26 of the report.

The ABMI assesses the **status of human**

development using the Institute's inventory of human development for the province of Alberta. This product, which compiles existing information on provincial human development, has been supplemented with ABMI data and ABMI qualitycontrol procedures.

We assess the **status of species** using ABMI survey data for:

- Breeding birds
- Vascular plants
- Armoured mites

We assess the **status of habitat** using remotely sensed information, which focuses on the amount and distribution of major habitats, including grasslands and protected areas.

It is important to note that the findings of this report are averages that apply to broad regions within the SSPR or to the entire SSPR. As with most landscapes in Alberta, specific sites within the SSPR are nearly 0% intact (e.g., buildings, parking lots, and active industrial sites) and other sites are 100% intact (e.g., undeveloped grassland and wetland habitat).

Next Steps

When sufficient data are available, the ABMI will expand reporting to include parkland, foothills, and mountain ecosystems in the SSPR. Similarly, the ABMI will report on more species and habitats as monitoring information for the SSPR continues to grow.

Supplemental Material

Detailed supplemental information about the findings presented in this report are publicly available and can be found at our website www.abmi.ca.

How does the ABMI report on the status of biodiversity?

▶ The Human Development Index

The ABMI reports on the extent of our human development by determining the area of land directly altered by human activities. It works like this:

- 0% means there is no visible human development.
- 100% means the landscape has been completely modified by human development.

In general, cities and cultivated fields have high human development, while protected areas have low human development. Values presented in this report are complete inventories circa 2007. The ABMI is currently updating this inventory to circa 2010.

See the SSPR Data Supplement (available at www.abmi.ca) for details.

▶ The Intactness Index

ABMI uses a tool called the Intactness Index to report on how intact our species are in a region. Here's how it works:

- The index ranges from 100% intact to 0% intact.
- An area with no evidence of human impact is 100% intact.
- An urban parking lot surrounded by big-box stores is 0% intact.
- If the abundance of a species is equal to the number we expect to find in an area of no human disturbance, that species is considered to be 100% intact.

The index declines from 100% toward 0% when:

- Common native species become rare or disappear.
- Common native species become exceptionally abundant.
- Weeds or invasive species become very common.

▶ Ecological Risk

As the intactness of a region declines toward zero, the ecological risks we face increase.

These risks are initially small and may be mostly unnoticeable. However, the less intact the region becomes, the more likely we are to change air quality, water quality, and the recreational opportunities we enjoy.

If a species becomes too abundant:

- That species may affect biodiversity by crowding out other species or driving other changes in the environment.
- The overabundance may indicate that the environment is already changing and specific species are taking advantage of the changes.

If a species becomes very uncommon:

- We risk losing that species.
- The ecosystem could be affected as a result of losing that species.

Determining Implications and Priorities

Deciding if and how to respond to changes in species intactness requires consideration of the:

- Current intactness value
- Degree of confidence in the intactness value
- Magnitude and immediacy of ecological risk
- Tolerance of ecological risk

The highest priority for attention will most likely be given to species that present significant and immediate ecological risk.

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ABMI species and habitat Intactness Index

ABMI uses a tool called the Intactness Index to report on how intact our species are.

The index declines from 100% toward 0% when:

- Common species become rare or disappear.
- Common native species become exceptionally abundant.
- Weedy or invasive species become very common.



ABMI reports on the status of biodiversity in the **South Saskatchewan Planning Region**

The South Saskatchewan Planning Region (SSPR) encompasses nearly 84,000 km² in southern Alberta. This region is the same size as the province of New Brunswick or the state of South Carolina and approximately 2.5 times the size of Vancouver Island.

The SSPR area makes up:

- 13% of Alberta's land area
- 68% of Alberta's Grassland Natural Region (Grassland Region)

The Grassland Region is the largest ecosystem in the SSPR. Representing 78% of the entire land base, the grassland ecosystem coincides with all of the region's major urban and agricultural development. Respectively, the Foothills and Rocky Mountain Natural Regions make up 2% and 15% of the SSPR. Just northwest of Calgary, the Parkland Natural Region makes up 5% of the SSPR.

