COSEWIC
Assessment and Update Status Report

on the

Loggerhead Shrike
excubitorides subspecies
Lanius ludovicianus excubitorides

in Canada

THREATENED
2004

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA

COSEPAC
COMITÉ SUR LA SITUATION
DES ESPÈCES EN PÉRIL
AU CANADA

COSEWIC status reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

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Previous report:

Cadman, M.D. 1986. COSEWIC status report on the Loggerhead Shrike *Lanius ludovicianus* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. 100 pp.

Production note: COSEWIC acknowledges David A. Wiggins for writing the update status report on the Loggerhead Shrike *excubitorides* subspecies *Lanius ludovicianus* in Canada. The report was overseen and edited by Richard Cannings, COSEWIC Co-chair Birds Species Specialist Subcommittee. This species was previously listed by COSEWIC as Loggerhead Shrike (Prairie population) *Lanius ludovicianus excubitorides*.

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COSEWIC
Assessment Summary

Assessment Summary – May 2004

Common name
Loggerhead Shrike *excubitorides* subspecies

Scientific name
Lanius ludovicianus excubitorides

Status
Threatened

Reason for designation
This raptorial songbird has suffered significant (more than 80%) population declines over the past 35 years. These declines have been linked to loss of native prairie and pastureland habitats and pesticide residues.

Occurrence
Alberta, Saskatchewan, Manitoba

Status history
This species was considered a single unit and assigned a status of 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. Last assessment based on an update status report.

COSEWIC
Executive Summary

Loggerhead Shrike
excubitorides subspecies
Lanius ludovicianus excubitorides

Species information

English name: Loggerhead Shrike *excubitorides* subspecies, French name: Pie-grièche migratrice de la sous-espèce *excubitorides*

Scientific name: *Lanius ludovicianus excubitorides* (Swainson).

The Loggerhead Shrike *excubitorides* subspecies. (hereafter Prairie Loggerhead Shrike) is a medium-sized songbird, approximately 21 cm in length. Adults are boldly coloured with a blend of black, white and gray, and are particularly conspicuous in flight. The best field mark is the black facial mask, which completely covers the eye (in the similar Northern Shrike, *Lanius excubitor*, the black facial mask does not extend above the eye). The bill is black with a hook at the tip of the upper mandible.

Distribution

The Prairie Loggerhead Shrike breeds from Alberta, Saskatchewan and Manitoba south through the Great Plains to northern Mexico. The winter distribution is poorly known, but is thought to be primarily the south-central United States (e.g., Oklahoma, Texas, Missouri) and Mexico.

Habitat

The Prairie Loggerhead Shrike inhabits a wide variety of open habitats including grasslands, sand-sage, pastures, agricultural areas, and open woodlands, with small shrubs and brushy trees providing nesting and foraging areas. Its habitat choice is still poorly understood, as many apparently suitable areas are not used.

Biology

Prairie Loggerhead Shrikes typically return to Canadian breeding areas from late April through early June. Nests are usually placed in thorny and/or dense shrubs and small trees within open habitats. Clutches of 4-7 eggs are initiated from late May

through early July (June peak), and a single brood is raised. Family groups remain together for at least 2 weeks following fledging, but family groups apparently dissolve thereafter as most southward migrants are solitary birds. Shrikes reach their wintering grounds in the fall, and remain until the following spring.

Population sizes and trends

In Canada, reported population sizes are 118 individuals in Manitoba (in 2002), 14000-15000 in Saskatchewan (as of 1999), and 6000 individuals in Alberta (1999). Populations are declining strongly in Manitoba, are apparently stable in Alberta, while the trend in Saskatchewan remains unclear. Difficulties in accurately assessing population trends stem from the different results of dedicated shrike surveys, and continent-wide Breeding Bird Surveys. In the U. S. portion of the range, population trends are variable, with declining populations in the eastern (e.g., Minnesota and Iowa) and the southern portions of the range (e.g., Kansas, Oklahoma, Texas, New Mexico), but apparently stable populations in the northwest (e.g., Montana, Wyoming).

Limiting factors and threats

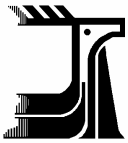
The primary limiting factor and threat to viable populations is thought to be conversion of grassland to cropland, and degradation of remaining grasslands. Other factors thought to have contributed to population declines include 1) accumulation of toxins (from pesticide applications) via the prey base; 2) collision with vehicles resulting from foraging (and nesting) activities around roadways; 3) increased predation at nest sites due to increasing habitat fragmentation; and 4) declines in prey abundance as a result of pesticide applications and habitat fragmentation. All of these factors may act to decrease reproductive success and adult survival.

Special significance of the species

Prairie Loggerhead Shrikes are closely related to the eastern subspecies *L. l. migrans,* which has disappeared from much of its former range in Canada and the northeastern United States. Formerly common throughout their range, Prairie Loggerhead Shrikes are now rare and Endangered in the northern and eastern portions of their range, with little sign of abatement in population declines in recent years.

Existing protection or other status designations

The Loggerhead Shrike is protected internationally (Canada, Mexico, USA) by the Migratory Birds Convention Act (1916). It is classified as G4 (apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery) by NatureServe; provincial NatureServe rankings are S2S3B in Manitoba, S4B in Saskatchewan and S3B in Alberta. This taxon is listed as *Endangered* in Manitoba, as a *Species at Risk* in Saskatchewan, and a *Sensitive Species* in Alberta; it is listed as *Endangered*, *Threatened* or a *Species of Concern* in several U.S. states.



COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species and include the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal organizations (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biosystematic Partnership, chaired by the Canadian Museum of Nature), three nonjurisdictional members and the co-chairs of the species specialist and the Aboriginal Traditional Knowledge subcommittees. The committee meets to consider status reports on candidate species.

DEFINITIONS (AFTER MAY 2004)

Species	Any indigenous species, subspecies, variety, or geographically or genetically distinct population of wild fauna and flora.
Extinct (X)	A species that no longer exists.
Extirpated (XT)	A species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A species facing imminent extirpation or extinction.
Threatened (T)	A species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A species that has been evaluated and found to be not at risk.
Data Deficient (DD)***	A species for which there is insufficient scientific information to support status designation.

* Formerly described as “Vulnerable” from 1990 to 1999, or “Rare” prior to 1990.

** Formerly described as “Not In Any Category”, or “No Designation Required.”

*** Formerly described as “Indeterminate” from 1994 to 1999 or “ISIBD” (insufficient scientific information on which to base a designation) prior to 1994.

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SPECIES INFORMATION

Name and classification

English name: Loggerhead Shrike *excubitorides* subspecies (Prairie Loggerhead Shrike)
French name: Pie-grièche migratrice de la sous-espèce *excubitorides*
Scientific name: *Lanius ludovicianus excubitorides* (Swainson)

Description

The Prairie Loggerhead Shrike is a medium-sized passerine, approximately 21 cm in length. Adults are boldly coloured with a blend of black, white and gray, and are particularly conspicuous in flight. The best field mark is the black facial mask, which completely covers the eye (in the similar Northern Shrike, *Lanius excubitor*, the black facial mask does not extend above the eye). The bill is black with a hook at the tip of the upper mandible. Sexes are similar in appearance, but males are slightly larger with darker primary feathers. Juvenile shrikes are brownish overall, with light greyish barring on the chest and belly.

