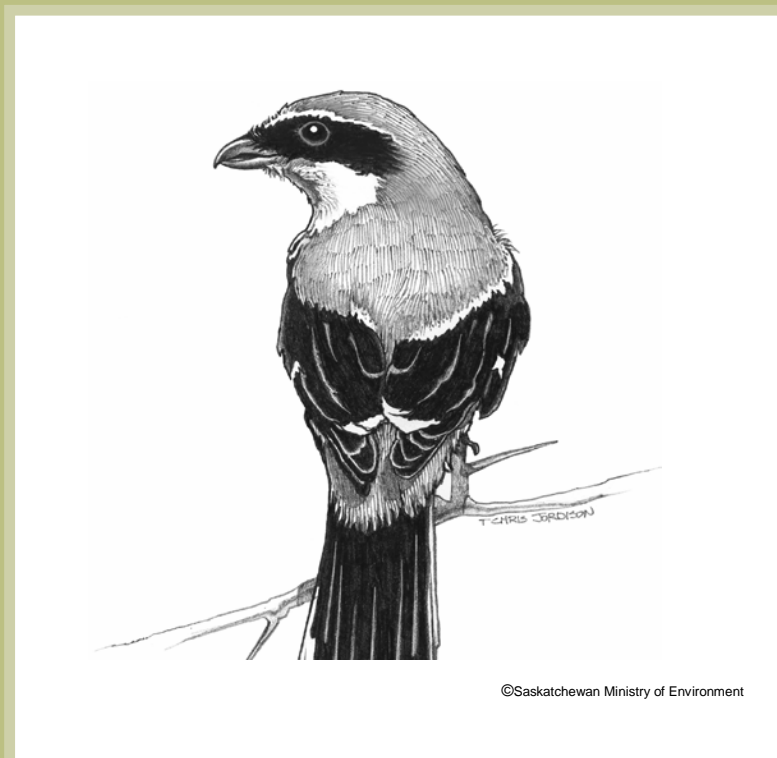


Recovery Strategy for the Loggerhead Shrike Prairie subspecies (*Lanius ludovicianus excubitorides*) in Canada

Loggerhead Shrike Prairie subspecies



2015



Government
of Canada

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du Canada

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For copies of the recovery strategy, or for additional information on species at risk, including COSEWIC Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the [Species at Risk \(SAR\) Public Registry](http://www.registrelep-sararegistry.gc.ca)¹.

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¹ <http://www.registrelep-sararegistry.gc.ca>

PREFACE

The federal, provincial, and territorial government signatories under the [Accord for the Protection of Species at Risk \(1996\)](#)² agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of recovery strategies for listed Extirpated, Endangered, and Threatened species and are required to report on progress within five years.

The Minister of the Environment and Minister responsible for the Parks Canada Agency is the competent minister under SARA for the Loggerhead Shrike Prairie subspecies, and has prepared this strategy, as per section 37 of SARA. To the extent possible, it has been prepared in cooperation with the Governments of Alberta, Manitoba and Saskatchewan, Parks Canada Agency, Department of National Defence, and Agriculture and Agri-Food Canada.

Success in the recovery of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this strategy and will not be achieved by Environment Canada, Parks Canada Agency, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this strategy for the benefit of the Loggerhead Shrike Prairie subspecies, and Canadian society as a whole.

This recovery strategy will be followed by one or more action plans that will provide information on recovery measures to be taken by Environment Canada and Parks Canada Agency and other jurisdictions and/or organizations involved in the conservation of the species. Implementation of this strategy is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

The recovery strategy sets the strategic direction to arrest or reverse the decline of the species, including identification of critical habitat to the extent possible. It provides all Canadians with information to help take action on species conservation. When the recovery strategy identifies critical habitat, there may be regulatory implications as SARA sets out a process to evaluate existing protection mechanisms under other Acts of Parliament and provincial and territorial legislation, and if necessary, to put in place additional protection under SARA. For critical habitat located on federal lands outside of federal protected areas the Minister of the Environment must either report on existing legal protection or make an order to provide protection. The Minister of the Environment will assess whether critical habitat is effectively protected on non-federal lands. The discretion to protect critical habitat that is not effectively protected rests with the Governor in Council.

² <http://registrelep-sararegistry.gc.ca/default.asp?lang=en&n=6B319869-1#2>

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Andrew Didiuk (Environment Canada) is acknowledged for preparing this document. The Loggerhead Shrike Prairie subspecies, Recovery Team [Andrew Didiuk (Chair) – Environment Canada; David Prescott – Alberta Sustainable Resource Development; Jeanette Pepper – Saskatchewan Ministry of Environment; Ken De Smet – Manitoba Conservation; Drew Taylor – Canadian Forces Base Suffield; Bill Bristol – Agriculture and Agri-Food Canada; Robert Sissons – Parks Canada Agency] are acknowledged for reviewing various drafts of this document and providing valuable feedback. Doug Collister of Accipiter Ecological Management provided valuable comment and information. Jared Killo and Kathy St. Laurent (Environment Canada) assisted in preparing data and mapping critical habitat. Dave Duncan, Mark Wayland, Medea Curteanu and Marie Christine-Belair (Environment Canada), Ken De Smet, Jeanette Pepper, David Prescott, Heather Weibe (Agriculture and Agri-Foods Canada), Natasha Wilkie (Agriculture and Agri-Foods Canada), Pat Fargey (Parks Canada), Joanne Tuckwell (Parks Canada), Dean Nernberg (Department of National Defense) and Journey Paulus (Cenovus) reviewed and provided comments on this recovery strategy.

EXECUTIVE SUMMARY

The Loggerhead Shrike Prairie subspecies (hereafter Prairie Loggerhead Shrike), is a medium-sized songbird that is often seen perched on tall shrubs, telephone poles and fence posts around farmyards, shelterbelts and pastures with shrubs in prairie Canada. It impales its prey on thorns or barbed wire to tear the flesh apart with its hooked beak, and is often called the butcher bird. In Canada, the Prairie Loggerhead Shrike breeds in the grasslands and Aspen Parklands of southeastern Alberta, southern Saskatchewan, and southwestern Manitoba.

The Canadian breeding range has contracted southward with few pairs now nesting in the Aspen Parkland region. The Canadian population of Prairie Loggerhead Shrikes has apparently been declining for at least 40 years. Between 1970 and 2009, mean annual rates of declines were estimated to be 1.2% for Alberta, 4.8% for Saskatchewan and 2.2% for Manitoba. The wintering distribution, likely in southwestern United States and Mexico, is poorly understood due to apparent mixing of subspecies. The Prairie Loggerhead Shrike was assessed as Threatened by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2004 because this bird has exhibited significant population declines over the past 35 years. It was listed as Threatened under Schedule 1 of the *Species at Risk Act* in 2005.

Threats to Prairie Loggerhead Shrike populations on the breeding and wintering grounds include land use changes on wintering grounds and cultivation of natural grasslands on the breeding grounds, as well as predation, severe weather, disease and parasitic infections. Other possible threats include pesticides and environmental contaminants and collisions with vehicles.

Recovery is deemed to be feasible although there are some unknowns. In keeping with the precautionary principle, this recovery strategy has been prepared as per section 41(1) of SARA as would be done when recovery is determined to be feasible.

The population and distribution objectives for the Prairie Loggerhead Shrikes are to 1) maintain the area of occupancy of the species across its distribution in Manitoba, Saskatchewan and Alberta, and 2) maintain population levels within this area of occupancy, based on information from regional surveys conducted during various times in the period 1993-2010.

Broad strategies to address the threats to the survival and recovery of the species are presented in the section on Strategic Direction for Recovery.

Critical habitat necessary for Prairie Loggerhead Shrike survival and recovery is partially identified in this recovery strategy based on the best available information at the time this recovery document was prepared. Critical habitat is identified as portions of 202 quarter-sections located within large contiguous areas of natural grasslands with well dispersed tall shrubs, 2 to 3 m in height and of low density (less than 30% areal extent) with shrike occupancy of ≥ 0.5 pairs/km² within and adjacent to Canadian Forces Bases Suffield, Alberta.