This report addresses the status of human development in the entire SSPR. However, it addresses biodiversity indicators in only the Grassland Region within the SSPR, but includes all developed and undeveloped habitats (e.g., pastures, cropped fields, and residential areas). The ABMI will be able to report on the status of biodiversity in the Mountain, Foothills, and Parkland Natural Regions within the SSPR in upcoming reports.



The South Saskatchewan Planning Region Economic and social context

The SSPR has been significantly transformed over the past century. This transformation has been fuelled by industrial activity and human settlement that depend on the region's limited natural resources.

Starting with immigration and settlement policies in the late 1800s and extending to the present day, this region maintains prosperous and vibrant agricultural communities built on the twin industries of cropping and livestock. According to the SSPR's land-use framework regional profile, today communities in the SSPR are responsible for producing 45% of Alberta's total agricultural output.¹

Complementing agricultural production are the region's other major industries: energy, forestry, mining, and tourism. The energy industry in the SSPR is dominated by conventional oil and gas production. In more recent years, unconventional gas production and renewable energy technologies are emerging to support the region's economic base. In addition, the forest industry supports local communities along the foothills of the SSPR with approximately 8% of the region's land base managed for timber production. All of these natural resource-based sectors are poised to remain economic priorities in the future of the SSPR.

Tourism and recreation are two other major industries in the SSPR that depend on the region's natural resources. With nearly 50% of the province's tourism expenditures made in the SSPR, this region is home to some of the world's most extraordinary tourist destinations.

Forty-five percent of Alberta's population lives in the SSPR, with nearly 90% living in the region's 5 cities, 29 towns, and 23 villages. Finally, the SSPR is home to seven First Nations communities and a major military reserve. Ranging from agricultural and energy production to urban living and tourism, the SSPR is positioned to play a significant role in Alberta's economic sustainability. Much of this future success will rely on services generated from the region's ecosystems and biodiversity. The SSPR natural environment supplies billions of dollars in ecological services including:

- Climate regulation
- Water regulation
- Water provision
- Water purification
- Soil formation and maintenance
- Nutrient cycling
- Erosion control
- Wildlife habitat
- · Crop pollination

The SSPR's economic, social, and ecological health are intimately interwoven features of a sustainable and prosperous future for the south.



¹ Government of Alberta (2009). *Profile of the South Saskatchewan Region*, https://landuse.alberta.ca/Documents/SSRP%20 Profile%20of%20the%20South%20Saskatchewan%20Region%20Report-P1-2009-11.pdf.

Human development

The ABMI defines human development as the visible conversion of native ecosystems to temporary or permanent residential, recreational, or industrial landscapes. This includes land conversion activities that support the agriculture and energy industries, residential settlement, and transportation infrastructure. As of 2007, the total human development across the entire SSPR is 49% and includes 41% agricultural cultivation (table 1). In comparison, the Grassland Natural Region within the SSPR has 57% total human development and 50% cultivation (figure 2).

The type and amount of human development in the SSPR provides context for interpreting the status of species and habitats. The ABMI is currently updating the amount of human footprint to 2010 levels.

table 1

Percentage of human development in the entire SSPR and in the four provincial natural regions that compose the SSPR

	Foothills	Grassland	Parkland	Rocky Mountain	SSPR
Cultivation and irrigation infrastructure	2	50	37	3	41
Residential, commercial, and energy infrastructure	1	4	9	1	4
Transportation infrastructure	1	2	3	1	2
Forest harvesting	18	0	0	5	1
Total human development (%)	22	57	50	11	49



Intactness of **native species**

The ABMI defines native species as those found in North America prior to European settlement. Thousands of native animal and plant species live in the SSPR. Native birds, vascular plants, and armoured mites represent a small but diverse subset of all of these species. The ABMI assessed the status of a total of 85 common native species in the SSPR and found them to be, on average, 54% intact. Of the 85 native species assessed by the ABMI, we profiled grassland birds, vascular plants, and armoured mites. In addition, we profiled the status of non-native species and species at risk in the SSPR. Comprehensive detail on all species is available in supplemental material associated with this report (available at www.abmi.ca).