Shrikes are well known for their habit of impaling prey items on thorns.

Nationally significant populations

Not applicable.

DISTRIBUTION

Global range

Loggerhead Shrikes have a wide breeding range in North America (Figure 1). The Prairie subspecies, *L. l. exubitorides* breeds from central and southeastern Alberta, central and southern Saskatchewan, and southwestern Manitoba, south through Montana, Wyoming, eastern Colorado, eastern New Mexico, Texas and into Sonora and northern Durango in Mexico (Figure 2; AOU 1957, Phillips 1986, 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 Great Plains and eastern Canadian prairies (central and eastern Manitoba). Due to apparent mixing of subspecies, the wintering distribution is poorly understood. In the northern portions of the range (including Canada), the species is migratory, while southern birds (Texas, Oklahoma) show some annual residency. Adults and juveniles banded in Alberta and Saskatchewan have been found in southern Oklahoma and central Texas in winter (Burnside 1987).

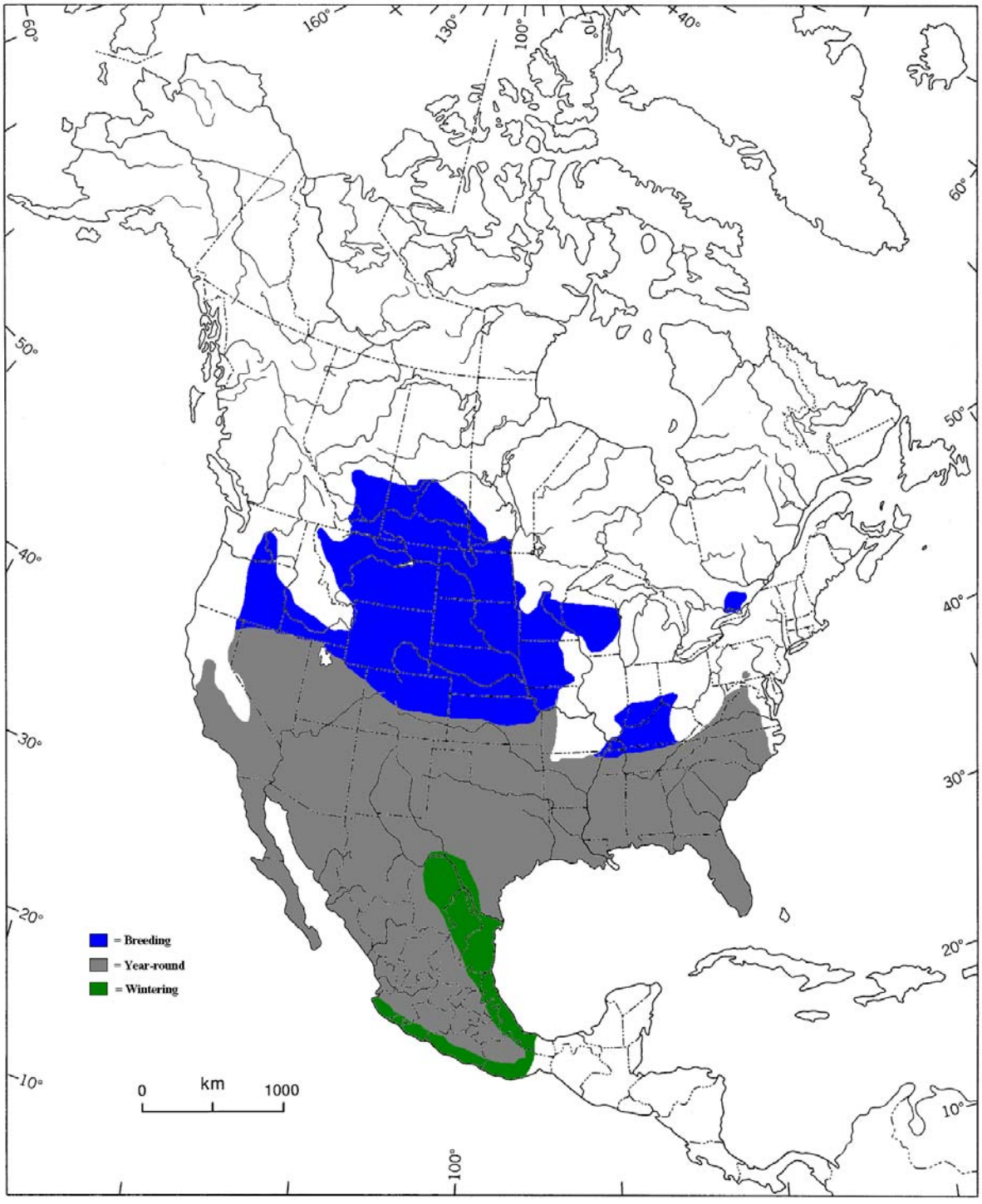

Figure 1. Global range of the Loggerhead Shrike in North America (modified from Yosef 1996).

