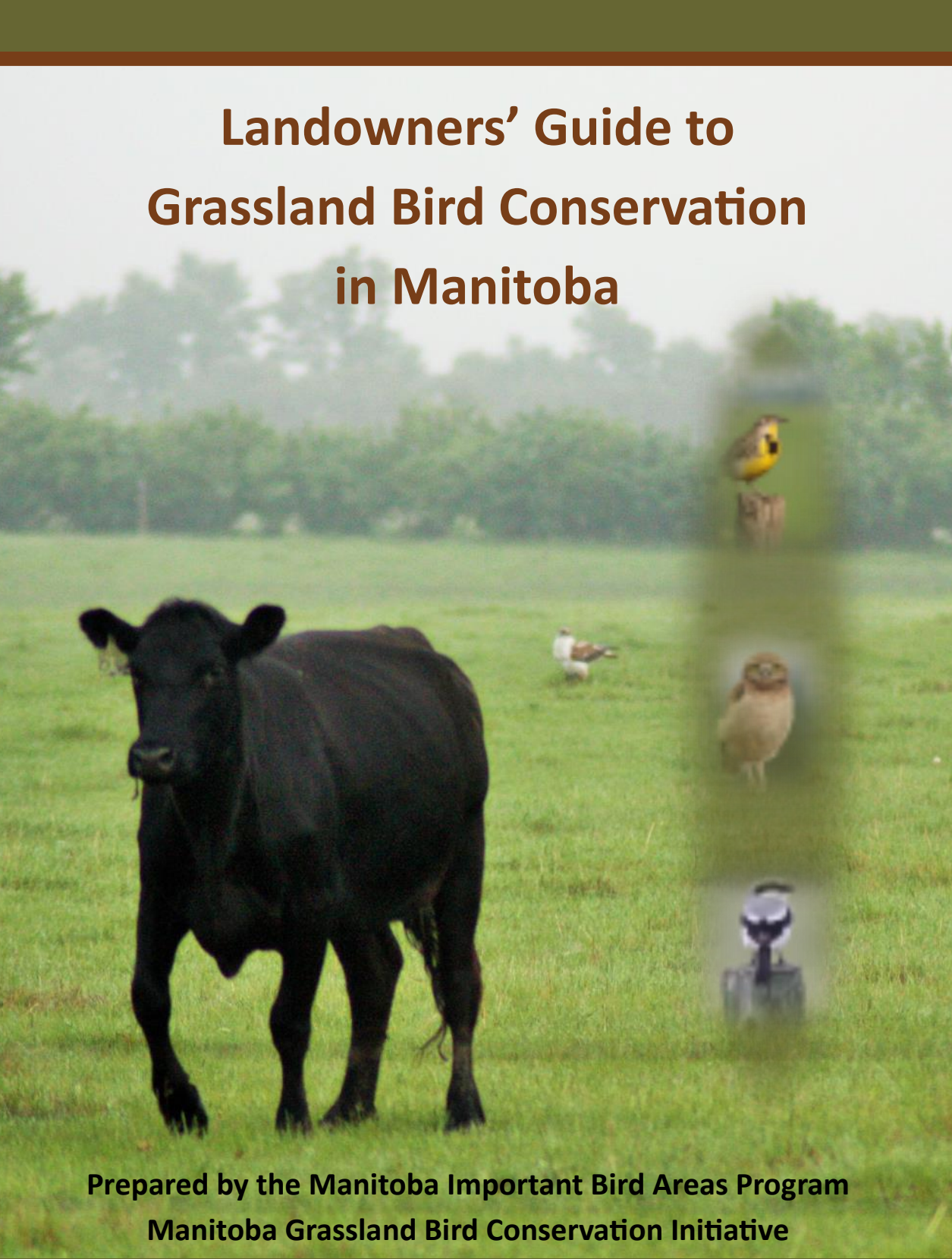
Landowners' Guide to Grassland Bird Conservation in Manitoba



Prepared by the Manitoba Important Bird Areas Program
Manitoba Grassland Bird Conservation Initiative

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Introduction

"Temperate grasslands are one of the world's great biomes, occupying 8% of the earth's surface. However, after cradling human needs for centuries they are the most endangered, the most altered and yet the least protected biome on the planet."

—Bob Peart, Temperate Grasslands Conservation Initiative (TGCI)

The rich tapestry of birdsongs are a distinct and precious part of the prairies. When our ancestors first came to Manitoba, they must have noticed the thrilling variety of songs that would greet them every morning. The songs of birds are often a stirring memory to our childhood; something we hope that future generations will have a chance to appreciate as well. For many prairie residents, it is the arrival of the first birds in spring that signals the end of a long winter, and the beginning of a new season of life on the prairies.

