

COSEWIC
Assessment and Update Status Report

on the

Prairie Skink
Eumeces septentrionalis

in Canada



ENDANGERED
2004

COSEWIC
COMMITTEE ON THE STATUS OF
ENDANGERED WILDLIFE
IN CANADA



COSEPAC
COMITÉ SUR LA SITUATION
DES ESPÈCES EN PÉRIL
AU CANADA

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2. Formerly designated by COSEWIC as northern prairie skink *Eumeces septentrionalis septentrionalis*.

For additional copies contact:

COSEWIC Secretariat
c/o Canadian Wildlife Service
Environment Canada
Ottawa, ON
K1A 0H3

Tel.: (819) 997-4991 / (819) 953-3215
Fax: (819) 994-3684
E-mail: COSEWIC/COSEPAC@ec.gc.ca
<http://www.cosewic.gc.ca>

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COSEWIC Assessment Summary

Assessment Summary – May 2004

Common name

Prairie skink

Scientific name

Eumeces septentrionalis

Status

Endangered

Reason for designation

This lizard is confined to a small region (less than 1700 km²) in Manitoba. It requires sandy soils and mixed grass prairie. Prairie habitat is being fragmented and lost to cultivation, Aspen succession and invasion by exotic leafy spurge. The Manitoba population is isolated from the rest of the species in the USA by over 100 km.

Occurrence

Manitoba

Status history

Designated Special Concern in April 1989. Status re-examined and designated as Endangered in May 2004. Last assessment based on an update status report.



COSEWIC
Executive Summary

Prairie Skink
Eumeces septentrionalis

Species information

The Prairie Skink (Scincidae: *Eumeces septentrionalis*) is a terrestrial lizard ranging from 25 mm (on hatching) to 85 mm snout-vent length (SVL) (maximum adult size). Prairie Skinks are brown with 4 pale longitudinal stripes. Juveniles are distinguished from adults by a bright blue tail. Adult males are distinguished from females by reddish orange on the head and throat during the breeding season.

Distribution

The Prairie Skink is limited to central Canada and the United States. Only the Northern Prairie Skink subspecies (*E. s. septentrionalis*) occurs in Canada, and it is limited to a small area (less than 1770 km²) of sandy soils in southwestern Manitoba. The nearest US population is more than 150 km to the south in northwestern Minnesota.

Habitat

The Prairie Skink is associated with mixed grass prairies. In Canada, it is limited to the Stockton Loamy Sand and Miniota Sands of the Carberry Hills of the Assiniboine Delta and a small disjunct population occurs on the Souris Sands of the Lauder Sandhills. The habitat in the Carberry Sandhills is naturally fragmented into three major units because of the Assiniboine River and the presence of other soil types not occupied by skinks. Sandy soils are required for nesting and overwintering habitat and summer burrows.

Biology

Females breed after their second or third winter and lay 4-18 eggs. Individuals breed annually but reproduction is significantly reduced in drought years. Eggs may be laid in communal nests with up to three nests under a single piece of cover. Eggs may also be laid underground away from cover objects. Females remain with the nest and reduce egg mortality by maintaining soil moisture. Prairie Skinks feed on insects and other small invertebrates. Movements are very limited and maximum length of a skink's home range rarely exceeds 100 m. More than 7 months of the year are spent in hibernation.

Population sizes and trends

Although the number and size of populations are unknown, it is clear that suitable habitat is limiting and habitat loss is well-documented, extensive and ongoing. Thus it is very likely that populations have declined since the original report to COSEWIC in 1989. The remaining populations are severely fragmented by the patchy distribution of a suitable combination of sandy soils and mixed grass prairie. These suitable habitat patches are being destroyed by cultivation, invasion by a weedy exotic, Leafy Spurge (*Euphorbia esula*) and by succession to aspen forest so local populations are disappearing.

Limiting factors and threats

Prairie Skinks are limited to mixed grass prairie on sandy soils. This habitat is being lost to cultivation, urbanization, road construction and by fire suppression which leads to succession and invasion of Leafy Spurge and Aspen Parkland. Although much of the Prairie Skink's habitat is publicly owned, this has not prevented succession or invasion by Leafy Spurge because most public lands are under fire suppression. The remaining mixed grass prairie habitat on the appropriate soil types is becoming increasingly fragmented as this habitat is being altered. In winters with little snow cover, frost may penetrate down to hibernacula and kill skinks.