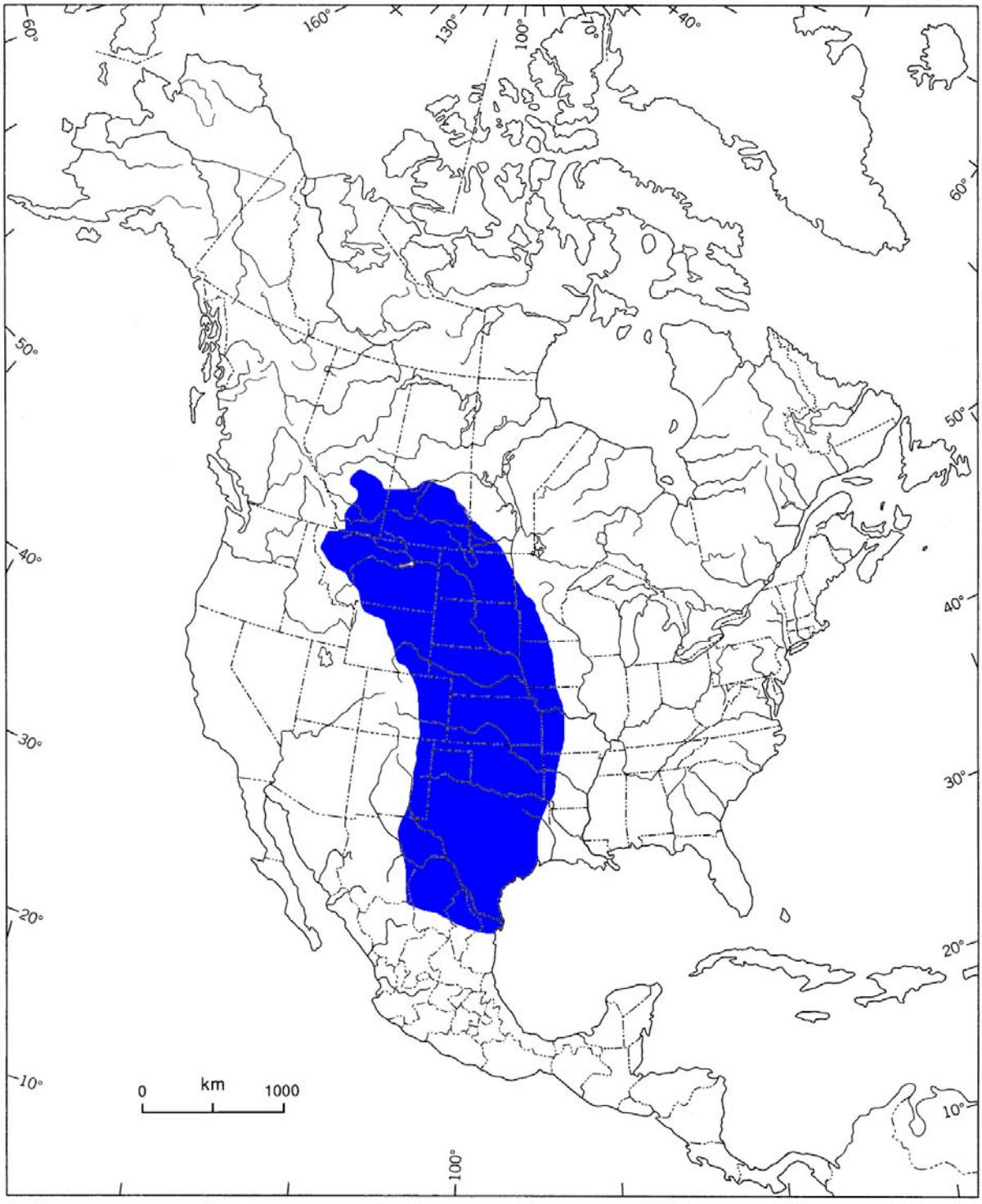

Figure 2. Approximate range of *L. l. excubitorides* in North America (modified from Burnside 1987).

Canadian range

In Canada, Prairie Loggerhead Shrikes occur as breeders only in Alberta, Saskatchewan and Manitoba (Figure 3). Winter records are exceptionally rare in Canada, as the winter range is the southern US and northern Mexico (see Figure 1).

Figure 3. Range of *L. l. excubitorides* within Canada.

In Alberta, the species has been found historically throughout the Aspen Parkland and Prairie regions (Salt and Wilk 1958). In recent decades, the range has contracted southward and there are fewer summer records in the Aspen Parklands. The core of the range in Alberta now appears to be the northern half of the province's grasslands eastward from Hanna and Brooks (R. Bjorge, in litt. 2004). However, recent surveying efforts in east-central Alberta have produced a number of breeding records in the southern Aspen Parkland region east of Stettler (Kiliaan and Prescott 2002).

The breeding range in Saskatchewan has also contracted southward. The species is still widely distributed in Parkland and Grassland areas, but it no longer breeds in most areas of central Saskatchewan (Meadow Lake, Nipawin, Somme areas; Smith 1996). Within the current distribution in southern Saskatchewan, populations are patchily distributed (A. Didiuk, pers. comm.).

In Manitoba, *L. l. excubitorides* overlaps and intergrades with *L. l. migrans* in the central portion of the province. *L. L. excubitorides* formerly nested north to the Interlake district, but is now largely confined to southwestern Manitoba.

HABITAT

Habitat requirements

Loggerhead Shrikes prefer open country such as pastures, prairie grasslands, sagebrush, and agricultural fields. In all of these habitats, shrikes require scattered small trees, shrubs or hedgerows for foraging perches and nesting sites. Prescott and Collister (1993) found that shrikes breeding in relatively arid short-grass prairies in Alberta preferred areas of medium (15-35 cm) and tall (> 35 cm) grasses while foraging. Further east, shrikes appear to prefer areas with relatively short grass, apparently due to greater capture success in such habitats (Gawlik and Bildstein 1993).

Preferred nesting sites are small trees and shrubs, especially those with thorns or dense interiors (Porter et al. 1975). There is some indication that within seasons, nest site preferences shift from low (bushes, shrubs) to high (deciduous trees) substrates, apparently in response to changes in local climatic extremes. Bjorge and Prescott (1996) found that the density of breeding shrikes in southeastern Alberta was positively correlated with the density of native trees/shrubs, farmyards, shelterbelts and rights-of-way. Thus, vegetative diversity may be an important factor in habitat suitability.

Territory size has been shown to correlate negatively with the local abundance of trees and shrubs – that is, in sparsely wooded areas, territories are much larger than in well-wooded areas (Miller 1951, Yosef 1996). Mean territories of *L. l. excubitorides* in Alberta was 13.4 ha (range 6.5 to 23.5, n = 20; Collister 1994). In other areas of North America, territory size ranges from 4.6 (Missouri) to 8.9 ha (Idaho; Yosef 1996).

Trends

Most authors have concluded that suitable breeding, migration, and wintering habitat has declined and continues to decline (see discussions in Telfer 1992, Yosef 1996, Cade and Woods 1997). The primary loss of habitat occurs through conversion of native grasslands to agricultural crops. In Canada, habitat loss has also occurred as a result of grassland areas along the northern periphery of the range reverting to forest (Cadman 1986).

In Alberta, surveys of potential habitat have uncovered a number of shrikes breeding within the southern Aspen Parklands region (Kiliaan and Prescott 2002). In Saskatchewan, similar province-wide surveys suggest a contraction of the population and perhaps habitat in the southeast (A. Didiuk, in. litt.; Table 3). In Manitoba, the remaining population of shrikes continues to contract, despite the presence of apparently suitable breeding habitat within the former range (K. De Smet, pers. comm.).

Protection/ownership

The vast majority of suitable Loggerhead Shrike habitat in Canada is under private ownership. As a consequence, habitat protection must be carried out largely through voluntary land stewardship programs. Such programs include suggestions to fence off small areas of shrubs and shelterbelts, to protect trees (by placing fencing, or other barriers around them) from cattle, and to plant shrike-friendly trees such as thorny buffalo-berry (*Shepherdia argentea)*. Despite the availability of literature and expertise on these subjects, there are no data available on the extent to which they have been adopted by private landowners.

There are currently efforts underway in Saskatchewan (Didiuk, pers. comm.) to first identify and then to protect known areas of suitable/preferred shrike habitat. Similar proposals have been made for Alberta (e.g., Prescott and Bjorge 1999) and Manitoba (De Smet, pers. comm.).

In Alberta, large numbers (ca. 1400) of buffalo-berry shrubs have been planted along the Canadian Pacific railway line in the southeast. There are also various land ownership proposals underway in Alberta that strive to protect areas of high shrike density (see Prescott and Bjorge 1999). Operation Grassland Community provides some extension work to landowners concerning Loggerhead Shrikes.

