Biodiversity

Discussion Paper for the Milk River Integrated Watershed Management Plan

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Note to Reader:

This is a working document. You will note that there are areas highlighted in red, some areas where question marks remain etc. or thoughts are not well developed. Your comments and feedback will be considered in the final version of this document.

- **Targets and Thresholds should be considered and interim targets established, some are proposed but more discussion is needed.**
- **Research and monitoring is important**
- **Please add in your comments!**

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1.0 INTRODUCTION

The Milk River watershed supports a diverse and unique assemblage of fish, wildlife and plant species. This results from the watershed's geographic location on the southern-most edge of Alberta as well as from the presence of numerous unique habitat structures in the watershed including hoodoos, cliffs, badlands, cottonwoods, and sagebrush. The large parcels of native prairie in which most of these unique habitat structures are found also provides essential habitat for many wildlife species. Several wildlife species such as the short-horned lizard, Mountain Plover, Greater Sage Grouse and swift fox are at the northern limit of their North American distribution within the Milk River watershed. Given the high human population and land-use pressures in the core of their continental ranges, it is now being recognized that maintenance of such peripheral populations is highly important ecologically if we are going to be successful in retaining these species well into the future. From the Alberta perspective, it is very important that prairie species, including species at risk, be properly managed within our province.

Wildlife populations and their habitats in the Milk River watershed are highly significant ecologically at the provincial, national, and international level. Provincially, the area supports about 75% of Alberta's species at risk, as well as providing an important contribution to the provincial populations of mule deer and pronghorn. Nationally, the Milk River watershed is the most important landscape in Canada for prairie species at risk; which has led to the creation of "MULTISAR" (multiple species at risk), a program aimed at conserving species at risk within the Milk River watershed. Internationally, the watershed is a source area for the re-colonization of swift fox back into northern Montana, provides key habitat for such international species as pronghorn and Greater Sage Grouse, and is a key part of the range of many migratory bird species which reside elsewhere at other times of the year. The number of different animal species that occur within the Milk River watershed ranges from 230 - 280 depending on the time of season. Seven species of amphibians, seven species of reptiles, 50 species of mammals, and approximately 200 species of birds use the Milk River watershed.

The wildlife and wildlife habitats of the Milk River watershed provide many social and recreational benefits to Albertans. Areas such as Writing-On-Stone and Cypress Hills Provincial Parks are destinations for people wishing to experience the unique ecological and landscape features of the region. Many hunters value the abundance of upland game birds and the trophy size of big game that are available in the Milk River watershed. Several wildlife management units (WMUs) within the Milk River watershed are managed for trophy mule deer. Additionally, the basin provides recreational hunting opportunities for pronghorn, white-tailed deer and elk, for upland game birds including Ring-necked Pheasant, Hungarian Partridge and Sharp-tailed Grouse, and for waterfowl.

1.1 Threats

Threats to wildlife and wildlife habitat can take many different forms as human population growth and development expansion occurs. The Milk River watershed, like most other geographic areas of Alberta, has been experiencing greater levels of human activity, disturbance and land use change in recent decades, although not to the same extent as experienced in other regions. Growth has mainly been in the oil and gas sector while agricultural activity has remained relatively constant. These activities, if not individually, have a cumulative effect on wildlife. In particular, two significant threats to wildlife in the watershed are worth highlighting:

a. the loss, fragmentation and degradation of native grasslands, and
b. the introduction of invasive species.

Inter-jurisdictional cooperation and coordination in the management of wildlife (among Fish and Wildlife agencies) with the adjoining province of Saskatchewan and the state of Montana is being achieved through the Northern Sage-brush Steppe Initiative. Among other things this partnership has embarked on a large-scale and long-term pronghorn antelope conservation and research initiative and is pursuing ongoing efforts in the conservation of Greater Sage Grouse.

Landowners are also interested in maintaining biodiversity by managing the land so that important habitat features are conserved for fish, wildlife and plants. Many agricultural producers are involved in programs, such as the MULTISAR program, that focuses on managing lands in a manner that is compatible with wildlife and species at risk.

Maintaining biodiversity should not take the place of the economic viability of agricultural operations in the watershed. The necessary economic instruments should be identified that can maintain biodiversity while supporting landowner investments on property is essential (link to agricultural activity).

Landowners are also concerned with access that is sought to private lands by universities (professors and students), municipal, provincial and federal governments, and non-profit organizations who seek to conduct research on unique fish, wildlife and plant species found in the watershed.

