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Loggerhead Shrike population trends in western Canada

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Abstract

Roadside surveys of Loggerhead Shrikes *Lanius ludovicianus*, originally established in 1987, were replicated in Saskatchewan in 1993 and 1998 and in Alberta in 1998. In Manitoba, the two survey routes that had shrikes on them in 1987 were replicated in 1993, but not in 1998. In Alberta, the mean density of shrikes was 3.8 times higher in 1998 than in 1987. In Saskatchewan, shrike densities increased from 1987 to 1993 and declined from 1993 to 1998. Although differences were not statistically significant, overall trends between 1987 and 1998 appeared more stable in the western half of Saskatchewan and less stable in the eastern half of the province. In Manitoba, the shrike density on the two resurveyed routes was 39% lower in 1993 than in 1987. Independent surveys in Manitoba revealed a 58% overall decline from 1987 to 1999. These results suggest that, since 1987, the population of Loggerhead Shrikes has increased in Alberta, remained relatively stable in Saskatchewan, and declined in Manitoba. Analysis and interpretation were limited due to observer changes, weather effects, and the inherent biases of roadside surveys.

Introduction

The western population of Loggerhead Shrike *Lanius ludovicianus excubitorides* is designated as "Threatened" (a species likely to become endangered if limiting factors are not reversed) by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC 1999). In Alberta, the species is designated as "Yellow A" (a species for which there has been concern expressed over long-term declines in numbers and that merits extra attention, as it may be in trouble) (Alberta Environmental Protection 1996). In Manitoba, the species has been designated as "Endangered" (threatened with imminent extinction or with extirpation throughout all or a significant portion of its Manitoba range) under the *Manitoba Endangered Species Act* (1990). In Saskatchewan, the species does not have any special designation under the species at risk provisions of *The Wildlife Act* (1999).

In summer 1987, roadside count surveys were completed over a study area of approximately 924 000 km² in the prairie and parkland ecoregions of the Prairie provinces. These surveys provided an initial assessment of the status and distribution of the Loggerhead Shrike (Telfer et al. 1989). This Progress Note documents our replication of these initial surveys in 1993 and 1998 and discusses observed changes in distribution and abundance and the implications of those changes.

Methods

The 1987 roadside surveys were replicated in 1993 and 1998 in Saskatchewan and in 1998 in Alberta, as recommended in the National Recovery Plan for the Loggerhead Shrike (Johns et al. 1994). The two survey routes in Manitoba on which shrikes were located in 1987 were replicated in 1993, and two other roadside routes established in core nesting areas in 1991 were replicated in 1993 and 1996. Surveys were conducted between 07:00 and 19:00 during the period 23 June to 20 July in 1993 and 17 June to 19 July in 1998. This is comparable to the 15 June to 15 July survey period in 1987 (Telfer et al. 1989). These periods correspond with the incubation and nestling periods of the shrikes. Based on recommendations made after the 1987 surveys, we did not survey shrikes when the temperature was over 25°C. Most routes followed lightly travelled back roads, with occasional sections following provincial highways. Surveyors scanned the countryside for shrikes while driving at 50–70 km/h, slowing down when necessary. Single birds were assumed to represent pairs if they were >300 m from a known pair and in suitable nesting habitat. To avoid mistaking fledglings for adults, surveyors used close observation and scanned the vicinity for additional fledglings and adults. Routes varied in length from 127 to 402 km, with most in the 200- to 300-km range. For a description of route locations, please contact the principal author.

In an observational study such as this, it is self-evident that shrike numbers will vary and that statistical tests do not address the biological significance of this variation. To assess our results in a biologically meaningful framework, we present sample sizes, means, standard deviations, and 95% confidence intervals (e.g., Anderson et al. 2001). We do not present results of significance tests (e.g., ANOVA)

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comparing shrike densities among years, as they are not appropriate in this context.

Results

Alberta

As in 1987, the 1998 surveys covered most of Alberta between the Saskatchewan border and 114°W and from the U.S. border north to 54°N. All 1998 routes were identical to those in 1987, except in a few instances where roads had been rerouted or were otherwise unnavigable. Shrike densities north of 52°N, south of 52°N, and in total are given in Table 1. The mean density of shrikes observed in 1998 was 3.8 times higher than in 1987.