BIOLOGY

Reproduction

Prairie Loggerhead Shrikes are summer residents in the northern half of their breeding range, including the Canadian Prairie Provinces. Shrikes arrive on the Canadian breeding grounds from April to June, typically raise a single brood of 4-6 young, and then begin fall migration sometime in August or September.

Both sexes are apparently involved in choosing the nest site and both gather nesting material, although only the female builds the nest (Yosef 1996). One egg is laid per day, and clutch size averages 5-6 eggs. Females perform all of the incubation and are fed extensively by their mates during the laying and incubation periods. The incubation period is approximately 16 days. Females brood the nestlings for the first 4 to 5 days, with males providing most of the food during this period. The nestling period lasts an average of 17-18 days, and the parents continue to feed the young during the post-fledging period.

If early season nesting attempts fail, the pair will typically renest within a few hundred meters of the failed nest. Second broods (following the successful fledging of a first brood) are rare in the northern part of the range (including Canada), but common further south (Yosef 1996).

Survival

Haas and Sloane (1989) found return rates of 28% for adult males and 5% for adult females in North Dakota. In Alberta, 1.2% of juveniles and 32% of adults were resighted in the following year, while 0.85% of juveniles and 16% of adults were resighted in Manitoba (Collister and De Smet 1997). Clearly, these return rates are not reflective of survival rates, given that adults and juveniles typically disperse from breeding and natal areas (see Movements/dispersal below). The lack of an accurate measure of adult and juvenile survival rates hampers attempts to accurately predict local population viability.

Juvenile mortality following fledging is apparently high, with 33-46% fledgling mortality the first 7-10 days after fledging (Yosef 1996). However, other studies (e.g., Blumton 1989) have shown relatively high fledgling survival. As a consequence, it is unclear whether fledgling survival is typically high, or whether the long dispersal distances of some fledglings (Blumton 1989, Haas 1995) has biased such estimates downwards.

Movements/dispersal

Collister and De Smet (1997) summarized breeding and natal dispersal in shrikes from Alberta and Manitoba. In Alberta, the mean distance moved by adults between successive years was 1.9 km. In the same area, young shrikes banded as nestlings were recaptured on average 12.4 km away from the natal site. In Manitoba, adults moved an average of 3.1 km between successive nesting sites, while natal dispersal averaged 15.4 km. However, there was considerable site fidelity, with 50% (10 of 20) of adult males and 27% (3 of 11) of adult females breeding on the same territory between captures. Breeding dispersal was greater among females in both study areas, although the between-sex differences were significant only in Manitoba (23% of males, 9% of females). Breeding site fidelity in Manitoba appeared to be affected by fledging success, as 7% of adults that successfully raised young returned to the same territory, whereas only 2.3% of failed breeders returned.

Recovery of shrikes banded in Canada suggests that most of the prairie population winters in the southcentral USA (Burnside 1987). Two shrikes banded as nestlings in Alberta were recovered during winter in central Texas, while four shrikes banded in Saskatchewan were recovered in central Missouri (1 bird), southern Oklahoma (1), and in Texas (2).

Interspecific interactions

Shrikes have been observed chasing a wide variety of birds, presumably in defense of foraging areas (Cadman 1985; Collister 1994; Woods 1994). Northern Mockingbirds (*Mimus polyglottos*) and Burrowing Owls (*Athene cunicularia*) occasionally steal food from shrike caches (Yosef 1996). Fledgling shrikes are attacked/harassed by a number of species of passerine birds (Smith 1991). There are no indications that

interspecific competition has contributed to local or range-wide population declines of Loggerhead Shrikes.

Adult shrikes attack and chase a wide variety of potential nest predators (see Yosef 1996). In Alberta, Collister (1994) documented feral cats, Black-billed Magpies (*Pica pica*), Long-tailed Weasels (*Mustela frenata*) and bull snakes (*Pituophis melanoleucus*) depredating shrike nests. While such predation may be more common in fragmented, agricultural habitats, there are currently no data to support the idea of increased predation rates on shrike nests in such habitats.

Behaviour/adaptability

Disturbance – Although it is typically assumed that Loggerhead Shrikes are tolerant of human disturbance around the nest site, there is conflicting evidence (Porter et al. 1975; Siegel 1980; Kridelbaugh 1983) as to how frequently shrikes desert the nest in response to disturbance. However, desertion rates are generally low. Only a single study (Campbell 1975) has assessed disturbance to foraging birds. The primary finding of Campbell's study was that foraging birds are often victims of collisions with vehicles. Such mortality is thought to be especially extensive in winter, when shrikes often focus their foraging efforts along roadsides (Miller 1931, Cadman 1986).

Food/foraging – Loggerhead Shrikes are opportunistic foragers, typically adjusting their foraging to exploit the available prey base (Miller 1931, Craig 1978). Although they feed primarily on insects during the breeding season, vertebrates make up an increasing proportion of the diet during the winter months. Several studies (see Disturbance section above) have noted that during winter, shrikes feed primarily along roadways.

POPULATION SIZES AND TRENDS

In Canada, reported population sizes are 118 individuals in Manitoba (in 2002), 14000-15000 in Saskatchewan (as of 1999), and 6000 individuals in Alberta (1999).

The Canadian population of Prairie Loggerhead Shrikes has apparently been declining since the 1960s (Cadman 1985, Telfer 1993, Cade and Woods 1997). As has occurred in the eastern USA and Canada with the *migrans* subspecies, the breeding range of prairie shrike populations has contracted southward as former pastures have been converted to agriculture and aspen parkland habitat has reverted to forest.

Pooled BBS data from Alberta, Saskatchewan and Manitoba (Connie Downes, pers. comm) show a mean annual decline of 4.5 % since 1968, suggesting a total decline of 80 % over that period and 37 % decline over 10 years (Figure 4). Recent BBS data suggest that populations may be stabilizing at low levels in Alberta (see Table 1), continuing to decline Manitoba, while the trend remains unclear in Saskatchewan. BBS data are difficult to interpret (statistically) in Manitoba due to small

sample sizes and resulting poor statistical power (see discussion under Manitoba, below). Shrike populations declined drastically in the Prairie Provinces from 1966-1979, and although those declines have lessened recently, the pattern is still towards declining populations (see Figure 4). Recent updates to the BBS dataset, incorporating data from 2001 and 2002, have typically resulted in stronger declines in shrike populations both in Canada and the USA (unpubl. data; http://www.mp2-pwrc.usgs.gov/bbs/). Thus, while there is some degree of statistical uncertainty with the BBS data, the overall pattern from those data suggest a continuing (albeit less rapid) decline in shrike populations in Canada.

Table 1. Loggerhead Shrike trend results from North American Breeding Bird Surveys. Data were taken from Sauer *et al.* (2002) and are given for the breeding range of *L .l. excubitorides*. Trend indicates the percentage of change/year.