67% native birds {38 species}







55% armoured mites {10 species}



average intactness of all species

{85 species}

Species Grassland birds

Many of North America's birds migrate to the prairies of Alberta in search of nesting and foraging habitats during the spring and summer. Some of these species have a strong association with native grassland habitats. Managers and scientists often use the status of grassland-associated birds as a stewardship indicator for intact native prairie ecosystems.

Of the 38 bird species assessed, the ABMI considers 12 to be strongly associated with native grassland habitat.

The ABMI assessed the status of 12 grasslandassociated bird species in the SSPR and found them to be, on average, 50% intact (table 2). Occurring across 98% of the region, the Western Meadowlark and the Vesper Sparrow are the two most widely distributed species. The Western Meadowlark is 84% intact, while the Vesper Sparrow is 95% intact. Both species have been identified by the Government of Alberta's Ministry of Sustainable Resource Development (SRD) as secure.

Of the species assessed by the ABMI, the Sprague's Pipit, Marbled Godwit, and Baird's Sparrow differed the most from what we expected to find under intact conditions. At 32% intact, the Sprague's Pipit is 68% less abundant than expected. It is also listed as "threatened" by Canada's Committee on the Status of Endangered Wildlife in Canada (COSEWIC) because of a sustained decline in the abundance of this species in the last 15 years. In contrast to the Sprague's Pipit, the Marbled Godwit is three times more abundant than we expected to find under intact conditions. ABMI data suggest that this large shorebird has a positive relationship to human development, which may be related to the co-occurrence of industrial agriculture and irrigation infrastructure. In other words, Marbled Godwit may benefit from open water associated with irrigation infrastructure.

At 33% intact, the Baird's Sparrow is 67% less abundant than expected. This species is most often associated with native mixed-grass prairie that has experienced no or little livestock grazing.

- Baird's Sparrow detected
- Baird's Sparrow NOT detected



Baird's Sparrow (*Ammodramus bairdii*) detected at 15 sites



The ABMI found **Baird's Sparrow** to be 33% intact, 67% less abundant than expected.

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Intactness and percentage occurrence of 12 grassland birds in the Grassland Region of the SSPR

Arrows indicate if the abundance of the species was above \blacktriangle or below \checkmark intact reference conditions.

Threat categories for grassland birds were identified by the Government of Canada and/or the Government of Alberta.² This assessment includes species and subspecies identified by Canada's Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and Alberta's Endangered Species Conservation Committee (within the Government of Alberta's Ministry of Sustainable Resource Development).