As a landowner, you may be asking the question 'why do grassland birds matter?' The pages of this booklet seek to answer this question, as well as the question of what can be done to ensure their protection, by:

- describing and categorising grassland ecosystems in North America and Manitoba;
- discussing the importance of grasslands to birds and other animals and plants;
- discussing factors related to grassland bird declines; and
- highlighting Manitoba's grassland bird species and some management techniques landowners can use to ensure their continued well-being.

Why Care About Grassland Birds?

Firstly, birds are an indicator of the overall health of the environment. Having a healthy diversity of birds usually means that there is plenty of food, water, space, and shelter for a variety of wildlife. The presence of nesting Sprague's Pipits or Loggerhead Shrikes in a pasture shows us that livestock grazing is benefitting wildlife. From a selfish point of view, many birds are extremely beneficial to have around. A single swallow can eat over 1000 mosquitos per day. A shrike may take small birds, but most of their diet revolves around insects, voles, and mice. Prairie hawks also consume a wide variety of voles, mice, and ground squirrels (one pair of Ferruginous Hawks will eat 500 ground squirrels in a season). More studies are showing that grassland birds and cattle need each other. Without cattle and active grazing, pasturelands are either converted to croplands or become so overgrown with grass and shrubs that they no longer support most of the grassland birds that occurred there when the site was actively grazed. Manitoba's grassland birds are increasingly dependent on landowners and farming to sustain healthy populations into the future.

The primary drivers throughout the history of grassland ecosystems have been natural fire and the grazing of large herds of bison.

From suppression of wildfire, removal of bison, conversion to cropland, energy extraction, and grazing of domestic livestock, humans are now the drivers of grassland ecosystems.

What Basic Characteristics Define Grassland Habitats?

To fully understand and appreciate grassland birds, we first need to understand a bit about the ecology of grassland ecosystems. Across our planet, grassland ecosystems are found in moderately wet climates where rainfall is too low to allow growth of large forests, but is high enough to support a rich diversity of grasses and other low-growing plants.

Grassland ecosystems are created and maintained by natural processes and features. There are 7 primary factors which might do this:

1. Grazing patterns
2. Fire cycles
3. Climate (rainfall, temperature)
4. Types of grass
5. Soil type
6. Tree and shrub distribution
7. Physical factors (mountain ranges, forest expanse)

North American grasslands are arguably the most threatened of all worldwide grassland ecosystems. In the Great Plains alone, 97% of tallgrass prairie, 71% of mixed-grass prairie, and 48% of shortgrass prairie had been lost by 2003, with much of the remaining areas of native prairies degraded.

North American Prairie Ecosystems

There are three broad categories of native prairie in North America: Tallgrass Prairie; Mixed-Grass Prairie, and Shortgrass Prairie. While these three major grassland types share many similarities, they also have contrasting features. There are many grassland bird species that are adapted to more than one grassland ecosystem, though each zone also has its own assortment of specialist bird species which thrive best, sometimes exclusively, within that grassland type. These characteristics are summarised in Table 1.