Region	1966-2002			1966-1979			1980-2002		
	N	Trend	P	N	Trend	P	N	Trend	P
Alberta	22	- 4.0	0.21	7	- 12.6	0.02	19	0.5	0.91
Saskatchewan	33	- 9.4	0.01	15	- 12.3	0.00	25	- 3.0	0.10
Manitoba	10	- 13.1	0.22	-	-	-	8	-3.3	0.76
Canada	75	- 10.0	0.00	32	- 16.6	0.00	54	- 2.5	0.12
North Dakota	28	- 0.6	0.76	12	- 6.0	0.21	27	3.5	0.07
Montana	24	2.6	0.34	10	- 10.5	0.44	23	2.6	0.40
South Dakota	34	- 1.2	0.40	23	4.6	0.21	27	- 2.0	0.22
Nebraska	42	- 2.7	0.07	27	- 10.1	0.03	36	- 0.1	0.96
Wyoming	63	- 2.2	0.19	17	- 2.1	0.63	60	1.3	0.40
Colorado	49	2.5	0.25	10	1.2	0.79	49	0.9	0.67
Kansas	44	-2.8	0.00	34	- 5.0	0.03	43	- 4.3	0.00
Oklahoma	57	- 5.6	0.00	33	- 5.1	0.00	55	- 5.5	0.00
New Mexico	54	- 5.4	0.00	21	- 11.1	0.00	51	- 3.1	0.02

Alberta

Data from provincial monitoring schemes show a similar picture. In Alberta, where BBS data suggest that populations may have stabilized in the 1980s, recent survey work has found breeding shrikes along the southern periphery of the Central Aspen Parkland, an area previously thought to harbour few shrikes (Kiliaan and Prescott 2002). Surveys in the core of the species' range in Alberta in 1993 and 1996 indicated a stable population there over that period, with 90 shrikes observed in 1993 and 96 in 1996 (Bjorge and Kiliaan 1997). However, roadside surveys in 1998 and 2003 suggest a 34% decline (from 1.96 to 1.29 pairs/km) over that 5-year period (D. Prescott, pers. comm. 2004). Similarly, recently updated data on the BBS web site suggest that the number of shrikes on BBS routes has declined in Alberta by 6.8% per year from 1993-2002, a number similar to that in Saskatchewan during the same period (see Table 2). However, there is often considerable uncertainty regarding the accuracy of BBS data for species with low population sizes and the Alberta trend is not statistically significant (see the discussion under Manitoba, on page 14).

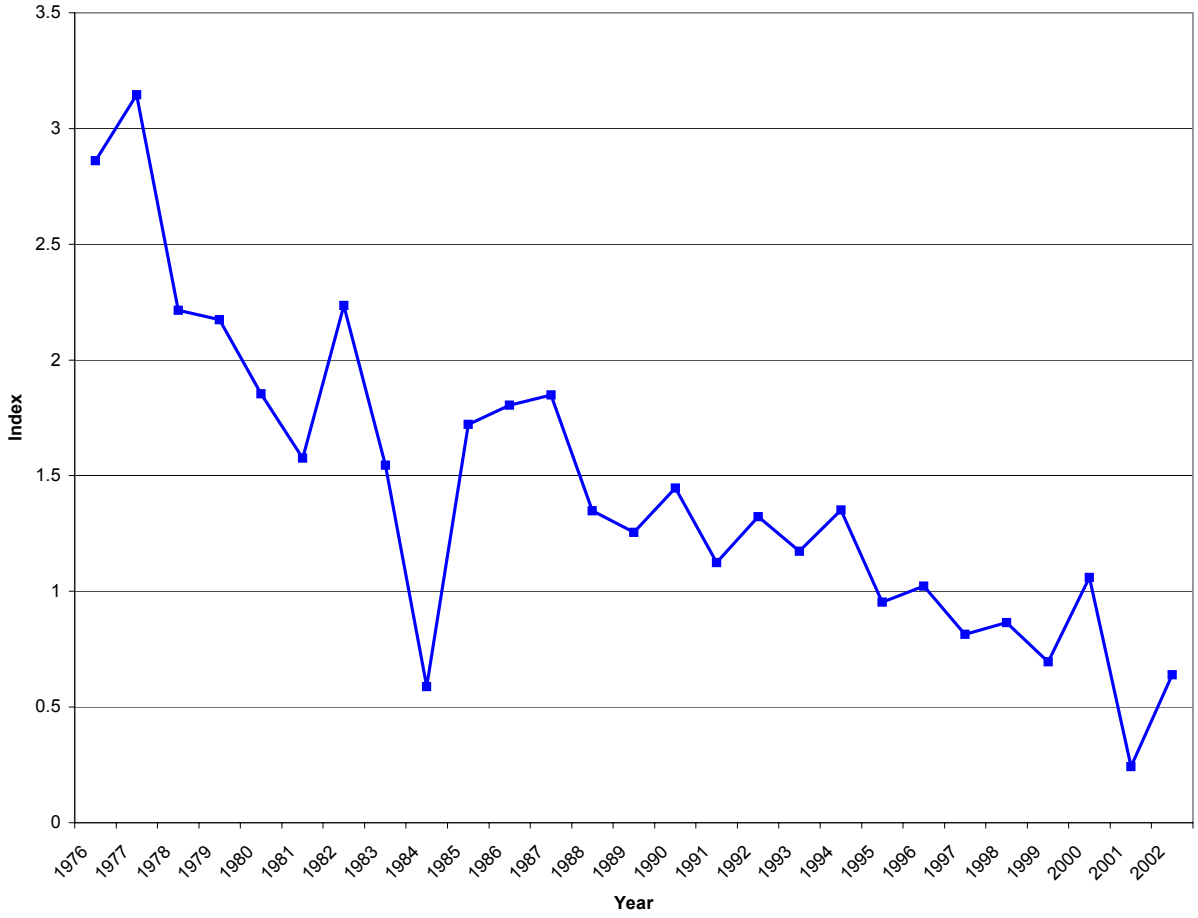

Figure 4. Breeding Bird survey indices of Loggerhead Shrikes from Alberta, Saskatchewan, and Manitoba (data from Connie Downes, Canadian Wildlife Service, in. litt.).

Table 2. Provincial results for Loggerhead Shrikes from the last decade of the Breeding Bird Survey, 1993-2002.
(www.mp2-pwrc.usgs.gov/bbs/).

Province	Routes	Trend (% change/year)	*P*
Alberta	16	- 6.81	0.20
Saskatchewan	19	- 6.31	0.02
Manitoba	5	- 2.60	0.85

Saskatchewan

Table 3 summarizes the numbers of breeding shrikes observed on transect surveys in Saskatchewan. While these data show little indication of a long-term decline

in abundance, the decline from 1993 to 2003 is cause for concern (for a similar pattern, see the paragraph below on Manitoba results). However, analysis of the last ten years (1993-2002) of BBS data for Loggerhead Shrikes shows a statistically significant (P = 0.02) decline of 6% per year in Saskatchewan. These data suggest that in 2002 the population had declined to 54% of the 1993 total.

Table 3. Results of roadside transect surveys for breeding shrikes in Saskatchewan (from Collister 1999 and A. Didiuk in litt. 2004).