Saskatchewan

As in 1987, southern Saskatchewan was divided into four regions: north and south of 51°N and east and west of 106°W (Cadman 1985). Shrike densities by region and by year are given in Table 2. The general trend was for regional densities to go up from 1987 to 1993 and to decline from 1993 to 1998. None of the regional changes in breeding pairs between survey years was meaningful.

Manitoba

The two routes in southwestern Manitoba that originally had some shrikes on them had lower nesting densities when they were replicated in 1993 (Table 3). On two other routes set up in dense nesting areas of the extreme southwest, shrike densities increased from 12.5 pairs/100 km to 17.8 pairs/100 km from 1991 to 1993, but declined to 9.4 pairs/100 km in 1996.

Discussion

Surveys

Roadside surveys suffer from potentially serious limitations. Visibility of shrikes can vary dramatically due to weather (wind, rain, high temperatures) and stage of the breeding cycle. For this reason, the survey protocol that was established set strict criteria to reduce the effects of these limitations. In Alberta and Saskatchewan, some observers changed between survey periods, introducing a confounding effect that was difficult to quantify. In Alberta, changes in observers were believed to have accounted for at least some of the observed increases in densities from 1987 to 1998. Although all observers were experienced in observing Loggerhead Shrikes, 12 different observers took part in the latter survey, as opposed to only one in 1987.

Roadside surveys can be effective in monitoring population trends, but they are not as effective at providing population estimates. Bjorge and Prescott (1996) found that 47.8% of shrikes located during block censuses were not within detection distance of a road. In addition, Bjorge (unpubl.) noted that only 63% of the shrikes found within 200 m of a road were initially detected while simulating a roadside survey. This suggests that as little as 33% of this Loggerhead Shrike population would have been detected by roadside

surveys. The purpose of this roadside survey was to monitor trends and not to provide population estimates.

The 1987 survey appeared to confirm the conclusion by Cadman (1985) that the distribution of Loggerhead Shrikes in the Prairie provinces had contracted, particularly in Alberta and Manitoba. The 1993 and 1998 surveys, where applicable, suggest that the range of the Loggerhead Shrike may have expanded since 1987 in some parts of Alberta, remained static in most of Saskatchewan, and contracted further in eastern Saskatchewan and southwestern Manitoba (Tables 1–3; Fig. 1).

Telfer et al. (1989) defined areas with fewer than two observations per 100 km of survey route as constituting a stratum with a sparse and patchy distribution of shrikes. Densities of 2–10 probable breeding pairs per 100 km of survey route were defined as indicative of a moderate, more evenly distributed population. Only two regions, Saskatchewan southwest and northwest, and one route in Manitoba (62F/2) showed moderate densities whenever surveyed.

Alberta

Within Alberta, the Breeding Bird Atlas and Breeding Bird Survey data indicate that the current breeding range of the Loggerhead Shrike is restricted to the Dry Mixed Grass ecoregion and its ecotone with the Aspen Parkland ecoregion (Collister 1994a). A population survey carried out in a portion of this region during the 1993 breeding season estimated a population of 2477 pairs in a 23 600-km² study area encompassing the best one-third of the species' breeding range in Alberta, which may extrapolate to a provincial population of around 5000 pairs (Bjorge and Prescott 1996). This survey was repeated in 1996 and 1998 (with half of the 26 original study blocks being surveyed in each year), revealing a total of 118 indicated pairs, comparable to the 111 indicated pairs found in 1993 (Bjorge and Kiliaan 1997; Bjorge, unpubl.). During 1996, Collister's (1994b) study area was resurveyed, and the number of breeding pairs located was comparable to those in 1992 and 1993 (Collister 1996; Collister and De Smet 1997). However, an intensive survey of the portion of the Suffield Military Reserve outside the Suffield National Wildlife Area during 1996 found only two pairs of nesting Loggerhead Shrikes, despite the presence of many apparently suitable nesting areas (Dillon Consulting Limited 1998). The area surveyed totalled approximately 2300 km², or about 10% of the area studied by Bjorge and Prescott (1996). During 1994 and 1995, there were approximately 20 pairs within the 458.7-km² National Wildlife Area portion of Suffield (Dale et al. 1999). CFB Suffield is considered to be within the heart of Loggerhead Shrike range in Alberta. With the exception of the much lower than expected number of birds found on CFB Suffield, the roadside count survey data presented in this Progress Note are consistent with the above evidence, suggesting a stable or perhaps increasing Alberta population.