Upland Sandpiper 28% OCCURRENCE Sensitive - SRD

Vesper Sparrow 98% OCCURRENCE Secure - SRD

McCown's Longspur 30% OCCURRENCE Special Concern - COSEWIC Secure - SRD

Western Meadowlark 98% OCCURRENCE Secure - SRD

Willet 52% OCCURRENCE Secure - SRD

Lark Sparrow V 18% OCCURRENCE Secure - SRD

Long-billed Curlew 30% OCCURRENCE Special Concern - COSEWIC Sensitive - SRD

Horned Lark 82% OCCURRENCE Secure – SRD

Chestnut-collared Longspur 32% OCCURRENCE Threatened - COSEWIC Secure - SRD

Baird's Sparrow 22% OCCURRENCE May Be At Risk - SRD

Marbled Godwit 58% OCCURRENCE Secure - SRD

Sprague's Pipit ▼ 48% OCCURRENCE Threatened - COSEWIC Sensitive - SRD



² www.speciesatrisk.gc.ca

www.srd.alberta.ca/FishWildlife/SpeciesAtRisk/Default.aspx

Species Native plants

The number and type of plant species native to the SSPR represent thousands of years of evolution to Alberta's harsh prairie climate. Ranging from the familiar Prairie Coneflower to the elegant Prairie Crocus, native plants in the SSPR provide enormous benefits to the economic and ecological health of this province. Native plants supply commodities such as forage for our livestock and timber to local mills. They also supply ecological services that directly benefit humans, including erosion control, water purification, water storage, and wildlife habitat. Finally, native plants are a component of Alberta's biodiversity that are important in their own right and represent our legacy in managing the natural environment. The ABMI monitors the status of native vascular plants as a valued and efficient indicator of environmental stewardship in the SSPR.

• Silver Sagebrush detected

Silver Sagebrush NOT detected

The ABMI has assessed the status of 37 native vascular plants in the SSPR and found them to be, on average, 41% intact (table 3). Of the 37 native species assessed, only Foxtail Barley was more abundant than expected under intact conditions, being two times more abundant in the Grassland Region in the SSPR. The remaining native vascular plant species were less abundant than expected and ranged from 26% to 78% intact. The species with numbers that differed most markedly from what we expected to find were the Prairie Crocus and the Narrow-leaved Milk Vetch. Both of these species were approximately 75% less abundant in the Grassland Region in the SSPR than expected under intact conditions.

At present, our assessment of native vascular plants is only available for relatively common species. The ABMI has an ongoing monitoring program operating in the SSPR and we anticipate that many more plants will be included in upcoming reports for this region. Listed rare and endangered plants are dealt with on page 20 in this report.



figure 4

Silver Sagebrush (*Artemisia cana*) detected at 13 sites

table 3

Percentage occurrence and intactness of 8 out of 38 native vascular plant species assessed by the ABMI in the Grassland Region of the SSPR

Arrows indicate if the abundance of the species was above \blacktriangle or below \blacksquare intact reference conditions.





Species Soil arthropods

The story of Alberta's soil is an epic tale of chilling conditions, death, and decay, and a journey lasting thousands of years. It all began about 12,000 years ago, during the retreat of the last Ice Age. When the Earth began to warm, the glaciers that blanketed all but the very southeastern part of Alberta began to slowly retreat back north. This grand melt crushed the bedrock, leaving behind deposits of rock, gravel, and sand. With the glaciers gone, plants and animals began to flourish. Over thousands of years of growth and decomposition, the leftovers of untold millions of organisms created the fertile soils that dominate Alberta's prairies and foothills.

Armoured mites (also known as oribatid mites) are a critical component of Alberta's soil biodiversity. No larger than the tip of a ballpoint pen, several hundred thousand armoured mites can be found in a square metre of healthy topsoil. Of the 10,000 armoured mite species known to exist on the planet, at least 325 occur in our province.

Like mammals and birds, some species of armoured mites are carnivores or herbivores. However, the majority lives off the remains of plants, animals, and fungi. Armoured mites also serve as food for many small arthropods such as beetles, ants, centipedes, larger mites, and spiders, and for some small frogs and birds. As a result, these tiny unseen species are vital to the maintenance of healthy soil and clean water in our province.

The ABMI monitors the status of armoured mites as an ecological indicator of soil and environmental health. The ABMI has assessed the status of 10 armoured mites in the SSPR and found them to be, on average, 55% intact (table 4). The species with numbers that differed most markedly from what we would expect to find under intact conditions were the Field Roamer, Grassland Little Dark-eye, and Twin Butte Nightgown Mite. We currently believe that the Field Roamer and the Grassland Little Dark-eye are new to science because, to date, they have only ever been identified in Alberta.

The Field Roamer is 200% more abundant in the SSPR than would be expected. This species is widely distributed in Alberta and seems strongly associated with developed landscapes including lawns, annual crops, and tame pasture. Although we cannot confirm, we speculate that the Field Roamer may be a non-native invasive species linked to human settlement in the prairies.