Region	Routes	km	Pairs per 100 km			
			1987	1993	1998	2003
Northeast	6	1175	1.02	1.11	0.85	0.87
Northwest	8	1290	3.49	6.05	5.89	5.89
Southeast	10	1971	1.47	2.74	1.67	0.36
Southwest	8	1473	2.58	4.48	3.94	4.89
Totals	32	5909	2.10	3.57	3.00	2.90

Manitoba

In Manitoba, annual censuses have been carried out since the original COSEWIC status report in 1986. The number of shrikes increased from 1987 (265 pairs) until 1993 (327 pairs), but has since declined, with only 59 pairs found in 2002 (K. De Smet, pers. comm.; see Figure 5). In contrast, Manitoba BBS data for the same period suggest an annual decline of 2.6% per year, or a decline from 327 pairs in 1993 to 257 pairs in 2002. Thus, as mentioned earlier in this report, BBS data must be viewed cautiously, especially within small, declining populations such as in Manitoba. In this case, dedicated surveys likely provide a much more accurate picture of population trends than does BBS methodology.

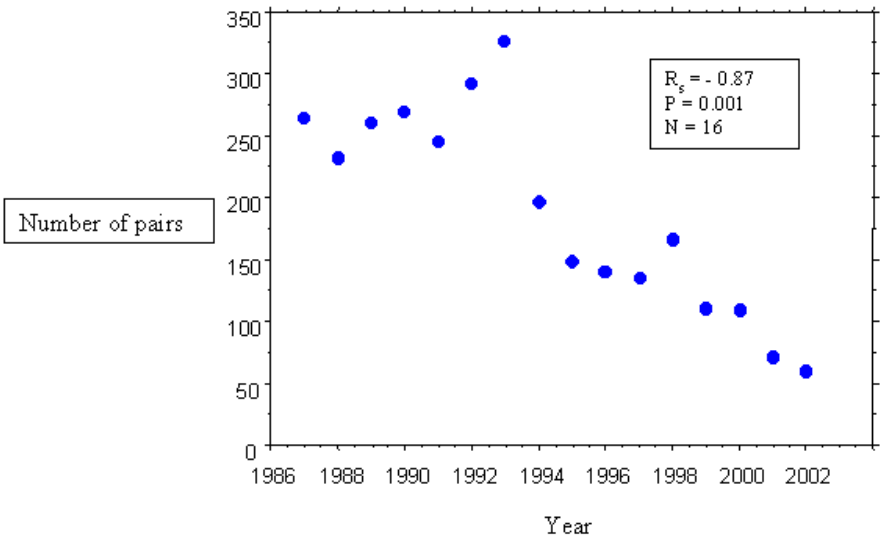

Figure 5. Results of annual surveys for nesting Loggerhead Shrikes in Manitoba. R_s = Spearman rank correlation.

Wintering range

On the wintering grounds, Loggerhead Shrikes have undergone declines within the Christmas Bird Count regions in the USA. Canadian (Alberta and Saskatchewan) populations of the Prairie Loggerhead Shrike are known to winter in the southern Great Plains states (Burnside 1987). Analysis of long-term trends in the numbers of shrikes seen on Christmas Bird Counts in Colorado and Kansas, as well as Oklahoma and Texas (the wintering areas of Canadian *excubitorides*) show statistically significant declines, with at least 50% declines in numbers from 1959-2002 (see Figure 6).

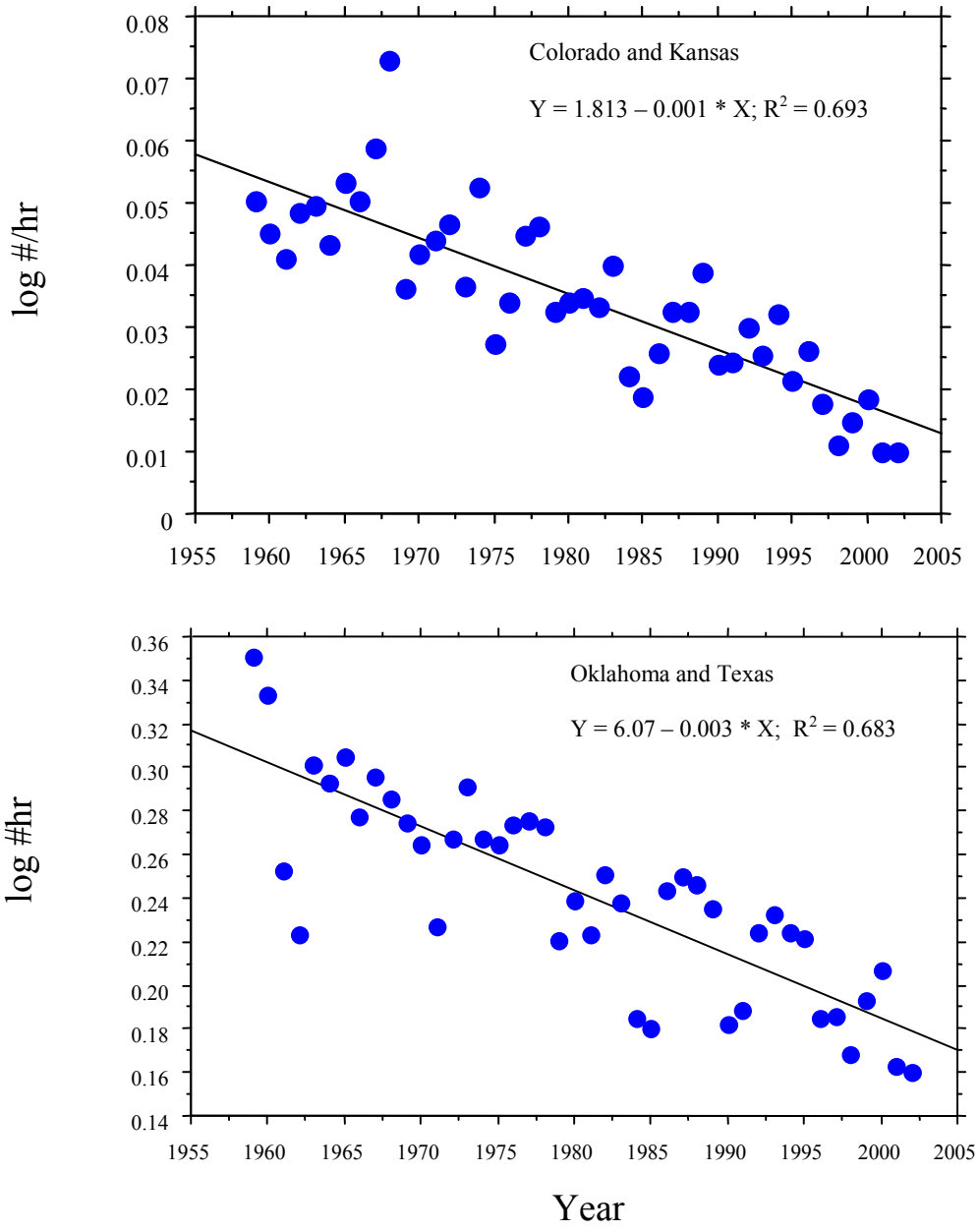

Figure 6. Pattern of abundance of Loggerhead Shrikes on Christmas Bird Counts in the southcentral USA.