One or more action plans will be posted on the Species at Risk Public Registry by 2019.

RECOVERY FEASIBILITY SUMMARY

Based on the following four criteria outlined in the draft SARA Policies (Government of Canada 2009), there are unknowns regarding the feasibility of recovery of the Loggerhead Shrike Prairie subspecies. In keeping with the precautionary principle, a recovery strategy has been prepared as per section 41(1) of the *Species at Risk Act* as would be done when recovery is determined to be feasible. This recovery strategy addresses the unknowns surrounding the feasibility of recovery:

1. Individuals of the wildlife species that are capable of reproduction are available now or in the foreseeable future to sustain the population or improve its abundance.

Yes. The reproductive potential of the existing population, with more than an estimated 20,000 individuals breeding in Alberta, Saskatchewan and Manitoba, suggests that the population can be sustained or increased.

2. Sufficient suitable habitat is available to support the species or could be made available through habitat management or restoration.

Unknown. There is sufficient suitable habitat available to support the subspecies in prairie Canada. It is uncertain if suitable wintering habitat is sufficient. Maintenance of suitable habitat in prairie Canada is essential to provide breeding habitat, however the availability of sufficient habitat along migration routes and on the wintering grounds needs to be assessed and addressed.

3. The primary threats to the species or its habitat (including threats outside Canada) can be avoided or mitigated.

Unknown. Reasons for the broad-scale population decline and the primary threats causing the decline are not well understood. It is possible that some combination of threats in wintering and migration areas, including habitat loss and habitat degradation and competition, are reducing overwinter survival rates of adults and juveniles. Studies are required to provide estimates of survival and the factors affecting survival. While some research indicates Mexico and adjacent southwestern United States are likely wintering areas (A. Chabot pers. comm.), wintering locations for the subspecies have yet to be confirmed. Identification of specific wintering locations will allow for the assessment in these areas of potential threats to the continued persistence of this subspecies.

4. Recovery techniques exist to achieve the population and distribution objectives or can be expected to be developed within a reasonable timeframe.

Unknown. Many factors such as habitat loss and degradation, competition with resident shrikes, pesticides, and collisions with motor vehicles can be mitigated using known techniques (Yosef and Grubb 1994, Flickinger 1995, Yosef 1996, Cade and Woods 1997, Dechant et al. 1998, Lynn et al. 2006). However, until the importance of potential threats to the subspecies on the wintering areas is determined it is unknown whether the overall population and distribution objectives can be effectively achieved through the application of these techniques.

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1. COSEWIC* SPECIES ASSESSMENT INFORMATION

Date of Assessment: May 2014

Common Name (population): Loggerhead Shrike Prairie subspecies

Scientific Name: *Lanius ludovicianus excubitorides*

COSEWIC Status: Threatened

Reason for Designation: In the Prairie provinces, this grassland bird species has been experiencing large-scale population declines and range contractions, since at least the 1970s. Its population has declined by as much as 47% over the past 10 years. These declines are primarily related to loss of suitable grassland habitat on both the breeding and wintering grounds.

Canadian Occurrence: MB, SK, AB

COSEWIC Status History: The species was considered a single unit and designated Threatened in April 1986. Split according to subspecies in April 1991. The excubitorides subspecies retained the original Threatened designation from April 1986. Status re-examined and confirmed in May 2004 and May 2014.

*COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

2. SPECIES STATUS INFORMATION

In Canada, the Prairie Loggerhead Shrike (*Lanius ludovicianus excubitorides*) was listed as Threatened under the *Species at Risk Act* (SARA) in July 2005. In Manitoba, the species *Lanius ludovicianus* is listed as Endangered under the Manitoba *Endangered Species Act*, which includes the *excubitorides* subspecies. It is not currently listed under provincial legislation in Saskatchewan or Alberta.

The global conservation status of the Prairie Loggerhead Shrike is apparently secure (G4T4; NatureServe 2011). The subspecies is not ranked in Canada (NNR) while in Manitoba and Saskatchewan it has a status of imperilled (S2) and vulnerable (S3) respectively (NatureServe 2011). In Alberta the species is ranked S3, indicating it is susceptible to extirpation because of large-scale disturbances (Alberta Conservation Information Management System, 2012). The Canadian distribution of the Prairie Loggerhead Shrike, represents 15% of the species' global distribution.

3. SPECIES INFORMATION

3.1 Species Description

The Prairie Loggerhead Shrike is a medium-sized songbird with a body length of approximately 21 cm. Adults are boldly colored with dark grey upper parts, whitish under parts, a black tail, and black wings with flashing white patches that are very conspicuous when the bird flies. They have a black facial mask which extends from the eyes across the lower forehead. The bill is black with a distinct hook at the tip of the upper mandible. Juveniles have light grayish-brown bars on the breast and sides and they have a less prominent facial mask. Prairie Loggerhead Shrikes are slightly smaller than Northern Shrikes (*Lanius excubitor*), with which they are sometimes confused. However, Northern Shrikes occur only on migration and wintering areas of the Prairie Loggerhead Shrike.

Loggerhead Shrikes are often seen perched on tall shrubs, telephone poles and fence posts around farmyards, shelterbelts and pastures with shrubs. They impale their prey on thorns or barbed wire to tear the flesh apart with their hooked beaks, and are often called the butcher bird. Prairie Loggerhead Shrikes winter in the southwestern U.S. and in Mexico (*see* COSEWIC 2004 for more information on species biology and ecology).

3.2 Population and Distribution

The Prairie Loggerhead Shrike breeds from southern prairie Canada south through Montana, Wyoming, eastern Colorado, eastern New Mexico, Texas and into Sonora and northern Durango in Mexico (Figure 1; Burnside 1987). Exact western and eastern range limits are not clearly defined, as populations apparently intergrade with *L. l. gambeli* and *L. l. nevadensis* in the Rocky Mountain region, and with *L. l. migrans* in the eastern Great Plains (Miller 1931, Vallianatos et al. 2002).

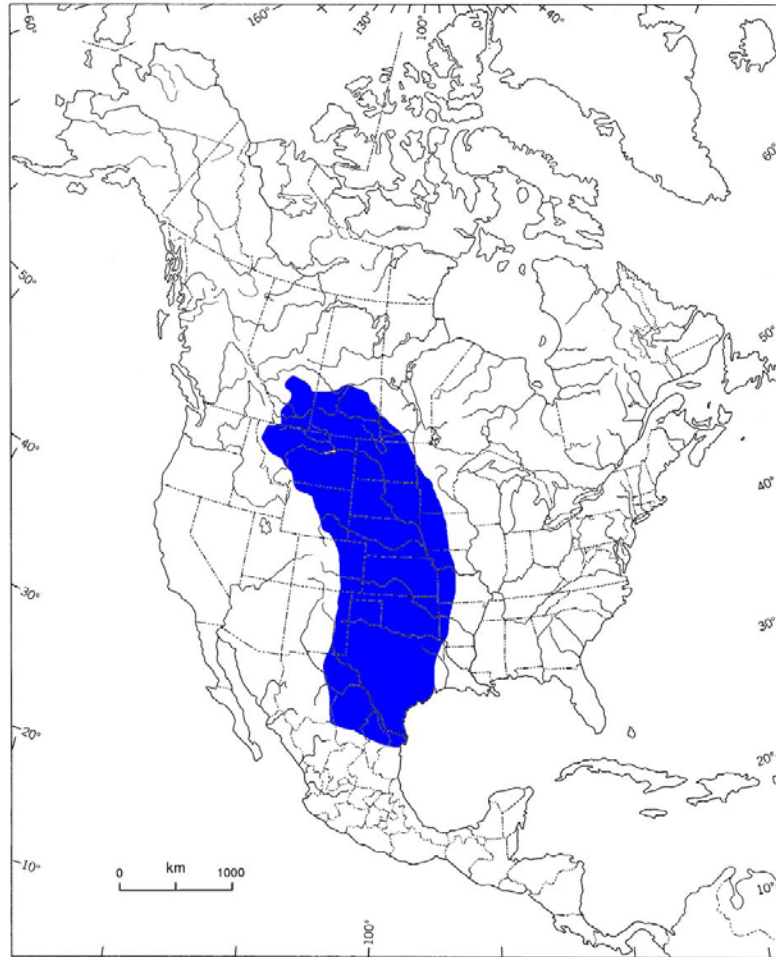


Figure 1. Approximate range of the Prairie Loggerhead Shrike in North America (modified from Burnside 1987 in COSEWIC 2004).