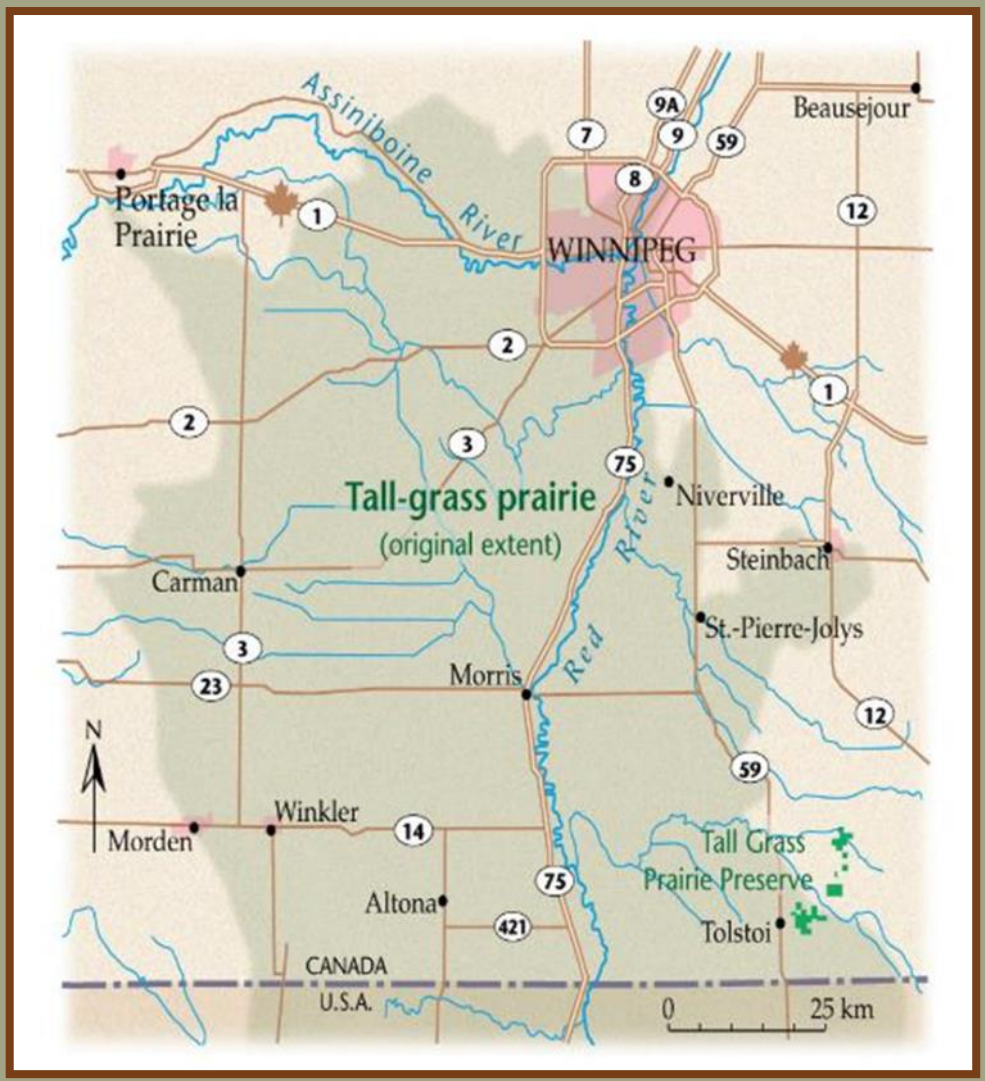
Map 1. Historic extent of short-, mid- and tallgrass prairie in North America (source: Houston Advanced Research Center, adapted from the USGS Northern Prairie Wildlife Research Center and the USGS National Wetlands Research Center)

	Tallgrass Prairie	Mixed-Grass Prairie	Shortgrass Prairie
			
Climate—rainfall	High annual rainfall and cool temperatures	Medium annual rainfall and moderate temperatures	Low annual rainfall and warm temperatures
Continental status	Approximately 4% remaining	<25% remaining	50% remaining
Manitoba status	<1% remaining	<10% remaining	NA
Vegetation structure	Low species and height diversity. Typically 1.5–2 m tall	High species and height diversity. Average plant height = 30 cm	Low species and height diversity, <25 cm tall
Main species of grass	Big bluestem, little bluestem, and Indiangrass	Wheatgrass, spear grass, little bluestem, and blue grama	Blue grama and buffalograss
Typical bird species	Bobolink, Clay-coloured Sparrow, Savannah Sparrow, Eastern Bluebird	Baird's Sparrow, Chestnut-collared Longspur, Ferruginous Hawk, Sprague's Pipit, Western Meadowlark	Mountain Plover, Prairie Falcon, McCown's Longspur, Long-billed Curlew
Natural habitat drivers	Historically maintained by wildfire and bison grazing	Historically maintained by wildfire and bison grazing	Historically maintained by bison grazing. Grass species are drought resistant

Table 1. The three broad categories of native prairie in North America

Grasslands in Manitoba

Before European settlers, tallgrass prairie was found all along the Red River Valley south of Winnipeg and transitioned to mixed-grass prairie west of the Red River in south-central Manitoba. The largest remnant of tallgrass in Manitoba is the Tallgrass Prairie Preserve near Tolstoi, but very small remnants exist elsewhere, such as Oak Hammock Marsh.



Map 2. Tallgrass prairie in the Red River Valley [not including areas of tallgrass further north], former extent in brown and current in green (source: http://www.canadiangeographic.ca/magazine/jun10/tallgrass-prairie.asp)

Mixed-grass prairie is not as threatened as the tallgrass, but it also occupies only a fraction of its former range. It is primarily limited to remnant fragments in southern and western Manitoba along the Souris and Assiniboine Rivers, and in the extreme southwest. The best examples in Manitoba are located in the Poverty Plains, Souris River Lowlands, and Lyleton-Pierson prairies. Significant areas are found as well around the PFRAs near St-Lazare and around Shilo.

Upland Sandpiper

"A Horned Lark or a Sprague's Pipit represents an almost immeasurable tiny part of the prairie ecosystem, but a prairie without the song of a Horned Lark or a Sprague's Pipit overhead is no prairie at all. And a place with no prairies at all is not a place that will stir the heart."