LIMITING FACTORS AND THREATS

Habitat conversion/degradation has been correlated with population declines of shrikes throughout North America (Yosef 1996). Telfer (1993) reported a 39% decline in unimproved pastureland between 1946 and 1986 in areas of the Prairie Provinces where shrikes have undergone the greatest declines. Telfer (loc. cit.) also studied shrike habitat use on the wintering grounds in Texas and found that only 17% of native grasslands remained. Samson and Knopf (1994) reported dramatic losses of native grasslands in Alberta (61% of mixed grass prairie), Saskatchewan (81% of mixed grass prairie and 85% of shortgrass prairie), and Manitoba (99% of both tallgrass and mixed grass prairie), as well as further south along the western and central Great Plains. Thus, the extensive loss of native grasslands (the preferred foraging habitat; Bent 1950) throughout the breeding, migration and wintering areas has also likely had a significant negative impact on Prairie Loggerhead Shrike populations.

Although the exact sources of mortality have not been identified, it is clear that mortality of recently fledged young is high. Collister (1994) found that during the first 10 days following fledging, mortality of juvenile shrikes in Alberta was 33% in one year and ≥ 53% in another year. In Indiana, Burton (1990) found a 46% mortality rate of juvenile shrikes within the first week of fledging.

There is extensive evidence of negative effects of pesticides on Loggerhead Shrikes (see summary in Yosef 1996). Declines in Loggerhead Shrike populations coincided with the introduction of organochlorines in the USA and Canada (Yosef 1996). Two studies have quantified relatively high levels of pesticides in shrikes breeding in Illinois (DDE; Anderson and Duzan 1978) and California (DDT; Rudd et al. 1981), while dieldrin has been implicated in the decline of Prairie Loggerhead Shrikes in Canada (G. Gox *in* Cadman 1985).

Pesticides may have direct negative effects via egg shell thinning (Morrison 1979) and consequent poor hatching success, impairment of behavioral development in juveniles, or death (Busbee 1977). In addition, pesticides may affect reproductive success and survival by significantly decreasing prey abundance. Cadman (1985) suggested that the sharp declines of Prairie Loggerhead Shrikes in Canada were correlated with the extensive use of dieldrin against grasshoppers, a primary source of food for breeding shrikes in the Prairie Provinces. Cadman cited evidence of a link between declines in clutch and brood sizes, hatching success, and the use of dieldrin in shrike breeding areas. On the wintering grounds, the recent spread of red fire ants has prompted the use of mirex (a pesticide), which can accumulate to relatively high levels in shrikes (Collins et al. 1974, Lymn and Temple 1991).

Collisions with vehicles are thought to be a major source of mortality for adult and juvenile shrikes. Shrikes often forage from hedgerows and barbed wire fences, often near roads, and several authors have documented extensive mortality in such situations (e.g., Robertson 1930, Miller 1931, Luukkonen 1987, Blumton 1989).

Predation on adults and eggs and nestlings appears to be higher near roads and hedgerows, which attract predators (DeGeus 1990). Feral cats have been noted as predators (Gawlik and Bildstein 1990, Scott and Morrison 1990), while raptors and carnivores in general have also been cited (Bent 1950).

In shortgrass prairie habitats, cattle may damage or kill the few trees available to nesting shrikes (D. Wiggins, pers. obs.). Populations of *L. l. excubitorides* in southeastern Colorado appear to actively avoid nesting in grasslands subject to summer cattle grazing, and instead nest in roadside shrubs and within fenced cattle exclosures (D. Wiggins, pers. obs.).

Weather conditions may have significant negative effects on reproductive success. Porter et al. (1975) found that 9 of 12 nests in eastern Colorado were destroyed during severe thunderstorms, and such storms are a frequent source of nest losses on the Great Plains of eastern Colorado (Susan Craig, pers. comm.). Poor weather (cold, wet) is likely even more of a problem on the periphery of the species' range (e.g., in Canada).

Finally, within the Manitoba population, reproductive success appears to be declining in step with the observed population declines. The most detailed data set (range-wide) on reproductive success has been collected in Manitoba, and several measures of reproductive success have declined since 1993, when the shrike population began a precipitous drop in numbers (Table 4).

Table 4. Measures of reproductive success in Manitoba from 1987-1993, relative to 1994-2002 (data from Ken De Smet, pers. comm.).

Factor	1987-1993	1994-2002
a) Clutch size	6.18	6.17
b) Mean brood size at 8-10 days	5.28	4.79
c) Nest success	62.5%	57%
d) b x c (fledged young per initiated nest)	3.30	2.73

West Nile Virus killed many captive Loggerhead Shrikes in Ontario in 2002 and there is a documented death from Alberta in 2003 (R. Bjorge, in litt. 2004).

SPECIAL SIGNIFICANCE OF THE SPECIES

Loggerhead Shrikes were formerly common inhabitants of open habitats throughout most of the USA and southern Canada. In recent decades, populations in various parts of the species' range have declined dramatically. Eastern populations (*L: l. migrans*) are now Endangered in Ontario and are largely absent from the majority of their former range in the northeastern United States. Although western populations have not undergone such drastic declines, some populations, such as the

San Clemente Island population (*L. l. mearnsi*) and the population (*L. l. excubitorides*) in southwestern Manitoba are now classified as Endangered. *L. l. excubitorides* has also undergone decades of population declines in the southern portions of the breeding range in Oklahoma and Texas where it was formerly very common.

Despite considerable attention towards these various declining and endangered populations, it is still unclear which factors are responsible for the species widespread declines (see discussions in Yosef 1996, Cade and Woods 1997). Conservation actions have been directed almost wholly towards identifying and protecting nesting habitats. Potential problems (habitat loss, pesticides) on the wintering grounds, where populations have declined, remain to be studied.

EXISTING PROTECTION OR OTHER STATUS

The Loggerhead Shrike is protected internationally (Canada, Mexico, USA) by the Migratory Birds Convention Act (1916). Classified as G4 (apparently secure globally, although it may be quite rare in parts of its range, especially at the periphery) by the Nature Conservancy, with provincial designations of S3S4B in Manitoba, S4B in Saskatchewan, and S3 in Alberta. S3 refers to a species that is either very rare or local throughout its range, or found locally in a restricted range. S4 is defined as species that are apparently secure, though they may be quite rare in parts of the range, especially at the periphery. A comprehensive summary of the existing protection and legal status of Loggerhead Shrikes can be found in Pruitt (2000).

In Canada, Prairie Loggerhead Shrikes have been designated *Threatened* by COSEWIC in 1986 and 1991 (COSEWIC 2003). The species is listed as *Endangered* in Manitoba (www.gov.mb.ca/natres/wildlife/index.html) and both a *Sensitive Species* and a *Species of Special Concern* in Alberta (Anonymous 2001). In Saskatchewan, it is considered a *Species at Risk,* requiring special management consideration (http://www.biodiversity.sk.ca/). It is also listed as *Threatened* in nearby Minnesota (http://www.dnr.state.mn.us/ets/birds.html) and *Endangered* in Wisconsin (www.dnr.state.wi.us/org/land/er/factsheets/birds/SHRIKE.HTM).