In Canada, Prairie Loggerhead Shrikes occur in southeastern Alberta, southern Saskatchewan, and southwestern Manitoba (Figure 2). The species has historically bred throughout the Aspen Parkland and prairie regions. In the northern portions of the range, including Canada, the species is migratory. The wintering distribution is poorly understood due to apparent mixing of subspecies. Recent investigations using stable isotopes and genetics suggest that Prairie Loggerhead Shrikes winter primarily in southwestern United States and Mexico (A. Chabot, pers. comm.).

In Alberta the breeding range has contracted southward in recent decades with fewer summer records in the Aspen Parklands (Figure 2). The core of the range in Alberta now appears to be the northern half of the province's grasslands eastward from Hanna and Brooks. In Saskatchewan the breeding range also appears to have contracted southward and it may no longer breed in many areas of the Aspen Parkland of east-central Saskatchewan (Smith 1996). In Manitoba Prairie Loggerhead Shrikes formerly nested north to the Interlake district but are now largely confined to southwestern Manitoba (K. De Smet, pers. comm.).

The changing abundance and distribution of nesting and perching sites has likely been a limiting factor that has influenced the historical and recent distribution of shrikes in the Prairie Provinces. Prior to European settlement, the Prairie Loggerhead Shrike was likely an uncommon species on the Canadian prairies. Its nesting habitat may have been restricted to the floodplains of larger drainages and to areas where soils and near-surface moisture provided suitable substrates for larger shrubs. The frequent occurrence of fire probably limited the occurrence of nesting shrubs in grassland areas. During the period of European settlement of the prairies the incidence of fire was reduced which increased the extent and longevity of nesting shrubs in these habitats.

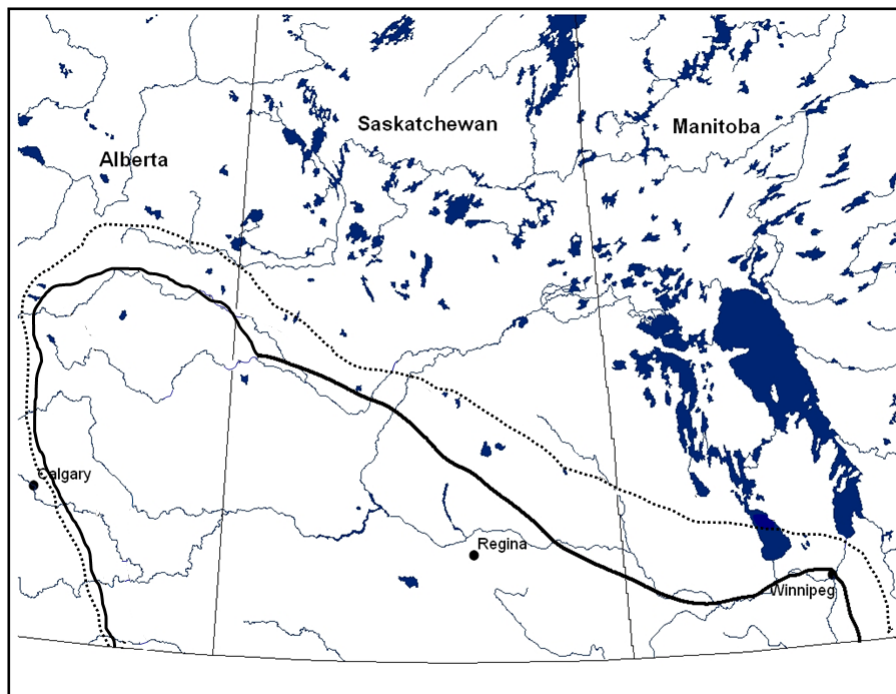


Figure 2. Former range (broken line) and the current range (solid line) of the Prairie Loggerhead Shrike in prairie Canada.

Canadian population size and trends

Population sizes in 2013 were estimated to be 70 individuals in Manitoba, 39,600 individuals in Saskatchewan, and 15,000 individuals in Alberta. However the accuracy of these estimates is uncertain due to sampling issues such that they cannot be used for setting quantitative population objectives.

Breeding Bird Survey (BBS) data for the 43-year period of 1970-2012 indicate mean annual rates of declines of 0.43 % for Alberta, 3.05 % for Saskatchewan and 5.0 % for Manitoba, and 2.35 % for the entire prairie region of Canada. Recent monitoring efforts, undertaken at 5-year intervals in the southern portion of the prairie provinces by Recovery Team, indicate that populations in Alberta declined 21 % between 1998 and 2013, and populations in Saskatchewan declined 71 % between 1993 and 2013. Monitoring in Manitoba has been restricted to a small

population which declined from an estimated 265 pairs in 1987 to an estimated 35 pairs in 2013 (K. De Smet, pers. comm.).

3.3 Needs of the Prairie Loggerhead Shrike

Prairie Loggerhead Shrikes require a suitable nesting site in the form of tall shrubs or low trees which provide a location for the nest cup at a height of 2 to 3 m above the ground. Dense leaf production is necessary to provide protection from the wind and rain for nestlings, and from detection by predators. A low density of shrubs, well dispersed, appears to be more suitable for breeding than single isolated shrubs or extensive areas of shrubs. Thorny Buffalo-berry (*Shepherdia argentea*), Choke Cherry (*Prunus virginiana*) and various species of willow (*Salix spp.*) are commonly used for nest sites. These tall shrubs also provide required perching sites for foraging and territorial defense.

The Prairie Loggerhead Shrike is associated with two different types of landscapes: tall shrubs in large areas of natural grassland habitat, and tall shrubs in farmland habitat. The former is considered to be optimal habitat for the subspecies.

Natural grassland habitat used by shrikes is characterized by widely spaced tall shrubs and low trees interspersed within large areas of natural grassland. This natural grassland habitat provides 1) tall shrubs or low trees suitable for nest sites; 2) elevated perches both natural (e.g. tree branches) and artificial (e.g. fence posts) for hunting, mating behaviour and territorial defense; and 3) a diversity of land cover which provides seasonal sources of prey for nesting pairs and for feeding of nestlings and fledglings (Pruitt 2000). Similar habitat is used during migration and on wintering areas.

In farmland habitat dominated by cropland, a diversity of vegetation in proximity to the nesting site may be important, with the amount and diversity of vegetation of varying heights being a major factor in habitat suitability (Prescott and Collister 1993, Gawlik and Bildstein 1993, Bjorge and Prescott 1996). Low vegetation height may allow improved detection of insect prey by shrikes. Active and abandoned farmsteads, road right-of-ways, vegetation along fence lines, cemeteries, equipment storage areas, other areas of human activity and small remnant patches of natural grassland such as those along minor drainages provide a variety of habitats if suitable tall shrubs are present. Roadside habitat provides many perches in the form of fences, power lines, man-made structures, and tree and tall shrub branches. In farmland habitat of prairie Canada, shrikes are widely but very locally distributed with overall low densities and no particular areas of high density.

Territory size and shape depends upon the distribution of habitat types in proximity to the nest site (Miller 1951, Yosef 1996). In one area of grassland habitat of Alberta, the mean territory area was 13.4 ha and ranged from 6.5 to 23.5 ha (Collister 1994). Shrikes frequently forage up to 400 m from nest sites and occasionally farther.