—Paul Johnsgard, Prairie Birds: Fragile Splendor in the Great Plains

Grassland Birds of North America

Forty-two species of North American birds breed solely on grasslands. The grassland birds discussed in this guide all breed in Manitoba's prairie habitats but there are also other species which occasionally breed in Manitoba (e.g., Dicksissel and Lark Bunting), or which once bred in Manitoba but no longer do (e.g., Long-billed Curlew and Greater Prairie Chicken).

Western Meadowlark

Sharp-tailed Grouse

Bobolink

Long-billed Curlew

Burrowing Owl (juvenile)

Ferruginous Hawk

Why are Grasslands Important for Birds?

Grasslands are the primary habitats for a number of rare and threatened species in Canada. Many spend their entire life on the Great Plains but others winter in Central and South America. Many birds are adapted for life on the prairies and are likely to disappear if their habitats no longer exist. Grasslands are ecologically rich. For example, three acres of tallgrass prairie can support 300 species of plants and one acre can support three million individual insects—perfect for a hungry bird or even something like a ground squirrel, which then provides nesting burrows for Burrowing Owls and food for Ferruginous Hawks.

Many people think that all grasslands are pretty much the same, but birds see things differently. Some species prefer sites that have been heavily grazed, while others seek out taller, less disturbed grass stands. Some species like some shrubs in the mix, while others avoid woody vegetation completely. Put it all together, and you have a remarkable mix of birds that depend on the fate of grasslands.

Prairies are not just important for birds. They also provide habitats for threatened plants, invertebrates, and mammals, including the long-gone plains bison and plains wolf. Examples of non-bird Species-at-Risk in Manitoba's prairies include:

buffalograss

western prairie fringed orchid

mule deer

northern prairie skink

western silvery aster

Great Plains toad

Why are Grassland Birds Under Threat?

Prairie ecosystems have changed significantly since European settlers arrived. The vast expanses of native grasslands once maintained by wandering bison herds and periodic wildfires are no longer with us. The prairies have been altered to such an extent that in many places birds and other wildlife no longer have the food and resources they need to thrive, but where birds still do thrive is in large part due to cattle production. Listed here are some of the most important factors contributing to current grassland bird declines:

1. Agricultural development in the prairies has provided immense gains to the economy, to society, and to rural communities. However, grassland birds and other wildlife have been affected in many ways including:

- Major habitat losses, including breaking up of habitat into several smaller patches.
- Accidental loss of nests.
- Loss of important prey species, like ground squirrels.
- Invasive species have had major impacts on agriculture and wildlife.
- Increased encroachment by shrubby and wooded vegetation due to the lack of grazing and wildfire.

2. With the loss of bison, cattle have become key to the health of remaining grasslands. When grazing exceeds the carrying capacity of native range, or the native rangeland grass species diversity is lost, grassland birds and livestock production both suffer.

3. Energy extraction has led to increased infrastructure and loss of habitat.

4. Increased urban sprawl has led to direct loss of habitat and loss of wetlands.

5. Increased linear features such as roads, wires, and fences increases predation and cowbird parasitism. Busier roads increase bird deaths on breeding, migratory, and winter ranges.

6. Predation risk to nests, young, and adults has increased due to a combination of the factors mentioned above.

7. Climate change has and will increase extreme weather events, causing further declines in food supplies, droughts, and decreased breeding success.

Manitoba's Grassland Birds

Primary Prairie Endemics—birds which are only found on, or have a very strong affinity to, the Western Great Plains	**Secondary Prairie Species**—birds which spend a proportion of their lifecycle in grasslands or have only a small portion of their range in the Great Plains	**Prairie Wetland Species**—birds which breed in wetlands in the Western Great Plains but also have a broader distribution in Canada
• Ferruginous Hawk • Sprague's Pipit • Baird's Sparrow • Chestnut-collared Longspur	• Swainson's Hawk • Bobolink • Sharp-tailed Grouse • Upland Sandpiper • Burrowing Owl • Western Meadowlark • Loggerhead Shrike • Horned Lark • Savannah Sparrow • Grasshopper Sparrow • Vesper Sparrow • Clay-colored Sparrow	• Sandhill Crane • Willet • Marbled Godwit • Wilson's Snipe • Wilson's Phalarope • Le Conte's Sparrow • Nelson's Sparrow

Chestnut-collared Longspur

Management for Grassland Birds

The changing prairie landscape has led to declines of many grassland bird species. As research continues and knowledge broadens, grassland management can be adapted to ensure that agricultural production is maintained while the species which rely on these places are conserved. It is widely acknowledged that grassland birds depend on active grazing and by following sound management practices, we can sustain both cattle and birds on a working landscape. Often, long-term benefits can be realized for both the landowner, grassland habitats, and prairie birds by following some of these practices. The following section outlines some of these management practices.