1.2 Objectives and Outcomes

The objective for biodiversity within the Milk River Integrated Watershed Management Plan is to:

> **Objective 9.** Recommend strategies to conserve and enhance native fish, wildlife and plant species diversity found within the watershed.

Outcomes/Policy Statements

- A diverse native fish, wildlife and plant community is present in the Milk River watershed through habitat conservation and enhancement efforts.

- Biodiversity in the Milk River watershed is maintained while **preserving the existing rights of landowners and leaseholders with respect to privacy, production value and commercial value of their land.**

2.0 INDICATORS, TARGETS AND THRESHOLDS

Note that ASRD-FWD provided input into the wildlife section of the Milk River Integrated Watershed Management Plan (including introductory information, wildlife indicator recommendations (Table 2) and recommendations found in Table 6). Targets and thresholds were not prepared for the Milk River Basin IWMP wildlife section by ASRD-FWD. The following note explains ASRD-FWD's approach. In order to develop targets and/or thresholds for wildlife populations a significant amount of information is required; for most species we do not have adequate information (either in the basin or provincially). ASRD-FWD discussed the possibility of developing thresholds or targets for the Milk River IWMP, however, in the end it was decided that this would be a significant time and financial commitment and would likely take several years to complete. Considering the size of the basin and the uncertain legislative authority of the IWMP it was decided that the time and financial commitments were not

justified at this time. As an alternative, objectives and actions were developed for 10 indicator species or groups of species for the MRB IWMP (Table 6).

2.1 Indicators

2.1.1 Fish

Since 1969, twenty-four species of fish have been captured in the Milk River. Fish captured included both forage fish (e.g., fathead minnow) and sport fish (e.g., sauger, mountain whitefish). Comparison of fish populations in the Milk River and its tributaries are limited since most of the fish studies that have been conducted were in relation to specific projects (i.e., dam investigations, status of species at risk) rather than specifically undertaken to produce population estimates. Water management in the Milk River has altered the fish present in the Milk River system. For example, the St. Mary River diversion likely introduced the lake whitefish and trout-perch into the Milk River drainage. Walleye in the Alberta portion of the Milk River likely migrated upstream from Fresno Reservoir in Montana. Although the three species at risk, western silvery minnow, Rocky Mountain sculpin (previously referred to as the Eastslope or St. Mary sculpin) and stonecat, are relatively abundant in the Milk River, they are considered "Threatened" under Alberta's Wildlife Act due to their limited distribution in Canada (i.e., Milk River).

Table 1. Summary of indicator fish species and the rationale for their selection.

Species	Rationale
Western Silvery Minnow	Listed Provincially and Federally
Rocky Mountain Sculpin	Listed Provincially and Federally
Stonecat	Listed Provincially
Sauger	Primary sport fish in the Milk River
Longnose Dace	
Longnose Sucker	
Lake Chub	
White Sucker	
Mountain Sucker	Mountain Sucker habitat suitability may be similar to Longnose Dace and Rocky Mountain Sculpin; all are benthic species. The maximum length of a Mountain Sucker is about twice that of a Longnose Dace, but an HS curve for Longnose Dace would likely be similar.

***** The FWMIS database shows <1% of the measured fish from the Milk River and tributaries are Northern Pike (NRPK). The five most numerous of the measured fish, in decreasing order, were: flathead chub, western silvery minnow, lake chub, longnose sucker and longnose dace.

2.1.2 Wildlife

Effectively managing and conserving wild species and their habitats requires an understanding of species' distribution, population levels and habitat requirements, along with knowledge of the factors that may threaten their long-term survival. Species that were chosen as indicator species for the Milk River watershed were selected based on several criteria. These were:

1. Current information (baseline data) on the species is available,
2. There is potential for monitoring the species in the future,

3. The species is a focal species for a particular habitat,
4. The watershed provides unique habitat for the species, and
5. An increase or decrease in the species population can be tied directly to the overall health of the watershed.

Resident species such as Greater Sage Grouse, Sharp-tailed Grouse, northern leopard frogs, prairie toads, prairie rattlesnake, and pronghorn where selected as they rely on a healthy watershed throughout the year. Migratory species such as Burrowing Owls, grassland birds, and Ferruginous Hawks were also selected as the watershed provides important and unique habitat for these migratory species during the spring and summer months. Many of the species selected are considered species of management concern[1] and are of particular interest for planning purposes.

Table 2. Summary of indicator wildlife species and the rationale for their selection.