An important limiting factor to the productivity of the Prairie Loggerhead Shrike is annual climatic condition. Climate can influence the abundance of insect prey such as grasshoppers which may, in turn, affect the distribution of shrike populations and re-nesting efforts by shrikes.

In addition, benign weather conditions (e.g., absence of violent storms) are needed for successful reproduction (K. De Smet, pers. comm.).

4. THREATS

4.1 Threat Assessment

Loggerhead Shrike populations have declined in most parts of its range in North America. Pruitt (2000) and COSEWIC (2004) listed a variety of possible causes for the decline in Loggerhead Shrikes including: habitat loss and degradation on both the breeding and wintering areas, severe weather, changes in predator populations, disease and parasitic infections, pesticide use which can cause direct mortality or can decrease prey abundance, and collisions with vehicles. While some of these suspected threats may alone not be severe, the collective impact of these threats requires attention. One of the remaining challenges in deciding how best to address threats is to determine the relative importance of breeding and wintering ground threats to the viability of the subspecies.

Table1. Threat Assessment Table

Threat	Level of Concern ^a	Extent	Occurrence	Frequency	Severity ^b	Causal Certainty ^c
Habitat Loss or Degradation						
Land use Changes in Wintering Areas	High	widespread	current	continuous	high	low
Cultivation of Natural Grasslands in Breeding Habitat	Medium	widespread	current	continuous	low	low
Climate and Natural Disasters						
Severe Weather	Medium	widespread	current	seasonal - summer	moderate	low
Changes in Ecological Dynamics or Natural Process						
Predation During Breeding	Medium	widespread	current	seasonal - summer	moderate	low
Disease and Parasitic Infections	Low	widespread	unknown/ anticipated	continuous	low	low
Pollution						
Pesticides and Other Environmental Contaminants	Low	widespread	current	continuous	low	low
Accidental Mortality						
Collisions with Vehicles	Low	widespread	current	continuous	low	low

^a *Level of Concern*: signifies that managing the threat is of (high, medium or low) concern for the recovery of the species, consistent with the population and distribution objectives. This criterion considers the assessment of all the information in the table.

^b *Severity*: reflects the population-level effect (high: very large population-level effect, moderate, low, unknown).

^c *Causal certainty*: reflects the degree of evidence that is known for the threat (high: available evidence strongly links the threat to stresses on population viability; medium: there is a correlation between the threat and population viability e.g. expert opinion; low: the threat is assumed or plausible).

4.2 Description of Threats

Land use changes in wintering areas

Major land use changes within the wintering areas of shrikes include conversion of natural grassland to incompatible types of agricultural uses, exclusion or suppression of natural fires in natural grassland habitat and urbanization (Pruitt 2000). Loss of habitat on the wintering areas may exacerbate intraspecific competition (Lymn and Temple 1991). Intraspecific competition on the wintering areas with resident shrikes that occupy territories year round is likely a factor in the decline of the Loggerhead Shrike, *migrans* subspecies (Brooks and Temple 1990, Cade and Woods 1997, Pruitt 2000, COSEWIC 2004). Overwintering survival and/or low recruitment

rates to the breeding population by juvenile and young adult shrikes was considered to be the most sensitive factor affecting population dynamics of the Loggerhead shrike, *migrans* subspecies (Tischendorf 2009). Variation in rates of decline across the Canadian range of the Prairie Loggerhead Shrike may reflect differences in survival rates associated with differences in quality of habitat and risks on the migration and wintering areas. The effects of habitat loss and degradation in wintering and migration areas on Prairie Loggerhead Shrike recovery remain poorly known and this scarcity of knowledge is a vital concern because of the likely importance of overwinter survival to population dynamics of shrikes.

Cultivation of natural grasslands in breeding habitat

Extensive loss of natural grassland habitat has occurred historically throughout most of the range of the Prairie Loggerhead Shrike (e.g. Telfer 1992). Natural grasslands for foraging are considered to be important components of productive breeding territories. Over the last century most small riparian areas with suitable shrubs for nesting shrikes have been reduced to narrow ribbons of habitat, or eliminated entirely if the drainage depression is shallow, by cultivation. Cultivation of remaining natural grasslands, particularly of smaller patches, continues (Statistics Canada 1997).

Although the Prairie Loggerhead Shrike has adapted to nest in cultivated farmland habitat through the use of planted shrubs on active and abandoned farmsteads and in shelterbelts and other plantings, the nesting success of shrikes nesting in this habitat has not been evaluated compared to that of shrikes nesting in natural grasslands. With increasing farm size and new farming practices and equipment, many abandoned farmsteads and shelterbelts are being removed.

Although the loss and degradation of breeding habitat due to cultivation is a cause for concern, they alone cannot account for the rapid rate of population decline in the past four decades. Recent declines in Prairie Loggerhead Shrike populations appear to be greater than would be expected based on the perceived extent and rate of loss of breeding habitat due to cultivation of natural grasslands.

Severe weather

Cold wet breeding seasons, especially with heavy rain storms, have resulted in nest abandonment or loss of young shrikes in both the *migrans* and *excubitorides* subspecies of Loggerhead Shrikes (Pruitt 2000, K. De Smet, A. Chabot, and C. Grooms, pers. comm.). Return rates of shrikes in years following high levels of nesting failure due to severe weather are lower, and successive years of reduced recruitment due to severe weather are believed to cause declines in local breeding populations (Collister and Wilson 2007). If climate change includes more frequent severe weather events, bird populations including those of the Prairie Loggerhead Shrike may have reduced breeding success.

Predation during breeding

Shrikes, like other passerines, are preyed upon by a variety of species including Raccoons (*Procyon lotor*), American Crows (*Corvus brachyrhynchos*), Black-billed Magpies (*Pica pica*),

Coyotes (*Canis latrans*), raptors, snakes, and domestic cats (*Felis catus*) (Blumton 1989, Pruitt 2000, COSEWIC 2004), but the significance of this threat has not been evaluated quantitatively. The changing prairie landscape and its associated predator community are believed to have reduced nest success in several species of prairie birds (Greenwood *et. al.* 1995). The effect of altered species composition of predators in prairie Canada, due to human activity, upon Prairie Loggerhead Shrike populations is unknown but may affect survival and recruitment. Nest predators are generally more common near edges in some landscapes (Dijak and Thompson 2000, Winter *et al.* 2000) and several studies have demonstrated that nest predation rates are reduced in large prairie fragments (Herkert *et al.* 2003). Shrikes nesting in linear habitats may be more susceptible to predation than those nesting in non-linear habitats due to a variety of predators using linear corridors while foraging (DeGeus 1990). There have been no investigations to specifically assess the role of predators or the role of landscape change and associated changing predator community on adult survival and nest success of the Prairie Loggerhead Shrike.

Disease and parasitic infections

There have been no investigations of the role of diseases and parasitic infections in observed declines of Prairie Loggerhead Shrikes. Shrikes have been reported by the U.S. Centers for Disease Control and Prevention to be susceptible to West Nile Virus. Captive Loggerhead Shrikes, *migrans* subspecies, have died from West Nile Virus infection although it is not clear whether their deaths were solely due to the virus or whether they were more susceptible to this disease due to stress associated with captivity. The impact of this disease on wild Loggerhead Shrike populations is unknown (Bertelsen *et al.* 2004). However, West Nile Virus is considered to be a factor in observed declines of Greater Sage Grouse (*Centrocercus urophasianus*) in southeastern Alberta and elsewhere within the range of this species. The virus may prove to be an important current and future threat but it does not account for past declines.

Other possible threats

Pesticides, other environmental contaminants and collisions with vehicles are possible threats (COSEWIC 2004) but their relative importance has not been substantiated.