Prescribed Burning

Prescribed fire attempts to replicate the wildfires which swept through the prairies in pre-settlement times. Periodic fires can be used by landowners to increase the area of pasture by halting woodland encroachment; increase the diversity of grass species; and burn off excess debris which will reduce the risk of wildfire and improve forage quality by releasing nutrients into the soil. Fortunately, habitats impacted by fire are good for many birds.

Research has shown that plant diversity falls in the year following prescribed fire but increases rapidly thereafter. After several growing seasons there is greater plant diversity than before the fire. Prescribed burns should occur periodically, over several years or decades, and preferably be limited to multiple small burn patches (less than an acre). Timing of prescribed burning in Manitoba will depend on the priorities of individual landowners and will either occur in early spring when fires can be better controlled and before birds nest—or in the fall, following the breeding season. Spring burns typically favour tall, perennial grass species that grow late in the season and provide better forage, while fall burns favour early-flowering grasses and other flowering plants. Spring burns are also more effective at removing woody vegetation.

Prescribed burning

Two years post-fire

Precautions should be taken to ensure burns are done safely and effectively with experienced practitioners (some excellent information can be found at http://pbatexas.org/). In some areas of the Great Plains, Prescribed Fire Associations act as facilitators, assisting landowners to carry out burning safely.

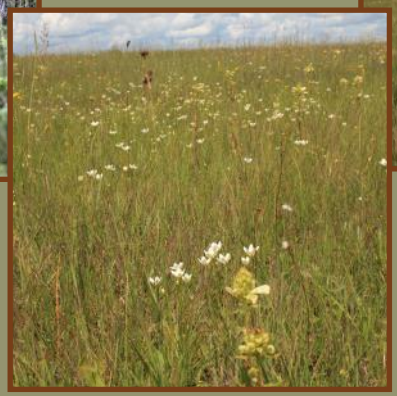
Shrub Mowing

Shrub mowing in pastures is an excellent example of a practice that can improve a landowner's bottom line as well as grassland bird habitat. Reducing woody species has been shown to improve grass production. From a bird standpoint, many threatened grassland species avoid shrubby areas.

Grazing Practices

Active grazing by livestock is the only practical way to conserve the remaining mixed-grass prairies and grassland birds in Manitoba. Large unbroken expanses of grassland allows landowners to keep more cattle in an area. Conveniently, grassland birds are more likely to prosper on areas of prairies uninterrupted by roads, fences, trees or other physical features. Ideally, 100 hectares of unbroken pasture with a diversity of grass species of varied height will provide the resources required by birds for nesting, shelter, and foraging. For most species, achieving the desired habitat usually depends on having relatively moderate densities of cattle in each field. Moderate densities create a patchwork of tall and short grass heights within a single area. However, there are different approaches to grazing used in North American grasslands. Landowners are best placed to decide which method is most appropriate to achieve the desired outcomes, some of which are shown in the photos below.

Species diversity and grasses of various heights



Native perennial grass cover

Larger fields with reduced edges

Other Management Techniques

Larger pastures are more bird friendly. Larger grasslands should provide more space for cattle, a greater diversity of grasses, and enhanced feed for livestock. Grassland birds are 'area sensitive', meaning they avoid nesting in smaller pastures. There are different figures given for the minimum size of field for grassland birds, and it probably varies from species to species, but everyone agrees that bigger is better. A minimum of 50 hectares is required for most species, but 100 hectares is ideal.

Minimise the length of field edges—think square-shaped fields. This will hopefully maximise the area available for grazing and is preferable to long, narrow, rectangular fields. The latter is bad for birds as increased field edges provide more habitat for predatory animals.

Hay as late as possible. Haying is not bad for birds as long as it does not occur during the nesting season. To prevent loss of nests, hay non-native grasslands first and native grasslands last. In some instances periodic haying, as opposed to leaving fields idle for more than a year, may be recommended to reduce excessive thatch/litter cover.

Avoid grassland monocultures in haying seed mixes. Grassland seed mixes should contain 60–80% grasses and at least three species of varied height are encouraged to provide varied forage for livestock and increased diversity for birds. Warm season grasses like bluestems are preferable to cool season grasses like alfalfa. Although slower to establish, these grasses increase water and nutrient uptake; are drought tolerant; are long-lived; have similar nutritional values to cool season grasses; and mature after grassland birds have fledged.

Retain shrub cover along field and grassland edges. These shrubby edges will provide shelter for livestock in inclement weather and are essential for species like Loggerhead Shrike, Brown Thrasher, and Brewer's Blackbird.