The primary on-the-ground protection efforts in Alberta, Saskatchewan, and Manitoba are to identify and protect critical habitat for Prairie Loggerhead Shrikes. Such efforts are typically oriented towards private stewardship, whereby landowners are encouraged to fence off and protect areas that are identified as important nesting and foraging sites.

SUMMARY OF STATUS REPORT

Prairie Loggerhead Shrikes have undergone significant range retraction and population declines in recent decades. Since the original designation of Threatened in 1986 (Cadman 1986), populations in Manitoba have continued to decline sharply, while

those in Saskatchewan have shown less drastic declines, and in Alberta, the species appears more or less stable. One problem in assessing current population trends is that the abundance of shrikes in Canada is now so low that BBS data have low statistical power. Ongoing surveys in Alberta and Saskatchewan should provide a much better picture of the status and population trends in the core of the species' Canadian range. Recent (1993-current) data from the known wintering areas (southcentral USA) of the Canadian population also suggest an ongoing decline in numbers.

The reasons for the declines in range and abundance are still unclear. Loss and/or degradation of grassland habitats, pesticide accumulation, predation at nest sites, and collisions with vehicles have all been cited as potential contributors. Although recent attempts have been made to improve breeding habitat (e.g., by planting shrubs in grassland areas, fencing potential nesting trees), there has not been sufficient time to assess the effects of such treatments.

In addition to the decline in population size in Manitoba, reproductive success there has declined since 1993, thus contributing to the overall population crash. Although there are currently no long-term reproductive data for Alberta and Saskatchewan shrike populations, such data are currently being collected in Saskatchewan.

TECHNICAL SUMMARY

Lanius ludovicianus excubitorides
Loggerhead Shrike *excubitorides* subspecies

Pie-grièche migratrice de la sous-espèce *excubitorides*

Range of Occurrence in Canada: AB, SK, MB

Extent and Area information	
• *extent of occurrence (EO)(km²)*	ca 300,000 km^2
• *specify trend (decline, stable, increasing, unknown)*	Decline
• *are there extreme fluctuations in EO (> 1 order of magnitude)?*	No
• *area of occupancy (AO) (km²)*	ca. 5000 to 10,000 km^2
• *specify trend (decline, stable, increasing, unknown)*	Decline
• *are there extreme fluctuations in AO (> 1 order magnitude)?*	No
• *number of extant locations*	Not applicable
• *specify trend in # locations (decline, stable, increasing, unknown)*	
• *are there extreme fluctuations in # locations (>1 order of magnitude)?*	
• *habitat trend: specify declining, stable, increasing or unknown trend in area, extent or quality of habitat*	Unknown
Population information	
• *generation time (average age of parents in the population) (indicate years, months, days, etc.)*	2
• *number of mature individuals (capable of reproduction) in the Canadian population (or, specify a range of plausible values)*	ca. 20,000
• *total population trend: specify declining, stable, increasing or unknown trend in number of mature individuals*	Declining
• *if decline, % decline over the last/next 10 years or 3 generations, whichever is greater (or specify if for shorter time period)*	37% over 10 years (83% since 1968) (BBS data)
• *are there extreme fluctuations in number of mature individuals (> 1 order of magnitude)?*	No
• *is the total population severely fragmented (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant / year)?*	No
• *list each population and the number of mature individuals in each*	
• *specify trend in number of populations (decline, stable, increasing, unknown)*	
• *are there extreme fluctuations in number of populations (>1 order of magnitude)?*	
Threats (actual or imminent threats to populations or habitats)	
- Loss of native grasslands and pastureland in breeding, migration and wintering grounds - Degradation of habitat due to cattle grazing - Pesticides, particularly DDT and dieldrin used on insect prey, occur in high concentration in shrikes and have been implicated in population decline - decreasing breeding success at low population levels	

Rescue Effect (immigration from an outside source)	Moderate
• *Status of outside population(s)?* **USA: Wisconsin: Endangered** **Minnesota: Threatened**	
• *does species exist elsewhere (in Canada or outside)?*	Yes
• *status of the outside population(s)?*	Stable, declining
• *is immigration known or possible?*	Yes
• *would immigrants be adapted to survive here?*	Yes
• *is there sufficient habitat for immigrants here?*	Yes, but declining
Quantitative Analysis	
Other Status **COSEWIC: Threatened (1986)**	

Status and Reasons for Designation

Status: Threatened	**Alpha-numeric code:** A2bc
Reasons for Designation: This raptorial songbird has suffered significant (more than 80 %) population declines over the past 35 years. These declines have been linked to loss of native prairie and pastureland habitats and pesticide residues.	

Applicability of Criteria

Criterion A (Declining Total Population): Threatened A2bc applies, since Breeding Bird Survey data suggest a 10-year decline of 37% and the causes for this decline have not ceased.

Criterion B (Small Distribution, and Decline or Fluctuation): Not applicable since AO and EO are too large

Criterion C (Small Total Population Size and Decline): Not applicable since population is too large

Criterion D (Very Small Population or Restricted Distribution): Not applicable because distribution is not restricted and population too large

Criterion E (Quantitative Analysis): Not done.

ACKNOWLEDGEMENTS

I owe particular thanks to Ken De Smet and Andrew Didiuk for providing me with extensive unpublished information on the status and biology of shrikes in Manitoba and Saskatchewan, respectively. David Prescott provided data from 2003 surveys in Alberta. Susan Craig gave a very useful account of a multi-year study of shrikes in eastern Colorado. Connie Downes, Canadian Wildlife Service, Ottawa, provided data from the Canadian Breeding Bird Survey.

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David Wiggins is an ornithologist working in Sweden and North America. He completed an undergraduate degree at the University of Oklahoma, a Master's degree at Brock University (on parental care in Common Terns), a Ph.D. at Simon Fraser University (on quantitative genetics in Tree Swallows), and a post-doctoral fellowship at Uppsala University in Sweden (on life-history evolution in Collared Flycatchers). David has since worked as a Research Ecologist within the Danish Environment Ministry, and is currently a consultant to the U.S. Forest Service, working with avian conservation projects in the western U.S.

AUTHORITIES CONTACTED

A number of regional experts have provided direct comments or published and unpublished data in support of this status report. Ken De Smet (Wildlife & Ecosystem Protection Branch, Manitoba Conservation) provided a wealth of information on the status of shrikes in Manitoba. Andrew Didiuk, Chair of the Prairie Loggerhead Shrike Recovery Team provided information on the current and recent status of shrikes in Saskatchewan, while David Prescott passed on data from recent surveys in Alberta and Ron Bjorge commented on the species status and distribution in Alberta. Gilles Seutin (Parks Canada) provided a number of unpublished reports. Other authorities contacted include Diane Amirault, Gord Court, Susan Craig, Theresa Fowler, Gloria Goulet, and Gina Schalk.