Credible evidence supporting COSEWIC's (2004) contention that pesticides may pose an important threat to loggerhead shrikes appears to be lacking. After reviewing the available literature, Yosef (1996) concluded that the effects of contaminants on Loggerhead Shrike populations remain unknown because the contaminant levels required to produce adverse effects on populations were unknown. The advent of organochlorine pesticides coincided with population declines of shrikes, as it did with some other species whose reproductive success was shown to be adversely affected by pesticide exposure. However, unlike those other species whose populations began to recover following the banning of most organochlorines, shrike populations continued to decline despite an average 79% decline in levels of pesticide residues in their eggs between 1971–1972 and 1995–1996 to levels that are below commonly-accepted toxicity thresholds (Herkert 2004, Blus 2011, Elliott and Bishop 2011). Since the banning of organochlorine pesticides there was an increased use of various acetylcholinesterase-inhibiting compounds such as carbamates and organophosphates. These may have lethal effects as well as

sublethal effects. Loggerhead Shrikes have been killed by certain formulations of carbofuran which are now banned in Canada (Mineau et al. 2005). However, there is no spatially explicit information on use of pesticides and other toxic chemicals of concern in prairie Canada (Mineau et al. 2005) which limits the certainty of any assessment of the impact of these environmental contaminants on the Prairie Loggerhead Shrike. Mineau et al. (2005) found no evidence that the use of granular insecticides in prairie Canada was related to population trends in Prairie Loggerhead Shrike, despite the severe hazard that this group of toxins can pose to birds.

Shrikes may be attracted to invertebrates found on the warm pavement of roads. There have been no investigations to assess the role of collisions with vehicles occurring in the Canadian prairies in observed population declines of the Prairie Loggerhead Shrike. However in some U.S. states, collisions rank as an important source of known mortality of shrikes (Pruitt 2000).

5. POPULATION AND DISTRIBUTION OBJECTIVES

The population and distribution objective for the Prairie Loggerhead Shrike is to stop the decline and maintain a stable or increasing population trend over the long-term across its recent (1993-2010) distribution in Manitoba, Saskatchewan and Alberta. Maintaining occupancy by shrikes in the areas of natural grasslands that shrikes currently occur in, or would be expected to occur in, will be important in order to achieve recovery. Anthropogenic habitats (e.g., hedgerows, shelterbelts, fields) may also be required for long-term maintenance of the population and this will be determined through further study.

Preventing further population decline is believed to be an appropriate objective that is consistent with the COSEWIC reason for designation which was based upon the significant habitat-related population decline that the species has experienced. Furthermore, the objective is believed to be achievable given that sufficient habitat likely exists to support existing population levels in prairie Canada, that most threats can be reduced or mitigated, and that effective management practices are being developed and implemented to reduce disturbance and habitat degradation. However, as discussed in the Recovery Feasibility Summary, it is unknown if the threats on the wintering areas which may be reducing survival rates can be avoided or mitigated. Although there are unknowns regarding the recovery of this species, the objective is consistent with a precautionary approach to species recovery.

6. BROAD STRATEGIES AND GENERAL APPROACHES TO MEET OBJECTIVES

6.1 Actions Already Completed or Currently Underway

Surveys of Prairie Loggerhead Shrikes and their habitat in large intact native grassland areas (54 Agriculture and Agri-Foods Canada pastures, and portions of 3 military bases and portions of Grasslands National Park and Riding Mountain National Park) were conducted from 2002 to

2010. In addition, extensive surveys of occurrence and abundance of Prairie Loggerhead Shrikes and habitat potential (over 185,000 sample points) were conducted from 2003 to 2010 in farmland habitat of Alberta and Saskatchewan.

These assessments were designed to stratify abundance of shrikes and habitat suitability across the prairies in order to allow estimates of abundance and habitat availability and quality, establish population and distribution objectives for specific portions of the species range, identify critical habitat, target stewardship programs, and identify sites for monitoring and research. It is anticipated that these surveys will be an improvement on estimates derived from Breeding Bird Surveys which have significant limitations for this species. They should also yield more reliable information than the five-year interval surveys conducted by the Prairie Loggerhead Shrike National Recovery Team since 1988. Populations in extreme southwestern Manitoba have been monitored since 1987.

During a cooperative international project in 2002-2004, stable isotopes and genomics were used to investigate the wintering areas of Prairie Loggerhead Shrikes (Chabot 2010). Low resolution and issues with the use of stable isotopes and genomics, combined with high dispersal of breeding shrikes among years, has resulted in low success with this approach.

Stewardship initiatives have been established and their level of effort is increasing in Saskatchewan and Alberta. Education programs with landowners and the agricultural community have been established.

6.2 Strategic Direction for Recovery

Table 2. Recovery Planning Table

Threat or Limitation	Priority ^d	General Description of Research and Management Approaches
Broad Strategy: Inventory and Monitoring		
All threats	High	<ul style="list-style-type: none"> Monitor population trend, distribution, productivity, and habitat throughout the prairie Canada range to assess if population and distribution objectives are being met, and to monitor threats to populations.
Broad Strategy: Habitat Protection and Management		
Cultivation of Natural Grasslands in Breeding Habitat	High	<ul style="list-style-type: none"> Refine and implement landowner practices to maintain and restore habitat. Develop best management practices for prescribed burning and other activities to be applied within a multi-species context.
Broad Strategy: Research		
Land Use Changes in Wintering Habitat	High	<ul style="list-style-type: none"> Use emerging technologies to identify migration areas and wintering areas of prairie Canadian populations. Assess potential threats of habitat loss and intra-specific competition in wintering areas.
Pesticides and other environmental contaminants, severe weather, predation, disease and parasitic infestations, collisions with vehicles	Low	<ul style="list-style-type: none"> Assess effects of pesticides on mortality and prey availability. Assess role of diseases such as West Nile Virus upon population trends. Assess significance of mortality along roads. Assess importance of predation as a threat. Improve assessment of effects of local and continental weather on shrike survival and productivity.
Broad Strategy: Communication and Stewardship		
All threats	Medium	<ul style="list-style-type: none"> Develop educational material to raise land owner and other stakeholder awareness. Promote and implement cooperative agreements and other voluntary measure to conserve critical habitat. Engage relevant U.S. and Mexican authorities to mitigate threats associated during migration and on wintering grounds.

^d “Priority” reflects the degree to which the approach contributes directly to the recovery of the species or is an essential precursor to an approach that contributes to the recovery of the species. Priorities are defined as: High = top priority action; Medium = needed to evaluate and guide conservation actions; Low = action would be beneficial to the understanding of the species but not a priority.

6.3 Narrative to Support the Recovery Planning Table

The approach for recovery of the Prairie Loggerhead Shrike focuses on protection and enhancement of suitable breeding habitat with concurrent studies addressing potential threats on the breeding areas, migration areas and the wintering areas. Population and habitat assessments will provide important information for habitat protection, population and habitat monitoring, and studies of potential threats. Concurrent studies are also needed to identify the wintering areas

and determine if low survival in these areas is the primary cause of population declines. Survival or recovery of regional populations in prairie Canada will require the viability of habitat with suitable nesting and foraging characteristics, which will depend partially upon effective partnerships with habitat stewards. Development and implementation of beneficial management practices to conserve and enhance habitat in a multi-species context will be required where the habitat requirements of shrikes may conflict with those of other species at risk (Appendix A). Recovery may benefit from participation in multi-species or landscape approaches for species at risk recovery.

7. CRITICAL HABITAT

Critical habitat is defined in the *Species at Risk Act* (Subsection 2(1)) as “the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species’ critical habitat in the recovery strategy or in an action plan for the species”.

7.1 Approach to Identifying the Species’ Critical Habitat

Critical habitat for the Prairie Loggerhead Shrike is identified in this recovery strategy to the extent possible based on the best available information. It is recognized that the critical habitat identified below is insufficient to achieve the population and distribution objectives for the species. A schedule of studies (Section 7.3) outlines the activities required to identify the additional critical habitat necessary to support the population and distribution objectives of the species.

The Prairie Loggerhead Shrike occurs in two different habitat types in prairie Canada. The first is where tall shrubs occur in farmland (former natural grassland that has been converted to cereal crop and other types of cultivation, and other human land uses). At this time, critical habitat cannot be identified in farmland because there remains substantial uncertainty regarding the biophysical attributes, distribution and abundance of such habitat, the occupancy of such habitat by shrikes and the amount of such habitat required for shrike recovery. The second type of habitat occurs in areas where tall shrubs are interspersed within large contiguous areas of natural grassland and constitutes the historical, natural habitat for shrikes.