Work towards eliminating invasive species.

Avoid building oil and gas infrastructure across the center of grasslands. Avoiding field centers will also maximize the usefulness of these areas for livestock.

Find out more about grassland birds. Knowing about the wildlife on your land and what they need to survive and reproduce will help you make decisions which will help to ensure their conservation!

Managing for Individual Species

Ferruginous Hawk

Canada status[1]: Threatened
Manitoba status[2]: Endangered

Trend in Manitoba: 64% decline in Alberta (similar level in Manitoba) from 1995–2008

The Ferruginous Hawk disappeared from the province for 50+ years but now around 20 pairs breed in the southwest. They used to nest on the ground in Manitoba but have adapted to nesting in trees and on artificial structures like poles. This has in part aided their recovery. Encouraging nesting by Ferruginous Hawks will naturally control the numbers and range of ground squirrels.

Factors influencing conservation status	• Habitat loss, fragmentation, and degradation • Human disturbance • Reduction in ground squirrel density
Conservation Management	• Avoid disturbing breeding hawks which are prone to deserting nests. • Consider erecting a couple of artificial nests (wire baskets with sticks added) in isolated trees that are close to grasslands that have ground squirrel colonies. These are very effective at encouraging Ferruginous Hawks to breed successfully.

Short-eared Owl

Canada status: Special Concern
Manitoba status: Threatened

Trend in Manitoba: 27% decline in population in the past decade

This species forages around wetlands and shrubby grasslands. They look quite similar to the Burrowing Owl but are about a third larger, with shorter legs and with very small ear tufts (absent in Burrowing Owls). Short-eared Owls have been negatively affected by loss of grasslands and prairie wetlands. They prefer to nest in tall grasslands, and therefore benefit from moderate grazing in mixed-grass prairie.

Burrowing Owl

Canada status: Endangered
Manitoba status: Endangered

Trend in Canada: 57% decline from 1994–2004

Extremely rare in Manitoba—which is at the periphery of its range—the Burrowing Owl prefers dry, open, shortgrass, and occasionally mixed-grass areas for nesting. Burrowing Owls arrive on breeding grounds in mid-May, building their nests in abandoned burrows of mammals. Often seen perched on fence posts, they avoid nesting near tree cover. One of the primary reasons for their current status is the loss of nesting burrows from animals like badgers and ground squirrels.

Factors influencing conservation status	• Conversion of grassland to cropland • Fragmentation and degradation of grasslands • Lack of suitable burrows • Use of pesticides to control grasshoppers • Vehicle collisions • Idling of pastures and haylands around nests increases the lushness of vegetation and cover for predators
Conservation Management	• Create artificial nest burrows in actively grazed pastures. The potential for injury to cattle is removed by inserting the burrow at a narrow angle and mounding dirt above the entrance. • Avoid using pesticides near native grasslands.

Short-eared Owl

Red-tailed Hawk

Swainson's Hawk

For more information on Burrowing Owls and for photos of artificial burrows visit http://www.mborp.ca/.

Loggerhead Shrike

Canada status: Eastern—Endangered; Western—Threatened
Manitoba status: Endangered

Trend in Manitoba: 47% decline in Canada from 2004–2014; probably less than 100 pairs currently nest in Manitoba

Loggerhead Shrikes inhabit a wide variety of open habitats, including grasslands, shrubby pastures, agricultural edges, and grasslands along the edge of sparsely wooded areas with small trees and shrubs where they nest and forage. Nesting shrikes act as pest controls, bringing an average of one grasshopper to feed their young in the nest every four minutes. They have a preference for small bushy trees and dense or thorny bushes, and often store food items on fence barbs or thorns for later use.

Factors influencing conservation status	• Loss of the natural pastures and grasslands • Decline in prey base from habitat change • Vehicle collisions
Conservation Management	• Retain several small areas of shrub habitat along fencelines. • Consider planting thorny native shrubs like buffaloberry and hawthorn in fenced areas or wet areas to create new habitat.

Loggerhead Shrike Habitat

Sprague's Pipit

Canada status: Threatened
Manitoba status: Threatened

Trend in Canada: 83% decline from 1966–2006

Sprague's Pipits are elusive, often heard but rarely seen except in flight. They prefer natural grasslands and tame pastures and are rarely found in cultivated areas. They nest on the ground, and forage for insects and seeds. Most of their breeding range is in the heartlands of the prairies in western Canada.

Factors influencing conservation status	• Habitat loss and fragmentation—they prefer the center of pastures • Reproductive failure due to trampling and disturbance from heavy grazing • Encroachment of woody vegetation • Pesticides
Conservation Management	• Benefit from moderate grazing. • Encourage vegetation diversity aiming for mixed-height grasslands. • Avoid using pesticides in or adjacent to native prairie.