The Grassland Little Dark-eye is 60% less abundant and the Twin Butte Nightgown Mite 66% less abundant in the Grassland Region in the SSPR than expected under intact conditions. Very little is known about the ecology or habitat requirements of these species, but they appear to be associated with native grassland ecosystems.



Twin Butte Nightgown Mite (*Camisia biverrucata*) detected at five sites

figure 5

Twin Butte Nightgown Mite detected
 Twin Butte Nightgown Mite NOT detected

Percentage occurrence and intactness of 10 armoured mites in the Grassland Region in the SSPR

Arrows indicate if the abundance of the species was above \blacktriangle or below \checkmark intact reference conditions.





Species Non-native species

Non-native species cost society millions of dollars annually in lost agricultural productivity, weed control, and site-rehabilitation activity. In addition to the economic cost, these non-native species represent the second largest threat to native biological diversity (the largest being habitat loss). In recent years, managing non-native species has become a global challenge affecting international trade, policy, and development.

The ABMI surveyed 60 sites in the Grassland Region in the SSPR and detected 87 non-native species. Three of these species are birds, while the remaining 84 species are vascular plants. Seventytwo of the 84 vascular plants are either always or occasionally identified as naturalized weeds by Alberta's management systems. Of the vascular plants detected by the ABMI, none are listed as prohibited weeds and 10 are listed as noxious weeds under the *Alberta Weed Control Act* (2010).

Non-native weeds were detected across 100% of the sites surveyed in the Grassland Region in the SSPR. An average of 9.5 non-native weeds were detected at each ABMI survey site. Seven of the ten most broadly distributed vascular plant species in the SSPR are non-native. Common Dandelion and Flixweed are the two most common vascular plant species in the SSPR; respectively, they were found across 83% and 60% of the Grassland Region in the SSPR.

These data can be used by managers to set regional targets for non-native species management to measure progress toward achieving those targets.

The ABMI detected 84 non-native vascular plants in the SSPR. Ten of these species are listed as noxious weeds under the *Alberta Weed Control Act* (2010).





Species at risk

The health of biodiversity in a region includes an assessment of species that are naturally rare or that have demonstrated a significant decline in abundance. These rare species are generally referred to as species at risk because future declines in abundance may result in the loss of the species from a region.

Sixty-nine species or subspecies are considered at risk in the SSPR. Three species occurring in the SSPR are listed as extirpated, while 20 are listed as endangered under the *Species at Risk Act* (SARA) or Alberta's *Wildlife Act*. The federal and provincial governments have identified data deficiencies or are evaluating 11 additional species in the region for designation as a conservation concern. Figure 8 shows species at risk in the SSPR as identified by the Government of Canada and/or the Government of Alberta. This assessment includes species and subspecies identified by Canada's *Species at Risk Act*, Alberta's *Wildlife Act*, Canada's Committee on the Status of Endangered Wildlife in Canada, and Alberta's Endangered Species Conservation Committee. This list does not include the 11 species that are identified as data-deficient or that are currently being evaluated for designation as a conservation concern.

A detailed list of species and at risk designations is available in the Supplementary Data File (00065) associated with this report at www.abmi.ca.

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Number of species or subspecies at risk in the SSPR

 $\label{eq:extracted} Extirpated - A wildlife species that no longer exists in the wild in Alberta, but exists elsewhere.$

Endangered - A wildlife species facing imminent extirpation or extinction.

Threatened – A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

Special Concern – A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.



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Spotlight on Sage-grouse

The Sage-grouse (*Centrocercus urophasian usurophasianus*) is one of the 69 species at risk in the SSPR. It is listed as an endangered species in both Alberta and Canada.