In areas of natural grassland in prairie Canada, habitat characterized by a low density of tall shrubs (2-3 m in height and less than 30% areal extent), that are well-dispersed and embedded in natural grassland is capable of supporting breeding populations of shrikes. Furthermore, territories of breeding shrikes tend to be clumped within suitable habitat, leading observers to suggest that the presence of other territorial shrikes may increase the probability that a shrike will establish a territory in a given area (Pruitt 2000). As a result of this ‘clumping’ tendency, the density of breeding shrikes is an important consideration in identifying habitat patches needed for species recovery.

7.2 Identification of the Species' Critical Habitat

The criteria listed below are based on expert opinion, which constitutes the best available information at this time, regarding a reasonable approach for identifying critical habitat for Prairie Loggerhead Shrike recovery. These criteria may be refined in the future, as better information becomes available.

Two criteria are used to identify critical habitat for Prairie Loggerhead Shrikes in natural grassland:

- 1) The biophysical attributes consist of large contiguous areas of natural grasslands that occur within 400 m (based on observed movements of shrikes from nest sites) of well dispersed tall shrubs, 2 to 3 m in height and of low density (less than 30% areal extent, variable among sites), and
- 2) A density of Prairie Loggerhead Shrikes ≥ 0.5 apparent breeding pairs / km², based on information from surveys conducted during the period 2003-2010.

Critical habitat for the Prairie Loggerhead Shrike is partially identified in this recovery strategy in natural grassland habitat in southeastern Alberta with biophysical attributes and density of breeding Prairie Loggerhead Shrikes as described above. This area (11,039 ha) is sandhill terrain within the Middle Sandhills of Suffield National Wildlife Area, Canadian Force Base Suffield (CFB), Alberta, and adjacent private and leased provincial crown lands. For this area high-resolution satellite imagery was used to manually create a minimum-area polygon bounding tall shrubs used for nesting, with the addition of an adjacent 400 m area of grassland to provide foraging habitat for those shrikes nesting along or near the periphery of the area of tall shrubs. Most of this area of critical habitat is estimated to have an areal extent of <5% tall shrub cover which is within the lower range of the <30% tall shrub cover attribute.

A map of this area is provided in Appendix B. The 202 quarter-sections within which the critical habitat occurs are listed in Appendix C.

Critical habitat for Prairie Loggerhead Shrike excludes currently existing unsuitable habitat including wetlands and anthropogenic features such as structures and roads. These features do not possess the attributes required by the Prairie Loggerhead Shrike and they are not identified as critical habitat, even when they occur within the indicated critical habitat polygon. Existing roads and their right-of-ways are not included in the description of critical habitat.

Additional areas of grassland habitat in southwestern Saskatchewan are currently being evaluated as potential candidates for identification as critical habitat, and will be addressed in a multi-species action plan, currently under development. Following completion of analyses in southwestern Saskatchewan, similar analyses will be undertaken in grassland areas of Alberta and southwestern Manitoba. Analyses of data from prairie-wide farmland habitat surveys are underway. Those analyses will allow determination of whether critical habitat in farmland habitat can be identified.

7.3 Schedule of Studies to Identify Critical Habitat

Table 3. Schedule of studies to identify critical habitat

Description of activity	Rationale	Timeline
Assess what part of the farmland habitat may be required to achieve recovery of the Prairie Loggerhead Shrike by completing analyses of data from prairie wide farmland surveys, and if necessary, by undertaking demographic research.	Determine if it is necessary and feasible to identify critical habitat in farmlands to meet population and distribution objectives	2015- 2018
Determine if critical habitat can be identified in farmlands by completing analyses of data from prairie wide farmland surveys.	Identification of critical habitat in farmlands to meet population and distribution objectives.	2015-2018
Quantify relationships between biophysical habitat characteristics and occurrence of breeding shrikes in order to improve ability to predict habitats likely to be used by shrikes and to improve description of the characteristics of shrike critical habitat.	Predictive relationships can improve certainty as to whether a particular area qualifies as critical habitat and as to what constitutes destruction of critical habitat.	2015-2018

Substantial progress has been made in identifying areas likely to contain critical habitat in southwestern Saskatchewan and it is anticipated that additional critical habitat in grasslands will be identified in that area in 2015 in a multi-species action plan. Additional sites in Alberta, Saskatchewan and Manitoba require examination, involving inspection and analysis of high-resolution satellite imagery and habitat reconnaissance, and habitat and shrike occupancy field surveys.

7.4 Activities Likely to Result in the Destruction of Critical Habitat

Destruction is determined on a case by case basis. Destruction would result if part of the critical habitat were degraded, either permanently or temporarily, such that it would not serve its function when needed by the species. Destruction may result from a single or multiple activities at one point in time or from the cumulative effects of one or more activities over time (Government of Canada 2009).

Activities that are likely to result in destruction of critical habitat include those that:

1. Significantly reduce shrub coverage and prevent shrub growth. Such activities include but are not limited to repeated annual burning and removing tall shrub patches with machinery or by any other means. These activities, when done excessively, can destroy critical habitat because they eliminate nesting and/or perching habitat.
2. Convert large areas of natural grasslands with suitable tall shrub cover to cropland or cover such areas with infrastructure or buildings. When done to excess, these activities may eliminate or reduce the quality of habitat to the extent that it is avoided by shrikes or can no longer support

the production of a sufficient prey base for foraging shrikes. Examples of such activities include, but are not limited to, conversion of grassland to cropland and development of human infrastructure such as homes, other buildings, roads, fire breaks and industrial infrastructure.

Insufficient information is available to provide thresholds of levels of different activities that would result in destruction of critical habitat. Alterations and proposed alterations to shrub and grassland cover within critical habitat will have to be assessed on a case-by-case basis in order to determine whether they qualify as destruction of such habitat.

8. MEASURING PROGRESS

The performance indicators presented below provide a way to define and measure progress toward achieving the population and distribution objectives.

Table 4. Performance measures

Population and Distribution Objectives	Performance measures
Stop the decline in the population and achieve and maintain a non-decreasing population trend over the long-term across its recent (1993-2010) distribution in Manitoba, Saskatchewan and Alberta	The population trend over the long-term is non-decreasing across its recent (1993-2010) distribution in Manitoba, Saskatchewan and Alberta.

9. STATEMENT ON ACTION PLANS

The Prairie Loggerhead Shrike will be included in a multi-species action plan for southwestern Saskatchewan, currently under development. Other actions plans, including those for Manitoba and Alberta will be completed by 2019.