Special significance of the species

The Prairie Skink is the only lizard species in Manitoba and one of only six native lizard species in Canada. It is disjunct from US populations and is likely to be genetically distinct from them.

Existing protection or other status designations

The Prairie Skink has the following natural heritage ranks: globally – G5; US – N5; Canada – N2; Manitoba – S2. It is not listed under the Manitoba Endangered Species Act, because it is not designated Threatened or Endangered. The skink and its habitat can be protected under the provincial Wildlife Act, which regulates human use of wildlife.



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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The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

**Update
COSEWIC Status Report**

on the

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Eumeces septentrionalis

in Canada

2004

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SPECIES INFORMATION

Name and classification

The Prairie Skink (*Eumeces septentrionalis*, Baird 1858) consists of 3 subspecies (Crother *et al.* 2000), one of which, the Northern Prairie Skink (*Eumeces s. septentrionalis*, Baird 1858), occurs in Canada. The other two subspecies are the Southern Prairie Skink (*E. s. obtusirostris*, Bocourt 1879) and the Pallid Skink (*E. s. pallidus*, Smith and Slater 1849). The Pallid Skink is not commonly recognized; however, it has not been explicitly addressed as either a synonym of the Northern or Southern Prairie Skink (Crother *et al.* 2000). Some authors consider the Northern and Southern Prairie Skinks to be distinct species (Collins and Taggart 2002). An examination of the genetics of the Prairie Skink is currently underway and includes samples from Manitoba (G. Fuerst, pers. comm., 2003).

Description

The Prairie Skink is a small, slender lizard, growing to approximately 85 mm snout-vent length SVL (Figure 1). Most adults are less than 80 mm SVL. The tail can be approximately the same length as the body. The Prairie Skink is brown with 4 light stripes running the length of the body and onto the tail. Males have reddish orange on the head and throat during the breeding season. Juveniles have bright blue tails.



Figure 1. Picture of Prairie Skink. Photo by Errol Bredin.

DISTRIBUTION

Global range

The Prairie Skink occurs in a narrow band running from southern Manitoba south to coastal Texas (Figure 2). The Northern Prairie Skink is found in southern Manitoba south to extreme northeastern Oklahoma. Isolated populations occur in Wisconsin and Illinois.