Saskatchewan

The range of the Loggerhead Shrike in Saskatchewan has contracted from former breeding areas at Meadow Lake, Nipawin, and Somme, although the Loggerhead Shrike is

Table 1
Summary of Loggerhead Shrike surveys in Alberta in 1987 and 1998

	Total transect length (km)	Number of transects	Shrikes per 100 km surveyed (indicated pairs)					
			1987			1998		
			Mean	SD	95% CI	Mean	SD	95% CI
North of 52°N	912	4	0.00	0.000	(0.0, 0.0)	0.47	0.943	(-1.0, 2.0)
South of 52°N	2890	12	0.66	0.833	(0.1, 1.2)	2.30	2.421	(0.8, 3.8)
Total	3802	16	0.49	0.772	(0.1, 0.9)	1.84	2.268	(0.6, 3.1)

Table 2
Summary of Loggerhead Shrike surveys in Saskatchewan in 1987, 1993, and 1998

	Total transect length (km)	Number of transects	Shrikes per 100 km surveyed (indicated pairs)								
			1987			1993			1998		
			Mean	SD	95% CI	Mean	SD	95% CI	Mean	SD	95% CI
North of 51°N, east of 106°W	1175	6	1.07	1.57	(-0.6, 2.7)	1.05	1.43	(-0.5, 2.6)	0.86	1.46	(-0.7, 2.4)
North of 51°N, west of 106°W	1290	8	3.26	2.78	(0.9, 5.6)	5.69	5.50	(1.1, 10.3)	5.57	3.57	(2.6, 8.6)
South of 51°N, east of 106°W	1971	10	1.66	1.33	(0.7, 2.6)	2.99	3.05	(0.8, 5.2)	1.69	1.91	(0.3, 3.1)
South of 51°N, west of 106°W	1473	8	2.52	1.51	(1.3, 3.8)	4.79	3.03	(2.3, 7.3)	4.00	2.68	(1.8, 6.2)
Total	5909	32	2.16	1.96	(1.5, 2.9)	3.75	3.85	(2.4, 5.1)	3.08	3.05	(2.0, 4.2)

Table 3
Summary of Loggerhead Shrike surveys in Manitoba in 1987 and 1993

Total transect length (km)	Number of transects	Shrikes per 100 km surveyed (indicated pairs)					
		1987			1993		
		Mean	SD	95% CI	Mean	SD	95% CI
451	2	5.10	4.67	(-37.54, 46.38)	3.10	2.98	(-24.14, 29.48)

still a fairly common summer resident in the Grasslands and Parklands ecoregions (Smith 1996). The species' range in Saskatchewan has been relatively constant since 1980. Based on field observations, survey blocks, and habitat assessment, Harris (unpubl.) estimated the Saskatchewan Loggerhead Shrike population in 1990 at 7000 pairs (14 000 birds). Independently, A. Smith (pers. commun.) estimated 15 000 birds based on Breeding Bird Survey data. These data suggest that Loggerhead Shrike numbers have been stable since the early 1990s, and no management emphasis has been directed towards the species since 1993. The roadside count survey data presented in this Progress Note appear consistent with these assessments, suggesting a relatively stable population

in central and western Saskatchewan, with a lower density and possibly less stability along the eastern border adjacent to Manitoba.