Species	Rationale	Management Concern	LMU[2]
Northern Leopard Frog	Resident	*Threatened* under *The Alberta Wildlife Act.*	All
Plains Spadefoot / Great Plains Toad	Resident	*Great Plains Toad: Species of Special Concern* as determined by the Minister of Sustainable Resource Development. Plains Spadefoot "May be at Risk" species under Alberta's General Status Program.	4, 5, 6, 7, 8
Pronghorn	Resident	"Sensitive" species under Albert's General Status Program.	All
Prairie Rattlesnake	Resident	"May be at Risk" species under Alberta's General Status Program and is currently being reviewed to determine its legislative status.	4, 5, 6, 7, 8
Greater Sage Grouse	Resident	Listed as an *Endangered* species under the *Alberta Wildlife Act* and the federal *Species at Risk Act*.	6, 7, 8
Sharp-tailed Grouse	Resident	"Sensitive" species under Alberta's General Status Program.	All
Burrowing Owl	Migratory	*Endangered* under the *Alberta Wildlife Act* and the federal *Species at Risk Act.*	All
Ferruginous Hawk	Migratory	*Endangered* under the *Alberta Wildlife Act* and as *Threatened* under the federal *Species at Risk Act.*	All
Loggerhead Shrike	Migratory	"Sensitive" species under the Alberta General Status Program.	All
Grassland Birds (i.e. Sprague's Pipit, Long-billed Curlew, Baird's Sparrow, Chestnut-coloured Longspur)	Migratory	The grassland bird guild is made up of a variety of species of birds with status designations ranging from "Secure" to "Endangered".[3]	All
Resident: Relies on healthy watershed throughout the year **Migratory:** watershed provides important and unique habitat during spring and summer months			

[1] Species of management concern can include 1) those species legally listed as *Endangered* or *Threatened* under the provincial *Wildlife Act*; 2) those designated as a *Species of Special Concern* by the Minister of Sustainable Resource Development or deferred through the provincial detailed status assessment process; and 3) species ranked as *At Risk*, *May Be At Risk,* or *Sensitive* in Alberta by the general status assessment process (refer to status designations within table below). More information on species at risk in Alberta can be found at: http://srd.alberta.ca/FishWildlife/SpeciesAtRisk/Default.aspx

[2] See Appendix A for a map of Land Management Units.

[3] For a comprehensive list please refer to the *Alberta Wildlife Act* or the federal *Species At Risk Act.*

2.2 Targets and Thresholds

About 70% of natural habitat in the Milk River watershed should be maintained for wildlife (Environmental Law Institute (2003). According to the Milk River State of the Watershed (2008), 71% of the watershed remains as native grassland on which many prairie species rely.

Table 3. Summary of indicator species and associated interim targets.

Indicator Species	Critical Habitat and Local Threats	Habitat Conservation/Protection Target
Fish		
Wildlife		
Northern Leopard Frog	Wetlands	No further loss of permanent, semi-permanent or ephemeral wetlands.
Plains Spadefoot / Great Plains Toad	Ephemeral wetlands	
Pronghorn	Wintering habitat What is wintering habitat?	
Prairie Rattlesnake	Suitable hibernacula (over-wintering dens) for survival. (Nicholson and Rose 2001, Watson and Russell 1997) and rookeries What is suitable? Threats: Loss of suitable hibernacula; Road mortality (Watson and Russell 1997)	Reduce road mortality by XX%. (what are the statistics on road mortality?)
Greater Sage Grouse	Sage brush habitat	Restore and maintain sage-brush habitat for the Greater Sage Grouse within its historical range. Increase and maintain the resident population from 13 breeding males to XX males through habitat restoration and re-introduction efforts.
Sharp-tailed Grouse	A mosaic of plant communities including native grassland and shrub mixtures with extensive ecotone. Native prairie provides nesting, hiding and brood rearing habitat; shrub cover provides a component of nesting and winter habitat (RCS 2004).	**Example:** A spring breeding population of at least 280 breeding birds in each of 5 sub-populations (1,400 total birds). The 280 breeding birds would include a spring population of 140 females, all breeders, and 140 males, of which only 10% are breeding birds (Temple 1991). **Is this achievable – what is the current population?** Each subpopulation requires a 4000+ ha patch of appropriate habitat (20,000 ha total habitat) (Temple 1991).
Burrowing Owl	Pastures grazed by livestock, short vegetation at nest burrows allows for detection of predators, mixture of short and tall grass prairie for nesting, foraging. Rely on burrows from Richardson's ground squirrels and	To maintain a stable or increasing owl population averaging 3,000 pairs across the prairies (currently estimated at 500 to 800 pairs) (National Recovery Plan for the Burrowing Owl 2002). The BC Recovery Goal is to establish viable populations of at least ten pairs of