Chestnut-collared Longspur

Canada status: Threatened
Manitoba status: Endangered

Trend in Manitoba: 30% decline in Canada from 1999–2009

The Chestnut-collared Longspur nests on the ground in the mixed-grass prairie, and is generally more common in heavily-grazed portions of larger pastures, feeding on seeds and insects on the ground. Across North America, the breeding population has declined by 90% since the 1960's. These birds are highly area-sensitive, and may therefore abandon an area due to loss of pastureland.

Factors influencing conservation status	• Habitat loss • Loss of actively grazed grassland habitats—invasion by woody scrub; roads; oil and gas development • Impacted by changes to grazing and haying caused by ground water levels • Pesticides reducing food availability
Conservation Management	• Cut annually in hay meadows. • Graze at moderate to high intensity, including near wetland areas. • Encourage mixed grass heights and patches of litter-covered ground. • Use prescribed fire.

Baird's Sparrow

Canada status: Special Concern
Manitoba status: Endangered

Trend in Manitoba: 25% decline in North America from 1999–2009

Endemic to the Great Plains, Baird's Sparrows are highly sensitive to habitat changes, preferring native mixed-grass prairies and lightly grazed pastures. Like many grassland birds, some may persist breeding into August, laying a second clutch or re-nesting following failure. Being largely at the edge of their breeding range, large-scale declines have occurred in Manitoba, with the current species' range being limited to the southwest.

Factors influencing conservation status	• Habitat loss • Loss of actively grazed grassland habitats
Conservation Management	• Try to delay haying in native haylands until after all other haying operations are completed. • Promote moderate grazing. • Consider prescribed fire. • Encourage vegetation diversity with mixed grass heights and patches of litter-covered ground.

Other sparrows of the prairies include the Grasshopper Sparrow (left) which are found in haylands or idle prairie, and Lark Sparrows (right) which nest in prairies with sandy soils and a tree and shrub edge.

Prairie Wetland Species

Wilson's Phalarope

Northern Pintail

Many species from the prairie wetlands use grasslands as key components of their nesting and foraging habitat. The prairie potholes are globally recognised as one of the most important areas for breeding waterfowl. These small wetlands are also very important for breeding and migrating shorebirds. Key breeding species of Manitoba's grassland/wetland edges include Willet, Marbled Godwit, Wilson's Phalarope, and Wilson's Snipe. Conserving wetlands and wetland edges by avoiding drainage, erosion, and spraying nearby will retain many of these species in the prairie landscape.

Marbled Godwit

Aerial Insectivores

Aerial insectivores are birds which hunt small insects in flight. The Barn Swallow has recently been designated as 'Threatened' in Canada following declines of 76% from 1970 to 2009, partly due to reduced insect numbers following loss of wetlands and removal of old farm buildings where they nest. Along with other threatened insectivorous birds like the Chimney Swift and Bank Swallow, Barn Swallows are important to people, consuming hundreds of mosquitos per bird each day. Protecting the nesting and foraging habitat of swallows is vital to conserving a healthy population.

Other Songbirds

Mountain Bluebird

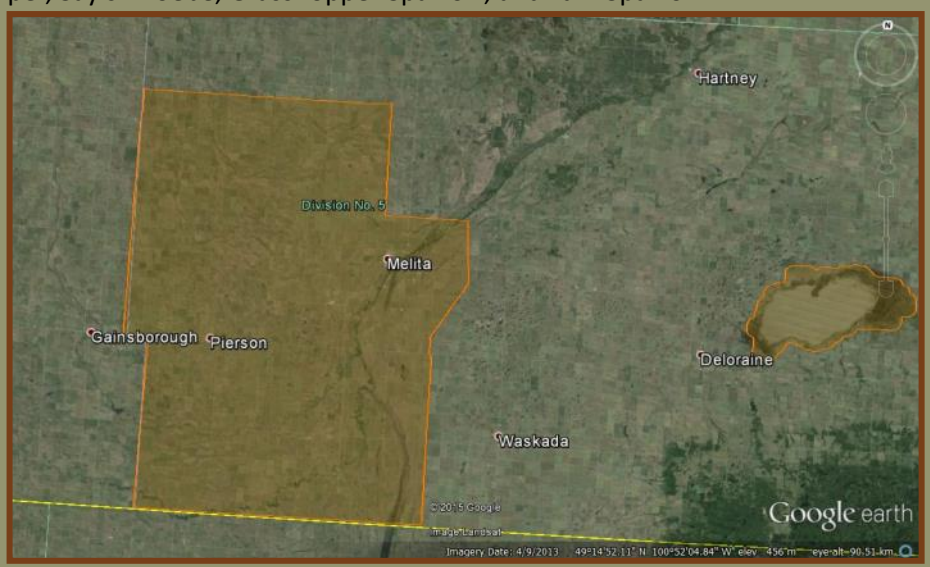
The Bobolink and Western Meadowlark are two of our most recognisable grassland birds, each undergoing long-term population declines. Bobolinks particularly thrive in haylands and Western Meadowlarks are found often near roadside ditches and associated grasslands. Mountain Bluebirds, bright blue summer visitors to the prairies, have benefited enormously from the provision of nest boxes on fence posts by concerned landowners and locals. Avoid placing nest boxes near trees. Horned Lark is another declining species of these ecosystems which nest on patches of bare ground in open cultivated fields. They may benefit from zero-tillage systems.