The Sage-grouse historically occupied Silver Sagebrush (*Artemisia cana*) habitat in southeastern Alberta extending from the U.S. border, north to Lethbridge, northeast to Brooks, and east to the Saskatchewan border near Empress. At present, this species occupies approximately 8% of its historical range in Alberta and can be found on native range south of Cypress Hills. Between the mid-1970s and 2003, it is estimated that Sage-grouse numbers in Alberta declined by approximately 80%. As of 2008, Sage-grouse numbers continue to decline in Alberta. In Alberta, the Sage-grouse depends on Silver Sagebrush (*Artemisia cana*) habitat. The amount of Silver Sagebrush habitat in Alberta has declined over the past 100 years as the landscape has been used for industrial and residential development. The ABMI has assessed the status of Silver Sagebrush in the SSPR and found it to be 30% intact. The ABMI will continue to monitor the status and trends of Silver Sagebrush.

In 2005, the Government of Alberta began implementation of a recovery strategy for Sagegrouse. The Government of Canada joined the Government of Alberta to cooperatively implement a recovery strategy in 2008.



Habitat Protected areas

Habitat is fundamental to maintaining healthy ecosystems and is also the component of biodiversity where most industrial planning and management occurs—humans most often manage habitat. Representation of different habitat types in an undeveloped state (e.g., protected areas) is a commonly used "coarse filter" tool for managing regional biodiversity. Protected areas help to maintain the thousands of species that are too poorly known to manage individually, and they provide a safeguard against mistakes in maintaining better-known species in the managed land base.

The ABMI used geographic information system (GIS) analyses to summarize the percentage of natural regions and subregions in the SSPR that are managed as protected areas. The ABMI's definition of protected areas in the SSPR includes Alberta's parks and protected areas network, federal parks, and National Wildlife Areas. Overall, 6.3% of the SSPR is managed as protected areas (table 5). That percentage is not evenly distributed across different natural regions and subregions. Of the 6.3% of the SSPR managed as protected areas, 4.8% is located in the Rocky Mountain Natural Region. As a result, 31% of the Rocky Mountain Natural Region in the SSPR is managed as protected areas.

The SSPR holds more than 90% of provincial responsibility for three of Alberta's natural subregions: the Foothills Fescue, Mixedgrass, and Foothills Parkland. Respectively, 1%, 1%, and 3% of these subregions are managed as protected areas.



Amount and distribution of protected areas in natural regions and subregions in the SSPR

Natural region and subregions located within the SSPR	Provincial responsibility (percentage of entire region that is located in the SSPR)	Percentage of region managed as a protected area
Grassland	68	2
Dry Mixedgrass	67	3
Northern Fescue	10	0
Foothills Fescue	92	
Mixedgrass	98	
Foothills	2	1
Upper Foothills	4	
Lower Foothills		0
Parkland		2
Central Parkland		0
Foothills Parkland	96	3
Rocky Mountain	27	
Alpine	10	80
Sub-Alpine	21	35
Montane	71	15
CCDD		()



table 5

Habitat Core native habitat

Resource managers and conservationists are often interested in minimizing the influence of human development on biological diversity. This interest often leads to initiatives that focus conservation resources on identifying and maintaining "core native habitat." Though this phrase and concept are commonly used in land-use planning and management, operational definitions are highly context-dependent and often spark disagreement among stakeholders. Science may help the situation by providing specific definitions when dealing with a single species; however, a more general use of this concept is best guided by first considering the objectives of stakeholders.

The ABMI defines "core native habitat" as "undeveloped native habitat that is distant enough from visible human development that it meets the particular management objectives of stakeholders." The analysis presented in this section does not account for other forms of human land use in core native habitat (e.g., livestock grazing or hunting) that may not be consistent with the management objectives of a particular stakeholder.

Land without human development directly on it is affected by nearby human development. While some species can effectively use habitat that is adjacent to human development, others require habitat that is more distant from it. We measure core native habitat using four different distances: 0 m, >50 m, >200 m, and >2 km away from development. These distances provide measures of native habitat that are available with different "buffers" from human development. For example, at 0 m from human development, all native habitat in the region is included in the percentage. However, at >50 m, only native habitat that is at least 50 m away from human development is included. These numbers are valuable because species respond differently to human activity, with some requiring larger buffers.