Indicator Species	Critical Habitat and Local Threats	Habitat Conservation/Protection Target
	badgers to excavate nest sites (RCS 2004).	burrowing owls at four separate locations. http://www.burrowingowlbc.org/the_bc_program_the_new_bc_program.htm
Ferruginous Hawk	Breeding habitat is comprised of nesting and suitable foraging habitat. 50% native prairie with solitary or small groups of trees (RCS 2004).Mixed grass prairies.	
Loggerhead Shrike	Flat, open habitats with scattered clumps of shrubs or hedgerows. Found close to pastures, meadows, farmsteads and railroad rights-of-ways. Native prairie for surrounding habitat preferred.	
Grassland Birds	Native prairie.	Maintain existing native grassland within the watershed. No further loss of native grassland. Maintain health and function of native grassland (link to agricultural activity and rangeland). Prevent fragmentation of native grassland.
Vegetation		
Native Grassland	Land conversion from grazing systems to cropping systems. Land conversion due to urban developments or oil and gas activity.	Maintain existing grasslands within the Milk River watershed. No further loss of native grassland. Maintain health and function of native grassland (link to agricultural activity and rangeland).
Silver Sagebrush		Maintain and increase the area of silver sagebrush within the watershed, recognizing its importance to Greater Sage Grouse.

3.0 RECOMMENDATIONS

3.1 Fish

a) Improve over-wintering habitat for fish by maintaining minimum flows.

b) Consider timing and duration of flows in water management decisions to maintain and improve habitat for a diverse fish population in the Milk River.

3.2 Wildlife

3.2.1 General

a) Reduce the threat to wildlife and wildlife habitat by managing the cumulative effect of human activity, disturbance and land use changes by managing:
   i. the loss, fragmentation and degradation of native grasslands, and
   ii. the introduction of invasive species.

b) Adopt "no further loss" policies for wetlands (Classes I – VII of the Stewart and Kantrud (1971) wetland classification system including permanent, semi-permanent and ephemeral wetlands). (Link to wetlands and riparian areas)

c) Land that is marginally productive for annual crops should be converted into long-term forage production or retained in its natural state (e.g., ephemeral wetlands). (Link to agriculture)

d) Connectivity among wetlands and natural drainage ways should be maintained and restored where possible. (Link to wetlands and riparian areas)

e) The recommended activity dates and setback distances for wildlife as outlined by AESRD should be consistently applied, be mandatory and enforced (Table 4).

Table 4. Recommended restricted activity dates and setback distances by level of disturbance.

Species	Location	Time of Year	Level of Disturbance[4]		
			Low	Medium	High

[4] Setback distances are based the thresholds at which human disturbance is likely to cause degradation and possible abandonment of key wildlife areas/sites. Wildlife species have variable tolerances for disturbance intensities, with higher levels of disturbance requiring greater mitigation. Human activities have been divided into three disturbance impact categories (low, medium and high) with setback distances increasing from low to high.

- Low impact disturbances are often infrequent, low-impact (e.g., land surveying), habitat is not being modified by the activities, and the duration of the activity is relatively short (i.e., hours).
- Medium impact disturbances are usually high in frequency, may use vehicles and other equipment, and may involve small habitat modifications (e.g., seismic drilling) and the duration is relatively long (i.e., days).
- High impact activities generally involve disturbances that are high in frequency, involve vehicles and machinery, permanently modify the habitat by altering vegetation, soils and perhaps hydrology (e.g., buildings, roads) and the impact is long term (i.e., more than 10 years).