Western Meadowlark

Southwestern Manitoba Mixed-Grass Prairie IBA

One of the last strongholds for threatened prairie bird populations within extreme southwestern Manitoba is the Southwestern Mixed-Grass Prairie Important Bird Area (IBA). This IBA surrounds the towns of Melita, Lyleton, and Pierson and includes three rather distinct bird sub-areas—the Poverty Plains, the Souris River Lowlands, and the Lyleton-Pierson Prairies.

This key grassland bird IBA supports all of Manitoba's threatened grassland birds, including more than two-thirds of Manitoba's nesting populations of the Ferruginous Hawk and most of Manitoba's nesting population of Loggerhead Shrike, Baird's Sparrow, Sprague's Pipit, and Chestnut-collared Longspur. Other grassland birds that occur in good numbers here include Sharp-tailed Grouse, Gray Partridge, Marbled Godwit, Upland Sandpiper, Say's Phoebe, Grasshopper Sparrow, and Lark Sparrow.



Map 3. Southwestern Manitoba Mixed-Grass Prairie IBA

Credits

Images

Christian Artuso: cover page, Western Meadowlark, Burrowing Owl, Loggerhead Shrike; page 2 & 3, Short-eared Owl (background); page 5, table inset images; page 7, Upland Sandpiper; page 8, Sharp-tailed Grouse, Bobolink, Western Meadowlark, Ferruginous Hawk, Burrowing Owl, Long-billed Curlew; page 9, western prairie fringed orchid, Great Plains toad; page 11, Chestnut-collared Longspur; page 14, species diversity, field with low edge; page 17, Burrowing Owl, Swainson's Hawk, Red-tailed Hawk, Short-eared Owl; page 18, Loggerhead Shrike; page 19, Sprague's Pipit; page 20, Chestnut-collared Longspur; page 21, Grasshopper Sparrow, Lark Sparrow, Baird's Sparrow; page 22, Marbled Godwit, Northern Pintail, Western Meadowlark, Mountain Bluebird; page 25, Ferruginous Hawk, tallgrass prairie (background).

Carla Church: page 9, Northern prairie skink; page 14, native grass cover.

Famartin/CC-BY-SA-3.0: page 2, Susie fire in the Adobe range west of Elko, Nevada, from Wiki Commons, https://creativecommons.org/licenses/by-sa/3.0/legalcode.

Carrie-Anne Lander: page 2, plains bison, Sandhill Cranes; page 23, Sandhill Cranes.

Manitoba Conservation's Critical Wildlife Habitat Program: page 1, Rivers prairie (background); page 2, heavily grazed grassland; page 4 & 5, Birdtail Sioux FN landscape (background); page 9, buffalograss; page 10 & 11, aspen (background); page 13, two years post-fire, prescribed burning; page 18 & 19, tallgrass prairie with big bluestem (background); page 20 & 21, little bluestem (background).

Manitoba Conservation Data Centre: page 9, western silvery aster.

Manitoba Habitat Heritage Corporation: page 13, shrub mowing.

Tim Poole: cover page, Ferruginous Hawk in cattle pasture (background); page 9, mule deer; page 16, Ferruginous Hawk; page 18, Loggerhead shrike habitat; page 22, Wilson's Phalarope; back cover, prairie creek (background).

Text by Tim Poole, based on literature review by Marshall Birch. Booklet design and editing by Carrie-Anne Lander. Comments on the text were provided by Christian Artuso, Ken De Smet, Paula Grieef, Tim Sopuck, and Bonnie Chartier.

[1] Status as defined by the Committee on the Status of Endangered Wildlife in Canada
[2] As defined by the Manitoba *Endangered Species and Ecosystems Act*

“The truth of the matter is, the birds could very well live without us, but many—perhaps all—of us would find life incomplete, indeed almost intolerable without the birds."

—Roger Tory Peterson

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