The ABMI found that 51% of the total SSPR is native habitat (table 6). Predictably, the percentage of native habitat is highest in the Rocky Mountain Natural Region (89%) and lowest in the Grassland Natural Region (43%). Thirty-eight percent of the SSPR is at least 50 m from human development, while only 1% of the SSPR is at least 2 km from human development.

Percentage of the total SSPR and natural regions in the SSPR classified as core native habitat using four distance-to-edge buffer widths

		SSPR	Foothills	Grassland	Parkland	Rocky Mountain
Buffer Widt	0 m	51%	78%	43%	50%	89%
	50 m	38%	54%	30%	34%	76%
	200 m	19%	22%	13%	13%	54%
7	2 km	1%	0%	0%	0%	8%



Spotlight on prairie-dominated landscapes Introduction

The Government of Alberta has developed an inventory of native vegetation resources in the SSPR. This inventory highlights all quarter sections in the SSPR with between 50% and 100% undeveloped native prairie habitat (prairiedominated landscapes). This section of the report addresses the status of human development and biodiversity on these prairie-dominated landscapes in the SSPR. Prairie-dominated landscapes encompass nearly 29,000 km² or 44% of the Grassland Natural Region in the SSPR. These resources are primarily concentrated in the eastern half of the region.

Like all major landscapes in the SSPR, the ABMI monitors the status of human development, species, and habitat in these prairie-dominated landscapes.



Spotlight on prairie-dominated landscapes Human development

As of 2007, the total human development across the prairie-dominated landscape in the SSPR is 12% and includes 6% agricultural cultivation; 4% residential, commercial, and energy infrastructure; and 2% transportation infrastructure (figure 9).

The type and amount of human development in these landscapes provides context for interpreting the status of species and habitats. The ABMI is currently updating the amount of human footprint to 2010 levels. Human development across prairiedominated landscapes in the SSPR is 12%.



Spotlight on prairie-dominated landscapes **Native species**

The ABMI assessed the status of 85 common native species in prairie-dominated landscapes and found them to be, on average, 79% intact. The three species groups assessed by the ABMI for this region show similar average intactness values that range from 77% to 81% intact.



{ 38 species }



native plants {37 species }





average intactness of all species {85 species }

Spotlight on prairie-dominated landscapes **Non-native species**

The ABMI surveyed 21 sites in prairie-dominated landscapes in the Grassland Region in the SSPR and detected 52 non-native species. Three of these species are birds, while the remaining 49 species are vascular plants. Forty-eight of the 49 vascular plants are either always or occasionally identified as naturalized weeds by Alberta's management systems.

Of the vascular plants identified by the ABMI in prairie-dominated landscapes, none are listed as prohibited weeds and nine are listed as noxious weeds under the *Alberta Weed Control Act* (2010). Non-native weeds were detected across 100% of the sites surveyed in prairie-dominated landscapes. An average of 8.4 non-native weeds were detected at each ABMI survey site.

Common Dandelion, Flixweed, and Common Goat's-beard are the three most common non-native vascular plant species in these prairie-dominated landscapes and were, respectively, found across 72%, 67%, and 61% of the land base (figure 10).

These data can be used by managers to set regional targets for non-native species management and measure progress toward achieving those targets.



General terms

▶ Limitations

The ABMI is designed primarily to be used as a proactive tool to identify the status, trends, and correlative relationships among common species, habitats, and human footprint. The status and trends in rare and endangered species and habitats are not yet directly evaluated by the ABMI monitoring program. There are many existing provincial and national systems specifically designed to measure rare and endangered species and habitats.

The ABMI indices are based on the establishment of current, intact reference conditions that are statistical predictions designed to account for human footprint. These reference conditions and subsequent ABMI analyses and reporting do not account for historical changes in a species' overall abundance (i.e., the ABMI cannot account for any change in a species that occurred before 2003).

ABMI reference conditions have statistical uncertainty for individual species. This uncertainty will decrease as the ABMI surveys more sites in the SSPR.