Manitoba

In a separate study in southwestern Manitoba (De Smet and Conrad 1989; De Smet 1992, unpubl.; Collister and De Smet 1997), overall nesting shrike populations declined 58% from 1987 to 1999, increasing gradually from 265 pairs in 1987 to 327 in 1993 and then declining rapidly to 110 pairs in 1999. Within extreme southwestern Manitoba, a 23-township block consistently supported about three-quarters of the

Figure 1
Shrike pairs per 100 km along roadside survey routes in 1987, 1993, and 1998

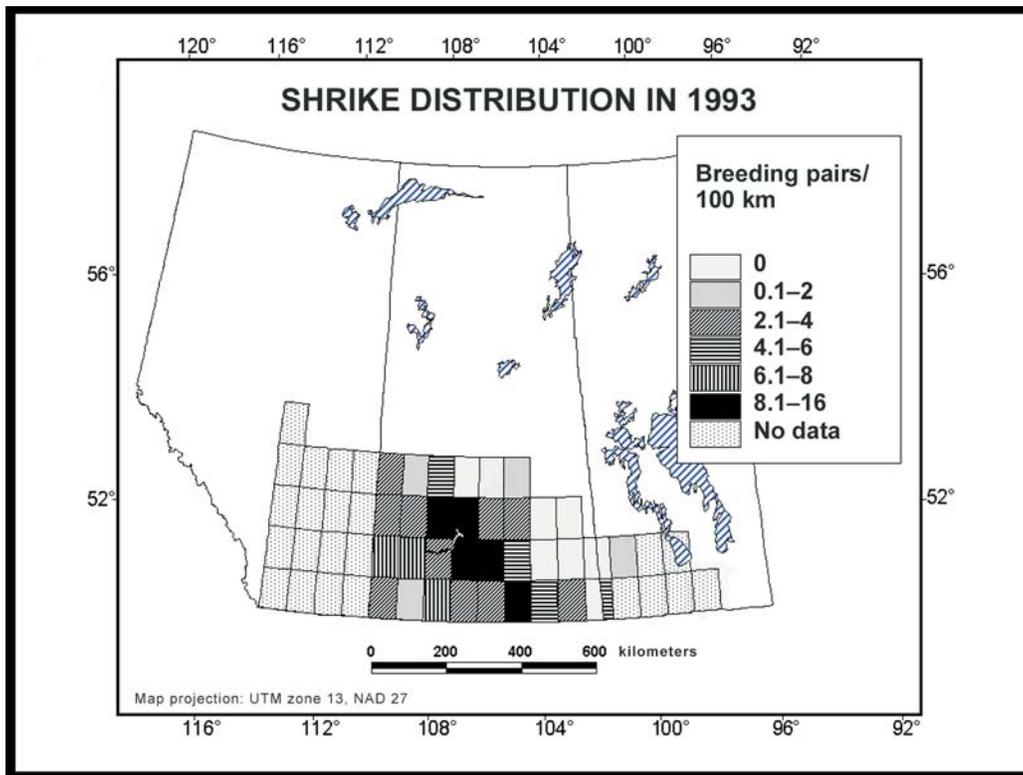
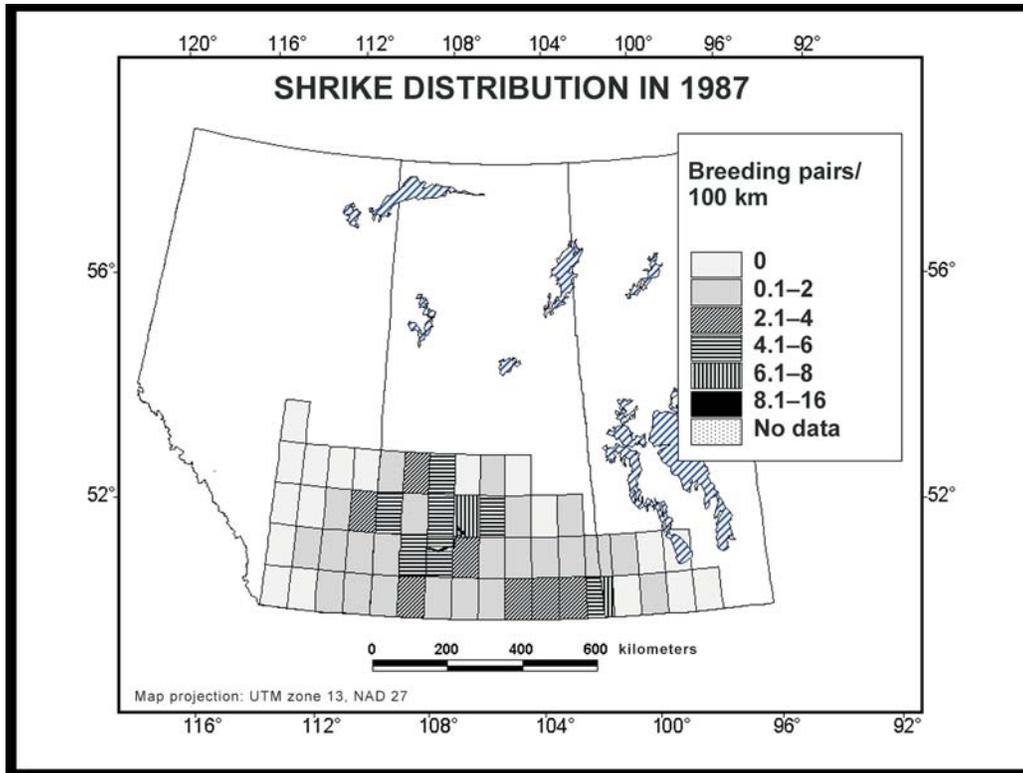
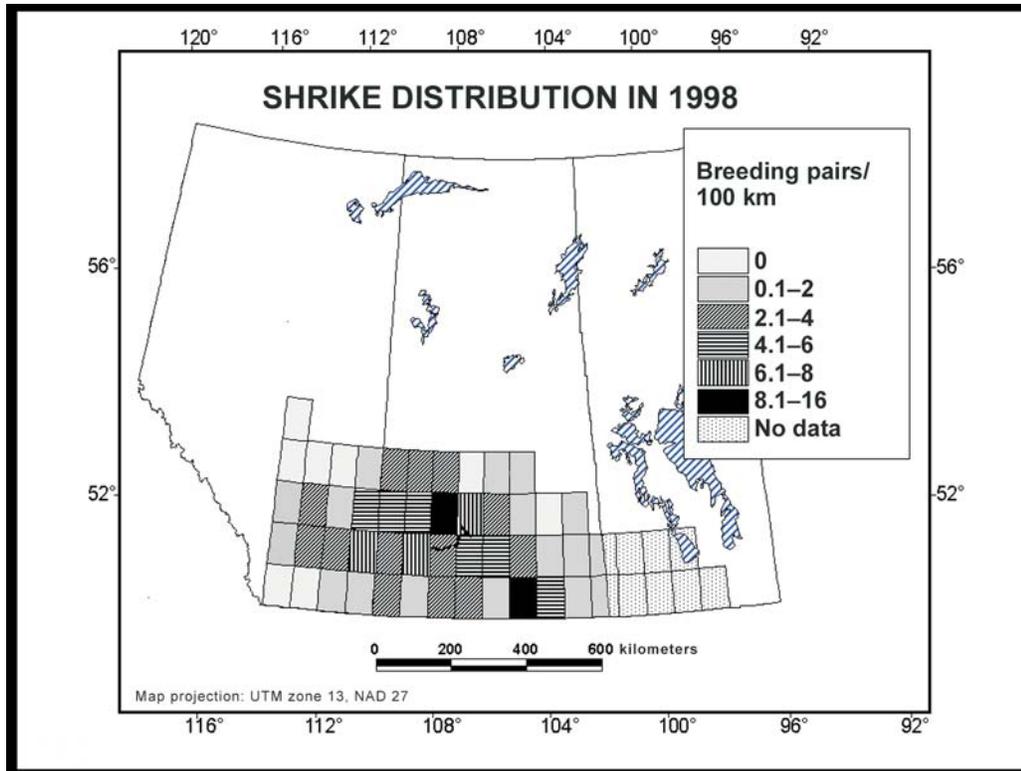