10. REFERENCES

- Alberta Conservation Information Management System. 2011. Animal tracking lists. Available: <http://tpr.alberta.ca/parks/heritageinfocentre/default.aspx> - accessed Feb. 13, 2012
- Bertelsen, M.F, R.A. Ølberg, G.J. Crawshaw, A. Dibernardo, L.R. Lindsay, M. Drebot, and I.K. Barker. 2004. West Nile Virus Infection in the Eastern Loggerhead Shrike (*Lanius ludovicianus migrans*): Pathology, Epidemiology, and Immunization. *Journal of Wildlife Diseases* 40:538-542.
- Bjorge, R., and D. Prescott. 1996. Population estimate and habitat associations of the Loggerhead Shrike, *Lanius ludovicianus*, in southeastern Alberta. *Canadian Field-Naturalist* 110: 445-449
- Blumton, A.K. 1989. Factors affecting Loggerhead Shrike mortality in Virginia. M.Sc. thesis, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.
- Blus, L.J. 2011. DDT, DDD and DDE in birds. Pp 425-445 in: Beyer, W.L. and J.P. Meador (eds.), *Environmental Contaminants in Biota: Interpreting Tissue Concentrations*, CRC Press, Boca Raton, FL
- Brooks, B. L., and S. A. Temple. 1990. Dynamics of a Loggerhead Shrike population in Minnesota. *Wilson Bulletin* 102: 441-450
- Burnside, F.L. 1987. Long-distance movements by Loggerhead Shrikes. *Journal of Field Ornithology* 58:62-65.
- Cade, T.J., and C.P. Woods. 1997. Changes in distribution and abundance of the loggerhead shrike. *Conservation Biology* 11:21-31.
- Cadman, M. D. 1990. Update status report on the loggerhead shrike (*Lanius ludovicianus*) in Canada. Unpublished report to the Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Environment Canada, Ottawa, Canada. 17pp.
- Chabot, A. 2010. The impact of migration on the evolution and conservation of an endemic North American passerine: Loggerhead Shrike (*Lanius ludovicianus*). PhD Thesis, Queen' University, Kingston Ontario. 189 pp.
- Collister, D. M. 1994. Breeding ecology and habitat preservation of the Loggerhead Shrike, *Lanius ludvicianus excubitorides*, in southeastern Alberta. Unpubl. M. E. Des. Thesis, Univ. of Calgary, Calgary, AB. 161 pp.
- Collister, D. M. and S. Wilson. 2007. Contributions of weather and predation to reduced breeding success in a Threatened Northern Loggerhead Shrike population. *Avian Conservation and Ecology* 2(2): 11-22

- COSEWIC. 2004. COSEWIC assessment and update status report on the Loggerhead Shrike excubitorides subspecies *Lanius ludovicianus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 24 pp.
- Dechant, J. A., M. L. Sondreal, D. H. Johnson, L. D. Igl, C. M. Goldade, M. P. Nenneman, A. L. Zimmerman, and B. R. Euliss. 1998 (revised 2002). Effects of management practices on grassland birds: Loggerhead Shrike. Northern Prairie Wildlife Research Center, Jamestown, ND. 19 pp.
- DeGeus, D.W. 1990. Productivity and habitat preferences of Loggerhead Shrikes inhabiting roadsides in a Midwestern agroenvironment. M.Sc. Thesis, Iowa State University, Ames, Iowa.
- Dijak, W.D., and F.R. Thompson. 2000. Landscape and edge effects on the distribution of mammalian predation in Missouri. *Journal of Wildlife Management* 64:209-216.
- Elliott, J.E., and C.A. Bishop. 2011. Cyclodeine and other organochlorine pesticides in birds. Pp. 447-475 in: Beyer, W.L. and J.P. Meador (eds.), *Environmental Contaminants in Biota: Interpreting Tissue Concentrations*, CRC Press, Boca Raton, FL
- Gawlik, D. and K. Bildstein. 1993. Seasonal habitat use and abundance of Loggerhead Shrikes in South Carolina. *Journal of Wildlife Management* 57:352-357
- Government of Canada. 2009 (draft). *Species at Risk Act* policies overarching policy framework. *Species at Risk Act Policies and Guidelines Series*. Government of Canada.
- Greenwood, R. J., A. B. Sargeant, D. H. Johnson, L. M. Cowardin, and T. L. Shaffer. 1995. Factors associated with duck nest success in the prairie pothole region of Canada. *Wildlife Monographs* 128:1-57.
- Herkert, J.R. 2004. Organochlorine pesticides are not implicated in the decline of the Loggerhead Shrike. *Condor* 106:702-705.
- Herkert, J.R., D.L. Reinking, D.A. Wiedenfeld, M. Winter, J.L. Zimmerman, W.E. Jensen, E.J. Finck, R.R. Koford, D.H. Wolfe, S.K. Sherrod, M.A. Jenkins, J. Faaborg, and S.K. Robinson. 2003. Effects of prairie fragmentation on the nest success of breeding birds in the midcontinental United States. *Conservation Biology* 17:587-594.
- Lynn, N. and S.A. Temple. 1991. Land-use changes in the Gulf Coast region: links to declines in Midwestern Loggerhead Shrike populations. *Passenger Pigeon* 53:315-325.
- Lynn S., J.A. Martin, and D. K. Garcelon. 2006. Can supplemental foraging perches enhance habitat for endangered San Clemente Loggerhead Shrikes? *The Wilson Journal of Ornithology* 118:333-340.
- Miller, A. H. 1931. Systematic revision and natural history of the American shrikes (*Lanius*). *University of California Miscellaneous Publications in Zoology* 38:11-242

- Mineau, P., C.M. Downes, D.A. Kirk, E. Bayne, and M. Csizy. 2005. Patterns of bird species abundance in relation to granular insecticide use in the Canadian prairies. *Ecoscience* 12:267-278.
- NatureServe. 2011. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: September 28, 2011)
- Prescott, D. and D.M Collister. 1993. Characteristics of occupied and unoccupied Loggerhead Shrike territories in southeastern Alberta. *Journal of Wildlife Management* 57:346-352
- Pruitt, L. 2000. Loggerhead Shrike status assessment. U.S. Fish and Wildlife Service. 169 pp.
- Sauer, J. R., J. E. Hines, and J. Fallon. 2003. The North American Breeding Bird Survey, Results and Analysis 1966 - 2002. Version 2003.1. USGS Patuxent Wildlife Research Center, Laurel, Maryland.
- Statistics Canada. 1997. Historical overview of Canadian agriculture. Report No. 1430 93-358-XPB, Statistics Canada, Ottawa, ON.
- Telfer, E. S. 1992. Habitat change as a factor in the decline of the western Canadian loggerhead shrike, *Lanius ludovicianus* population. *Canadian Field-Naturalist* 106:321-326
- Tischendorf, L. 2009. Population Viability Analysis of the Eastern Loggerhead Shrike (*Lanius ludovicianus migrans*). Unpublished Report for the Canadian Wildlife Service – Ontario, Environment Canada. 46 pp.
- Vallianatos, M., S.C. Loughheed, and P.T. Boag. 2002. Conservation genetics of the loggerhead shrike (*Lanius ludovicianus*) in central and eastern North America. *Conservation Genetics* 3:1-13
- Winter, M., D.H. Johnson, and J. Faaborg. 2000. Evidence of edge effects on multiple levels in tallgrass prairie. *Condor* 102:256-266.
- Yosef, R. 1996. Loggerhead Shrike (*Lanius ludovicianus*), *The Birds of North America Online* Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu/bna/species/231>
- Yosef, R., and T.C. Grubb Jr. 1994. Resource dependence and territory size in Loggerhead Shrikes (*Lanius ludovicianus*). *Auk* 111:465-469.

APPENDIX A. EFFECTS ON THE ENVIRONMENT AND OTHER SPECIES

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the [Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals](#)³. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or any of the [Federal Sustainable Development Strategy](#)'s⁴ (FSDS) goals and targets.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that strategies may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the strategy itself, but are also summarized below in this statement.