Species	Location	Time of Year	Level of Disturbance[4]		
			Low	Medium	High
Great Plains Toad and Plains Spadefoot	Class III wetlands on Native Prairie	Year round	100 m	100 m	100 m
Northern Leopard Frog	Breeding ponds	Year round	100 m	100 m	100 m
Eastern Short Horned Lizard*	Habitat	Year Round	100 m	100 m	200 m
Bull Snake, Western Hognose Snake, Prairie Rattlesnake	Hibernacula	Year around	200 m	200 m	500 m
	Rookery	March 15th – October 31st	200 m	200 m	200 m
		November 1st - March 14th	50 m	50 m	200 m
Greater Sage Grouse*	Leks	Year	3200 m	3200 m	3200 m
	Habitat	Year-	1000m	1000 m	1000m
Sharp-Tail Grouse	Leks	March 15th – June 15th	500 m	500 m	500 m
		June 16th – March 14th	100m	100 m	500m
Peregrine Falcon, Bald Eagle, Golden Eagle, Prairie Falcon, Ferruginous Hawk	Nesting sites	March 15th – July 15th	1000 m	1000 m	1000 m
		July 16th – March 14th	50 m	100 m	1000 m
Burrowing Owl	Nesting sites	April 1st – August 15th	200 m	500 m	500 m
		August 16th –October 15th	200 m	200 m	500 m
		October 16th – March 31st	50 m	100 m	500 m
Colonial Nesting Birds: American White Pelican, Great Blue Heron*	Nesting sites	April 1st – August 31st	1000 m	1000 m	1000 m
		September 1st – March 31st	100 m	100 m	1000 m
Piping Plover waterbodies*	Nesting sites	April 15th – July 31st	100 m	200 m	200 m
		August 1st – April 14th	100 m	100 m	200 m
Ord's Kangaroo Rat**	Nesting sites (dens)	Year Round	50 m	100 m	250 m
Threatened and Endangered Plants	Habitat	Year Round	30 m	30 m	300 m
Swift Fox	Den	February 16th – July 31st	500 m	500m	500 m
		August 1st – February 15th	50 m	100 m	500 m
Long-billed Curlew Upland Sandpiper Mountain Plover Short-eared Owl Sprague's Pipit	Active nest and surrounding habitat	April 1st - July 15th	100 m	100 m	100 m

*These species habitats are mapped

** All activity should conclude before sunset and not use artificial illumination within 1000 meters of Ord's Kangaroo Rat range.

f) There should be no industrial activity within 100 m of water bodies (wetlands, ponds, creeks, rivers, lakes, including dry water bodies), or within 100 m of the crest of any coulee associated with riparian areas or unique geographical features like hummocky moraines, because of extensive wildlife use (AESRD, Fish and Wildlife Division) (link to commercial/industrial activity).

g) Guidelines for setback distances should consider existing disturbances (i.e., roads, abandoned well sites) that may be closer to nests than the recommended setback distance, regardless of the activity level associated with that existing disturbance.

h) Investigate opportunities to use protective notations and other forms of securement to describe areas of limited or no development.

i) Emphasis should be placed on pre-project planning to avoid sensitive or critical habitat.

j) Promote innovative use of shared/common access and footprints (link to commercial/industrial activity)

k) Review regulatory incentives to ensure that minimal disturbance is prioritized.

l) Reclamation of abandoned wells should be accelerated in priority areas to improve wildlife habitat (link to commercial/industrial activity).

m) Continue to encourage and promote the inter-jurisdictional cooperation and coordination in the management of wildlife (among Fish and Wildlife agencies and others) with the adjoining province of Saskatchewan and the state of Montana through initiatives such as the Northern Sage-brush Steppe Initiative (a partnership focused on pronghorn antelope conservation and research and the conservation of sage grouse).

n) Scientific approaches for wildlife management are dependent on data and information (i.e., monitoring). The data gaps for managing various wildlife species in the Milk River watershed are identified in Table 5 and should systematically be addressed.

Table 5. Summary of data requirements to better understand and manage wildlife species (Milk River State of the Watershed Report 2008).
Note some of these requirements may be outdated, and others may be added.

Species	Data Requirements
Northern Leopard Frog	1) Detailed inventory of historic and active northern leopard frog ponds within the watershed to better understand population and identify differences in habitat between active and non-active sites.
Plains Spadefoot / Great Plains Toad	1) Identify and map current and historical ephemeral wetlands, 2) Study on the impact of road mortality of toads in Alberta 3) Initiate a monitoring program during high and low precipitation years to better understand population 4) Evaluate the effect of water management projects on reproductive success and over-wintering survival 5) Evaluate the effect of water quality on reproductive success
Pronghorn	1) Long-term detailed range assessments on native grasslands focused on forb and shrub abundance in relation to fluctuations in pronghorn number 2) Population demographics for pronghorns inhabiting native prairie and those in agricultural areas 3) BMPs for reclaiming silver sagebrush 4) Sight ability model for pronghorn antelope to assist with aerial surveys
Prairie Rattlesnake	1) Use road mortality information to identify areas of high mortality of rattlesnakes 2) Identification of hibernacula in highly suitable areas to better understand population
Greater Sage Grouse	1) Identify BMPs for silver sagebrush reclamation 2) Study the impact and transmission of the West Nile Virus in Greater Sage Grouse 3) Determine viability of population
Sharp-tailed Grouse	1) Evaluation of habitat using a Resource Selection Function model to predict lek locations 2) Evaluation of BMPs used by MULTISAR for Sharp-tailed Grouse
Burrowing Owl	1) Survival rates of Burrowing Owls at various life stages 2) Extent and impact of between-year dispersal by juveniles and adults 3) Effect of various grazing practices on prey species populations 4) Effect of environmental contaminants on survival and reproduction 5) Migratory route used and winter range of Milk River watershed owls 6) Upper development threshold
Ferruginous Hawk	1) Impact of climate change on ground squirrel populations and on Ferruginous Hawk nesting success 2) Status of non-breeding population 3) Impact of habitat fragmentation on nesting success and threshold level
Loggerhead Shrike	1) Identify areas in the watershed with potential for shrike habitat (e.g., using habitat suitability index models and air photo interpretation