Figure 1 (cont'd)

Shrike pairs per 100 km along roadside survey routes in 1987, 1993, and 1998



nesting pairs observed from 1987 to 1999. Within this block, a six-township main core area stretching from Broomhill to Lyleton and including the Lyleton shelterbelts and Poverty Plains has accounted for half of the 1987–1999 totals. In this main core, overall shrike populations increased from 118 pairs in 1987 to 150 in 1993, but have since declined to 73 pairs in 1999. In the remaining 17 townships immediately north and west of the Broomhill–Lyleton core, however, populations increased from 64 pairs in 1987 to 93 in 1993 and have since declined 88% to 11 pairs in 1999. Results from two roadside routes established in the core area during 1991 and replicated in 1993 and 1996 also revealed increasing populations until 1993, but a 47% decline from 57 pairs to 30 pairs between 1993 and 1996 (De Smet, unpubl.). The roadside count survey data presented in this Progress Note are consistent with these additional survey data, suggesting a declining Manitoba population.

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References

- Alberta Environmental Protection. 1996.** The status of Alberta wildlife. Publication No. I/620. Edmonton. 44 pp.
- Anderson, D.R.; Link, W.A.; Johnson, D.H.; Burnham, K.P. 2001.** Suggestions for presenting the results of data analyses. *J. Wildl. Manage.* 65:373–378.
- Bjorge, R.R.; Kiliaan, H.P.L. 1997.** Densities of Loggerhead Shrikes on study blocks in southeastern Alberta inventoried in both 1993 and 1996. *Blue Jay* 55:217–219.
- Bjorge, R.R.; Prescott, D.R.C. 1996.** Population estimate and habitat associations of the Loggerhead Shrike, *Lanius ludovicianus*, in southeastern Alberta. *Can. Field-Nat.* 110:445–449.
- Cadman, M.D. 1985.** Status report on the Loggerhead Shrike (*Lanius ludovicianus*) in Canada. Report prepared for the Committee on the Status of Endangered Species in Canada (COSEWIC). 97 pp.
- Collister, D.M. 1994a.** Historical distribution and abundance of the Loggerhead Shrike, *Lanius ludovicianus excubitorides*, in Alberta. Report prepared for Alberta Environmental Protection. 10 pp. plus figures.

Collister, D.M. 1994b. Breeding ecology and habitat preservation of the Loggerhead Shrike (*Lanius ludovicianus excubitorides*) in southeastern Alberta. Master's Degree Project, Faculty of Environmental Design, University of Calgary, Calgary. 161 pp. plus appendices.

Collister, D.M. 1996. Population survey of Loggerhead Shrike, *Lanius ludovicianus excubitorides*, nesting pairs, Bassano Subdivision — Atlee to Cavendish. Report prepared for Alberta Environmental Protection. 9 pp.

Collister, D.M.; De Smet, K.D. 1997. Breeding and natal dispersal in the Loggerhead Shrike. *J. Field Ornithol.* 68:273–282.

COSEWIC. 1999. Canadian species at risk, April 1999. Committee on the Status of Endangered Wildlife in Canada. 22 pp.

Dale, B.C.; Taylor, P.S.; Goossen, J.P. 1999. Avifauna component report — CFB Suffield NWA — wildlife inventory. Canadian Wildlife Service, Edmonton. 161 pp. including appendices.

De Smet, K.D. 1992. Manitoba's threatened and endangered grassland birds: 1991 update and 5 year summary. Manuscript Report No. 92-03. Manitoba Department of Natural Resources. 49 pp.

De Smet, K.D.; Conrad, M.P. 1989. Status and habitat needs of the Loggerhead Shrike in Manitoba. Pages 243–245 in *Proceedings of the 2nd Endangered Species and Prairie Conservation Workshop*. Provincial Museum of Alberta Occasional Paper No. 15.

Dillon Consulting Limited. 1998. CFB Suffield natural resources inventory. Report prepared for the Department of National Defence.

Johns, B.; Telfer, E.; Cadman, M.; Bird, D.; Bjorge, R.; De Smet, K.; Harris, W.; Hjertaas, D.; Laporte, P.; Pittiway, R. 1994. National recovery plan for the Loggerhead Shrike. Prepared for The Recovery of Nationally Endangered Wildlife Committee. 32 pp.

Smith, A. 1996. Atlas of Saskatchewan birds. Special Publication No. 22. Saskatchewan Natural History Society, Regina. 456 pp. plus overlays.

Telfer, E.S.; Adam, C.; De Smet, K.; Wershler, R. 1989. Status and distribution of the Loggerhead Shrike in western Canada. Canadian Wildlife Service Progress Notes No. 184.

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