Detailed information about this report, including estimates of statistical confidence, is publicly available in the following supplemental material available at www.abmi.ca:

- Status of Biodiversity in the South Saskatchewan Planning Region: Supplementary Report 2011 (00064), Version 2011-08-13, Alberta Biodiversity Monitoring Institute, Alberta, Canada.
- Status of Biodiversity in the South Saskatchewan Planning Region: Supplementary Data File 2011 (00065), Version 2011-08-13, Alberta Biodiversity Monitoring Institute, Alberta, Canada.

Looking Forward

The ABMI has made considerable strides in supporting biodiversity management in Alberta; however, we are just beginning. The ABMI continues to build momentum and is committed to:

- Ensuring the effective delivery of relevant, timely, and scientifically rigorous biodiversity information
- Improving biodiversity management by contributing critical knowledge to decision-making systems
- Supporting governments and industries in meeting their domestic and international reporting obligations.
- Eliminating duplication and redundancy in provincial biodiversity monitoring
- Facilitating the seamless transfer of information to government, industry, the research community, and the public

The legacy created through the development of the institute is truly enormous. The ABMI is committed to continued excellence in biodiversity monitoring.

Scientific Integrity

The ABMI is committed to the responsible analysis and interpretation of data. The ABMI holds itself to the highest ethical standards, including operational transparency, honesty, conscientiousness, and integrity. The ABMI strongly encourages the responsible and ethical evaluation and interpretation of the information contained in this report. For a complete discussion of the ethical behaviour endorsed by the ABMI, please see Honor in Science, published by Sigma Xi (1997), available at http://www.sigmaxi. org/programs/ethics/Honor-in-Science.pdf. A broader discussion about the use of ABMI data and information can be found in Scope and Application of the ABMI's Data and Information (00048), Version 2008-01-04, Alberta Biodiversity Monitoring Institute, Alberta, Canada. This report is available at www.abmi.ca.

ABMI

is committed to continued excellence in biodiversity monitoring.

Disclosure

Data used to prepare this report is available on the ABMI's website and includes species, habitat, and remotely sensed data collected between 2003 and 2010. A comprehensive description of the scientific methods used in analyses of data for this report is described in:

- Alberta Biodiversity Monitoring Institute. 2010. Manual for Estimating Species and Habitat Structure Intactness (20029), Version 2010-03-01. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at http://abmi. ca/abmi/reports/reports.jsp [accessed August 1, 2011].
- 2. Alberta Biodiversity Monitoring Institute. 2010. *Manual for Estimating Human Footprint Intactness* (20030), Version 2010-05-18. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at http://abmi.ca/abmi/ reports/reports.jsp [accessed August 1, 2011].

Jim Herbers was the principal author of this report. David Huggard and Daiyuan Pan analysed and helped to interpret the data. Monica Kohler, FinalEyes Communications, Plumbheavy Design and many others provided technical and editorial insight. Many stakeholders from government, industry, and environmental non-governmental organization (ENGO) communities provided valuable feedback.

Terms and Conditions of Report Preparation

The ABMI is responsible for initiating and resourcing the creation of this report. The following terms were applied as a condition of the ABMI preparing this report:

- 1. The ABMI reports on a standardized list of biodiversity indicators that are relevant to landuse planning. Developed by the ABMI, these indicators will be consistently applied to landuse status reporting.
- 2. The ABMI maintains full control over all language and messaging in this report.
- 3. This biodiversity status report is relevant to regional areas and not localized landscapes unless as described in the report. As data accumulates, the ABMI will be able to report on the status of biodiversity in smaller administrative units or regions.
- 4. The report was released publicly in a timely manner.

▶ Image Credits

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Alberta Biodiversity Monitoring Institute. 2011. The Status of Biodiversity in the South Saskatchewan Planning Region: Preliminary Assessment. (00063) Version 2011-08-13. Alberta Biodiversity Monitoring Institute, Alberta, Canada. Report available at www. abmi.ca. Published August 2011.

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