Species	Data Requirements
	2) Conduct canoe surveys to confirm unique habitats and identify sites previously unrecorded 3) Assess how riparian health relates to Loggerhead Shrike habitat characteristics, abundance and nesting success 4) Improve methodology to derive trend data
Grassland Birds (i.e. Sprague's Pipit, Long-billed Curlew, Baird's Sparrow, Chestnut-coloured Longspur)	1) Effect of pesticide use, habitat fragmentation, various grazing regimes, and climate change on abundance, diversity and nesting success of grassland birds 2) Survey area should be expanded to improve data availability across the watershed 3) Rates of cowbird parasitism and rates of predation with increasing habitat fragmentation and decreasing patch size 4) Relationship between grassland birds and the health of different vegetation communities.

o) Support stewardship groups working within the Milk River watershed that provide information, support and assistance to local producers in conserving northern leopard frogs, Plains Spadefoot, Great Plains Toad, pronghorn wintering habitat, Greater Sage Grouse, Sharp-tailed Grouse, Ferruginous Hawk populations, Burrowing Owls, Loggerhead Shrike populations and grassland birds. Where opportunities exist partner on educational initiatives, enhancement projects and demonstration sites.

3.2.2 Sage Grouse

b) Oil and gas and other infrastructure should not be placed within critical sage brush habitat

Rationale: Using small radio transmitters to monitor sage-grouse movement, researchers found no radio-tracked birds within 1,200 m of gas wells and other developments and clear avoidance by birds out to almost 2 km (Carpenter and Boyce 2010). Researchers have also found that Greater Sage Grouse abandon leks within six kms of well-drilling activity. In winter, the birds are less sensitive, but they still avoid sagebrush habitat within 1.9 kms of industrial activity. Even when energy companies reclaim land, sagebrush may not re-establish. With increasing gaps in the cover, and more fences and wellheads for hawks to use as perches, young sage grouse do not survive (http://outdoorcanada.ca/22684/hunting/birds/how-habitat-loss-is-killing-the-sage-grouse).

There has been a significant loss (>90%) of Greater Sage Grouse silver sagebrush habitat in southeastern Alberta. By 1968, the sage grouse sagebrush habitat had decreased to only 4000 km^2. The Greater Sage Grouse population declined drastically over the past several decades. According to COSEWIC, between 1988 and 2006 the total Canadian sage-grouse population declined by 88%. As of the spring of 2012, there were only 13 males at leks and the total population of Greater Sage Grouse in Alberta was estimated at maybe 40 birds. http://albertawilderness.ca/issues/wildlife/sage-grouse

Sage grouse need at least a 5% cover of silver sagebrush for nesting and brooding (Aldridge 2001). Aldridge (personal communication) stated that a successful brood requires a 500 ha area with sufficient forbs and sagebrush for their diet, and sagebrush cover for nesting and brooding (McNeil and Sawyer 2001).

3.2.3 Burrowing Owl

1. Identify factors associated with annual population changes, including adult and juvenile survival, particularly in areas with commercial/industrial developments.
2. Identify and implement protocols that lessen factors affecting population declines.
3. Maintain, increase, and enhance breeding and foraging habitat.
4. Optimize nesting success, fledging rate, and survival on Canadian breeding grounds.
5. Gain a better understanding of migratory routes used and winter range of “Canadian” owls;

3.2.4 Prairie Rattlesnake

a) Establish road underpasses for rattlesnakes in high risk areas.

Refer to Table 6 for recommendations currently in place for wildlife management in the Milk River watershed (AESRD 2012).