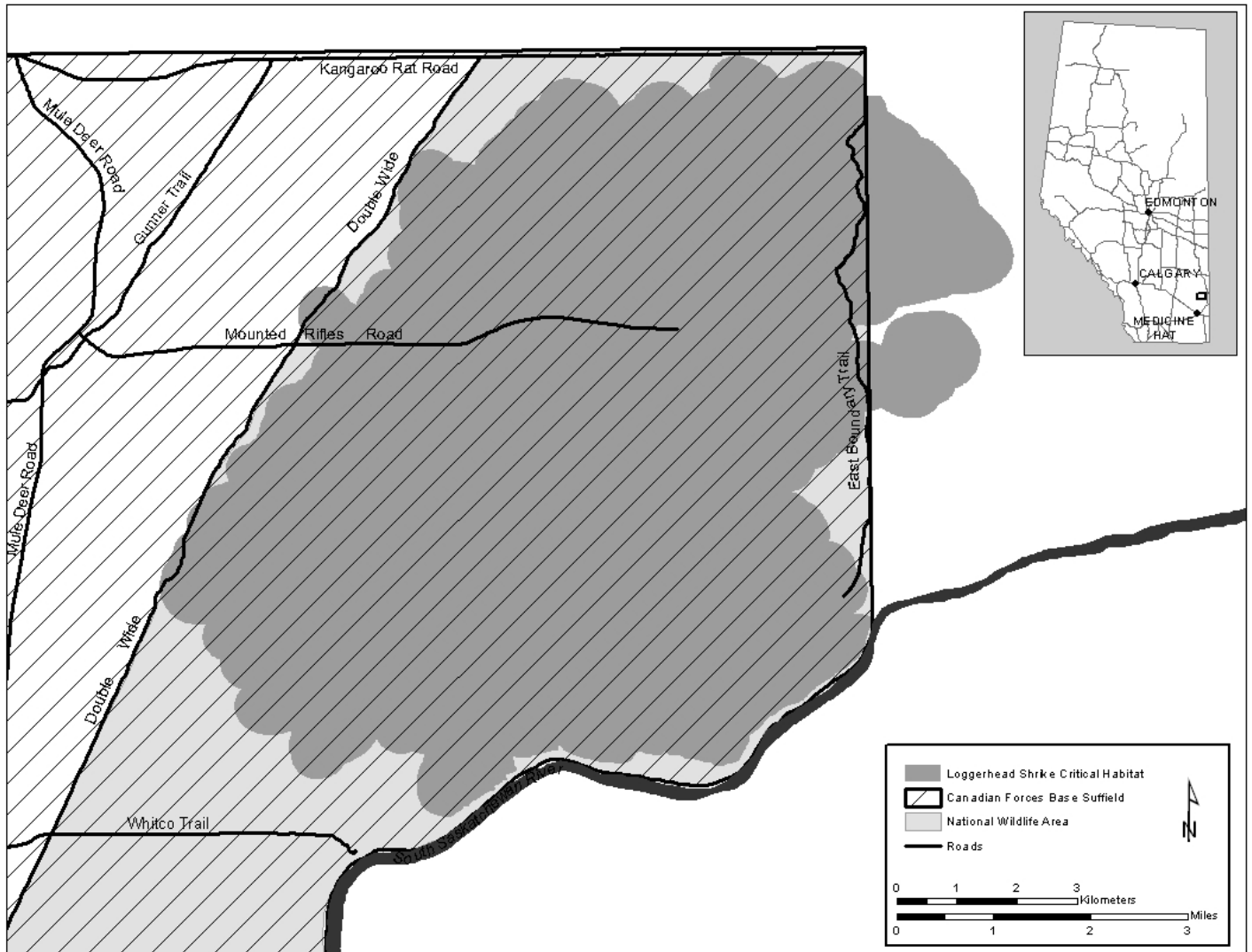
Prairie Loggerhead Shrike habitat is shared by many other species, including multiple species at risk. These include not only avian species but also a number of mammals, insects and plants. While some of the proposed strategies for recovery will benefit the environment in general and are expected to positively affect other sympatric native species, there could be adverse consequences to those species whose requirements may differ from those of the Prairie Loggerhead Shrike. Therefore, it is important that habitat management activities for shrikes be considered from an ecosystem perspective through the development, with input from responsible jurisdictions, of multi-species plans, ecosystem-based recovery programs or area management plans that take into account the needs of multiple species, including other species at risk. As stewardship programs are implemented to reduce the impact of threats to shrikes, the approaches will be shared with recovery managers for other grassland species, with the intent of integrating the needs of other species, to the extent possible, into approaches that will reduce threats to shrikes.

This recovery strategy directly contributes to the goals and targets of the *Federal Sustainability Development Strategy for Canada*. Specifically, it contributes to Goal 5: “Wildlife Conservation – Maintain or restore populations of wildlife to healthy levels”, and to Goal 6: “Ecosystem/Habitat Conservation and Protection- Maintain productive and resilient ecosystems with the capacity to recover and adapt”.

³ <http://www.ceaa.gc.ca/default.asp?lang=En&n=B3186435-1>

⁴ <http://www.ec.gc.ca/dd-sd/default.asp?lang=En&n=CD30F295-1>

APPENDIX B. CRITICAL HABITAT FOR PRAIRIE LOGGERHEAD SHRIKE IN THE MIDDLE SANDHILLS LOCATED WITHIN AND ADJACENT TO SUFFIELD NATIONAL WILDLIFE AREA, CFB SUFFIELD, ALBERTA



Areas within which critical habitat is found in CFB Suffield National Wildlife Area and surrounding area, southeastern Alberta. The detailed polygon (shaded grey) comprising 11,039 ha is provided to show areas that meet the criteria set out in Section 7.2.

APPENDIX C. LEGAL LAND DESCRIPTIONS OF QUARTER SECTIONS CONTAINING CRITICAL HABITAT FOR THE PRAIRIE LOGGERHEAD SHRIKE WITHIN AND ADJACENT TO SUFFIELD NATIONAL WILDLIFE AREA, CFB SUFFIELD, ALBERTA⁴

Quarter(s)	Section	Township	Range	Meridian
NE, NW, SE	13	19	4	4
NE, SE	23	19	4	4
NE, NW, SE, SW	24	19	4	4
NE, NW, SE, SW	25	19	4	4
SE	26	19	4	4
SE	36	19	4	4
NE, NW, SE, SW	1	20	3	4
NE, NW, SE, SW	2	20	3	4
NE, NW, SE, SW	3	20	3	4
NE, NW, SE, SW	4	20	3	4
NE, NW, SE, SW	5	20	3	4
NE, NW, SE, SW	6	20	3	4
NE, NW, SE, SW	8	20	3	4
NE, NW, SE, SW	9	20	3	4
NE, NW, SE, SW	10	20	3	4
NE, NW, SE, SW	11	20	3	4
NE, NW, SE, SW	12	20	3	4
NE, NW, SE, SW	13	20	3	4
NE, NW, SE, SW	14	20	3	4
NE, NW, SE, SW	15	20	3	4
NE, SE, SW	16	20	3	4
NE, NW	7	19	3	4
NE, NW, SE, SW	8	19	3	4
NE, NW, SW	9	19	3	4
NE, NW	10	19	3	4
NE, NW	11	19	3	4
NE, NW, SW	13	19	3	4
NE, NW, SE, SW	14	19	3	4
NE, NW, SE, SW	15	19	3	4
NE, NW, SE, SW	16	19	3	4
NE, NW, SE, SW	17	19	3	4

⁴ Prairie Loggerhead Shrike critical habitat occurs on all or portions of the listed quarter sections. Some quarter sections that are on the edge of polygon may only partially contain Prairie Loggerhead Shrike critical habitat. Prairie Loggerhead Shrike critical habitat excludes existing unsuitable habitat including wetlands and anthropogenic features such as structures and roads.

Quarter (s)	Section	Township	Range	Meridian
NE, NW, SE, SW	18	19	3	4
NE, NW, SE, SW	19	19	3	4
NE, NW, SE, SW	20	19	3	4
NE, NW, SE, SW	21	19	3	4
NE, NW, SE, SW	22	19	3	4
NE, NW, SE, SW	23	19	3	4
NE, NW, SE, SW	24	19	3	4
NE, NW, SE, SW	25	19	3	4
NE, NW, SE, SW	26	19	3	4
NE, NW, SE, SW	27	19	3	4
NE, NW, SE, SW	28	19	3	4
NE, NW, SE, SW	29	19	3	4
NE, NW, SE, SW	30	19	3	4
NE, NW, SE, SW	31	19	3	4
NE, NW, SE, SW	32	19	3	4
NE, NW, SE, SW	33	19	3	4
NE, NW, SE, SW	34	19	3	4
NE, NW, SE, SW	35	19	3	4
NE, NW, SE, SW	36	19	3	4
NE	36	19	4	4
NW, SW	5	20	2	4
NE, NW, SE, SW	6	20	2	4
NE, NW, SE, SW	7	20	2	4
NW, SW	8	20	2	4
SE, SW	18	20	2	4
NE, NW, SE, SW	31	19	2	4
NW	32	19	2	4