3.3 Vegetation

a) Encourage development on lands that have previously been disturbed to discourage development on native grassland.

b) Well-managed grazing programs should be used to maintain healthy native grasslands and sage-brush, including appropriate stocking rates, timing restrictions and distribution tools.

   Silver sagebrush (*Artemisia cana*) is a very important plant species, in that it provides cover for sage grouse breeding and nesting. Silver sagebrush is also important for winter browse for the Pronghorn antelope (*Antilocarpa americana*). Silver sagebrush is considered to be an increaser species, meaning that it tends to increase in cover and height with grazing pressure on grasses and forbs (McNeil and Sawyer 2001).

c) Range health assessments should be used to document changes in the health of grasslands on public and private lands.

d) Prevent the spread and colonization of non-native and exotic or invasive plants.

Table 6. Specific recommendations currently in place to manage wildlife in the Milk River watershed (AESRD 2012).

Indicator Species	Goal	Recommendations[5]	Priority	Implementation Actions
Northern Leopard Frog	To conserve northern leopard frogs and their associated habitat within the Milk River Basin (Northern Leopard Frog Recovery Team 2005).	Advise local landholders of land management practices which enhance the habitat and survival of northern leopard frogs. (Northern Leopard Frog Recovery Team 2005)	medium	Establish partnerships with existing non-government organizations (NGOs) to achieve education and awareness recommendations.
Plains Spadefoot / Great Plains Toad	To conserve ephemeral wetlands from physical destruction and habitat degradation, in order to provide habitat for a unique assemblage of associated species (ASRD 2004).	Maintain ephemeral wetlands and the water quality associated with these wetlands. (Green et al. 2004, Michalsky et al. 2004)	medium	Establish partnerships with existing NGOs to implement best management practices (BMPs) in areas significant for the great plains toad or plains spadefoot (RCS 2004).
Pronghorn	To ensure that viable populations of pronghorn antelope are maintained throughout the Milk River Basin. What is a viable population?	1. Facilitate pronghorn movements throughout the Milk River Basin. (Alberta Fish and Wildlife Division 1990) 2. Maintain habitat quality on all pronghorn wintering areas. (Alberta Fish and Wildlife Division 1990)	medium medium	1. Provide information on wildlife friendly fencing (Paige 2008) to landholders. Partner with government and non-government organizations to implement wildlife friendly fencing demonstration sites. 2. Establish partnerships with existing non-government organizations to implement BMPs for pronghorn (Fish and Wildlife Division 1990).
Prairie Rattlesnake	Maintain the population of prairie rattlesnakes within the Milk River Basin. What is the current population?	1. Protect prairie rattlesnake overwintering sites (hibernacula) and birthing sites (rookeries) through stewardship activities. 2. Identify areas of high road mortality for prairie rattlesnakes and develop and implement methods to mitigate the impacts of roads in these areas.	high medium	1. Identify existing and potential hibernacula sites to Alberta Fish and Wildlife Division. 2. Develop a reporting system for snakes found dead along roadways to determine areas for future mitigation action. The identification of hibernacula sites will assist with industrial development siting and route selection, with municipal planning, and will reduce the number of snake/human conflicts within the basin. High risk road crossings will be identified through a reporting system and alternative mitigation measures can be developed to limit the negative impacts of roads on the prairie rattlesnake (e.g. use of signs).
Greater Sage	Enhance and maintain habitat for sage-	Manage for appropriate range health for	high	1. Establish partnerships with existing NGOs to implement

[5] Objectives and action recommendations for listed indicator wildlife species are taken from Minister approved national Recovery Plans, ASRD-FWD approved Management Plans, and existing government planning documents.

Indicator Species	Goal	Recommendations[5]	Priority	Implementation Actions
Grouse	grouse to satisfy life cycle requirements in support of a viable population within its remaining historical range (The Greater Sage Grouse Action Team 2005). What is a viable population?	sage grouse on grazing leases. (The Greater Sage Grouse Action Team 2005) What is appropriate?		BMPs. (Adams et.al. 2004) 2. Investigate incentives at the County level that promote good stewardship for sage-grouse and other species at risk within the Milk River Basin. 3. Educate and increase awareness among the general public that ranchers are retaining native prairie habitats and grazing it in a manner compatible with the habitat needs of the sage grouse in order that ranchers who provide this important service might be acknowledged.
Sharp-tailed Grouse	To ensure a viable population of sharp-tailed grouse within the Milk River Basin. What is a viable population?	Maintain nesting and lek habitat for the sharp-tailed grouse.	medium	1. Establish partnerships with existing NGOs to implement BMPs for the sharp-tailed grouse. 2. To assist with the discovery of new dancing grounds (leks), landowners and lessees are encouraged to notify Alberta Fish and Wildlife of the location of any known lek sites.
Burrowing Owl	Maintain and conserve breeding habitat for the Burrowing Owl in order to contribute to the provincial recovery goal of increasing the population to natural self-sustaining levels (Alberta Burrowing Owl Recovery Team 2005). What are natural self-sustaining levels?	1. Promote habitat conservation programs which support private landholders in managing habitat for Burrowing Owls. (The Burrowing Owl Recovery Team 2006) 2.Ensure adequate numbers and distribution of nest burrows created by badgers and ground squirrels. (The Burrowing Owl Recovery Team 2005). What are adequate numbers? 3. Participate in research project for Burrowing Owls survival rates, extent and impact of juvenile dispersal, grazing practices on prey species, and effect of contaminants on survival and reproduction.	medium high high	1. Promote habitat conservation programs which provide information and support to local landholders who have Burrowing Owls and other species at risk. Support the implementation of BMPs for Burrowing Owls. 2. Encourage land managers to maintain populations of fossorial mammals (i.e., burrowing mammals having limbs adapted for digging) that provide burrows for Burrowing Owls. • seek landowner support for maintaining fossorial mammals through education initiatives that target property owners and leaseholders • determine what level of acceptance (i.e., social tolerance) landowners have for fossorial mammals. 3. Use extension and education programs, to ensure that trapping, poisoning, and hunting do not eradicate local populations of fossorial mammals. 4. Maintain small mammal populations to provide an adequate prey source for other species at risk including the Ferruginous Hawk.

Indicator Species	Goal	Recommendations[5]	Priority	Implementation Actions
				5. Balance pest control and the needs of the burrowing owl to ensure the survival of the species while meeting the needs of landholders.
Ferruginous Hawk	Conserve nesting habitats, including nest sites, and foraging habitat for the ferruginous hawk in order to contribute to the provincial population goal. (Alberta Ferruginous Hawk Recovery Team 2009).	1. To maintain existing grasslands on both public and private lands and where opportunity exists, increase the acreage of grasslands. (Alberta Ferruginous Hawk Recovery Team 2009) 2. To ensure ferruginous hawk prey availability is considered in range management plans and recommendations. (Alberta Ferruginous Hawk Recovery Team 2009)	high medium	1. Inform private landholders of the importance of naturally-occurring trees and shrubs as important components of the prairie ecosystem, and encourage, through stewardship programs, their protection from destruction, and their careful management. 2. Install nest platforms in suitable habitat based on the established nest protocol (Migaj et. al. 2011). Ensure that artificial sites are placed properly to avoid conflicts with other species at risk. 3. Provide information on financial incentives to ranchers and farmers who are maintaining natural habitats for species at risk such as Ferruginous Hawks. 4. Market Incentives: • encourage urban consumers to purchase open range-raised beef. • promote market demand for labelling to identify beef produced by "Endangered Species Friendly" producers, leading to a system of market-based incentives to producers for providing species at risk habitat 5. Provide financial incentives to agricultural producers through the Alberta Environmental Farm Plan and other stewardship programs so that producers may realize financial benefits from having species at risk on their lands. 6. Educate and increase awareness among the general public that ranchers are retaining native prairie habitats and grazing it in a manner compatible with the habitat needs of the Ferruginous Hawk in order that ranchers who provide this important service might be rewarded.
Loggerhead	Maintain a population of Loggerhead Shrike	Implement BMPs designed to maintain	medium	Establish partnerships with existing NGOs to implement BMPs

Indicator Species	Goal	Recommendations[5]	Priority	Implementation Actions
Shrike	through habitat management and enhancement.	and enhance habitat for the Loggerhead Shrike (RCS 2004).		for the Loggerhead Shrike. (RCS 2004)
Grassland Birds	Maintain the biodiversity of grassland bird species	Promote native grassland retention. Conserve native grasslands through stewardship actions, BMPs, and the integration of grassland bird recovery needs into prairie conservation programs.	high	Maintain large, contiguous blocks of native habitat. Implement BMPs that maintain healthy rangelands, with the understanding that a mosaic of grazing disturbances (ranging from healthy to unhealthy) will benefit a variety of wildlife species including grassland birds. (Prescott 2010, RCS 2004)

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Appendix A. Land Management Units defined for the Milk River watershed.