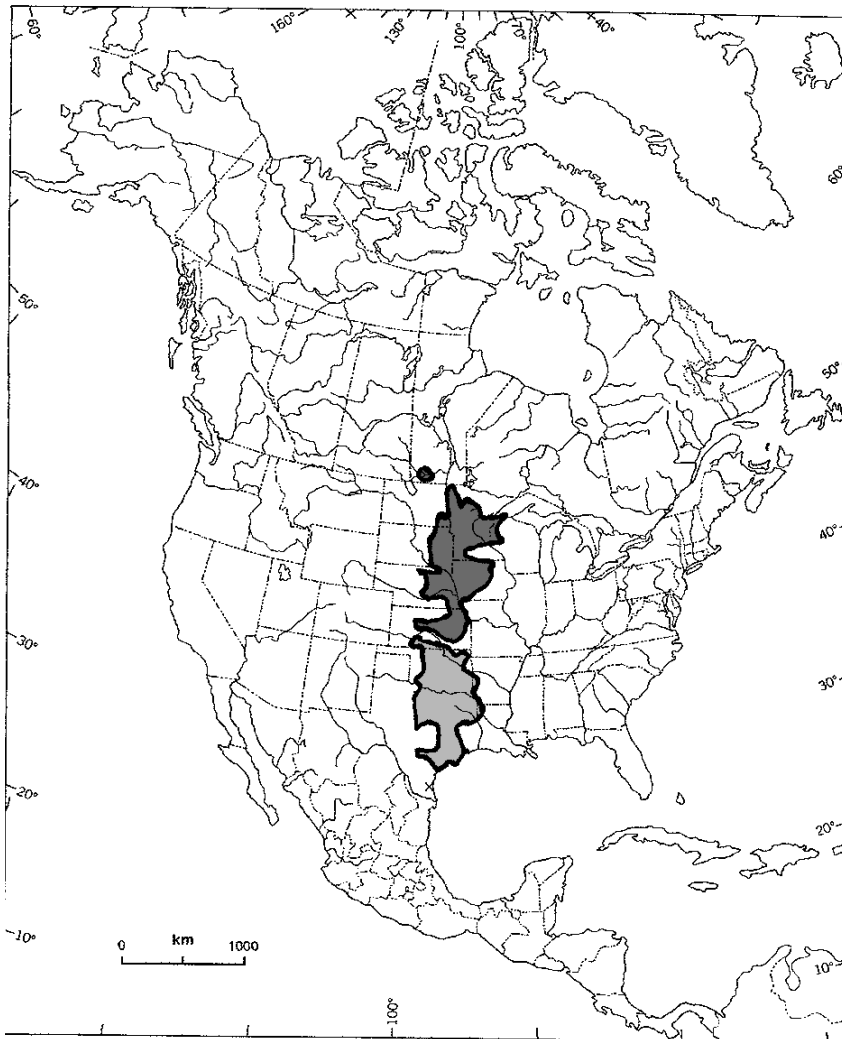


Figure 2. North American distribution of Prairie Skink.

Canadian range

In Canada, the Prairie Skink is limited to a small area of southwestern Manitoba disjunct from the US range (Cook 1964, Figure 3). The nearest US population is in northwestern Minnesota (Conant and Collins 1998), over 150 km from the Canadian populations. Within Manitoba, Prairie Skinks occur in two discrete areas. The majority of reports are within the sandy soils of the Upper Assiniboine Delta region (Carberry Sandhills). Most reports in this area are within 25 km of the town of Carberry (Figure 4).

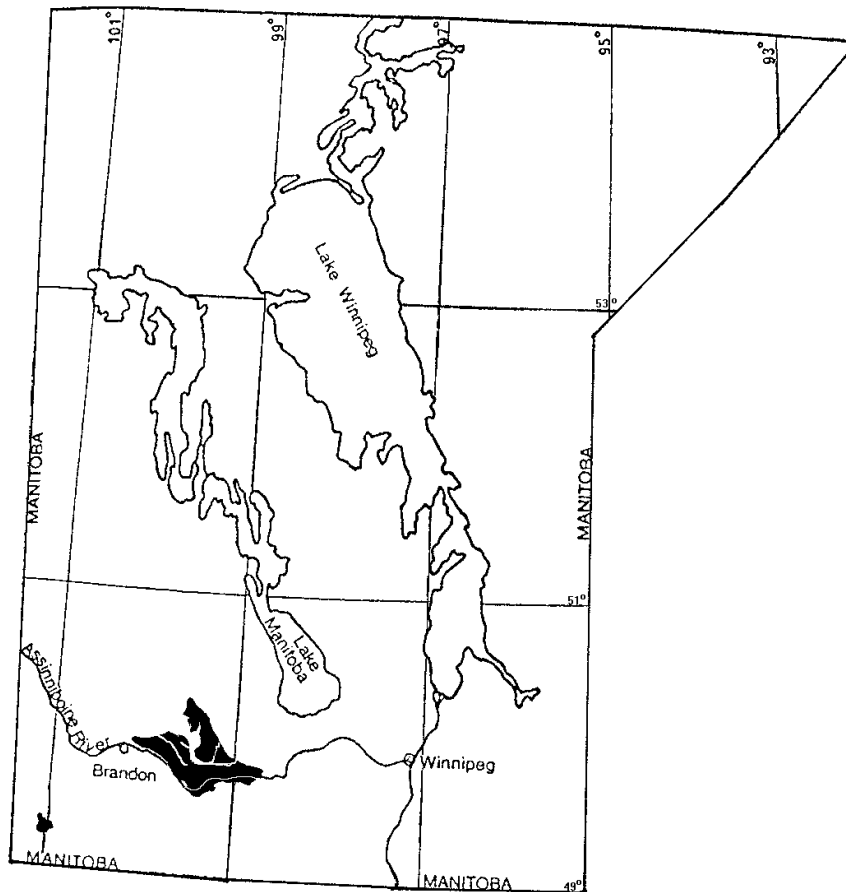


Figure 3. Canadian distribution of Prairie Skink.

The northern limit of the range is approximately 6 km SW of Neepawa. The southern limit of the main population is 3.5 km NE of Glenboro, south of the Assiniboine River. The entire north-south range spans less than 70 km.

The eastern limit is roughly 12 km north of Treherne. The western limit of the main population is 6 km south of the Canadian Forces Base Shilo, along the sandy banks of the Assiniboine River. The east-west span of the main population is less than 75 km.

Within this region, Prairie Skinks are limited to areas of Stockton Loamy Sands (1400 km²) and Minota Sands (370 km²) (see technical summary, Bredin 1993). The total area of the main population (including areas not inhabited by skinks) is less than 1770 km² (Figure 3, 4).

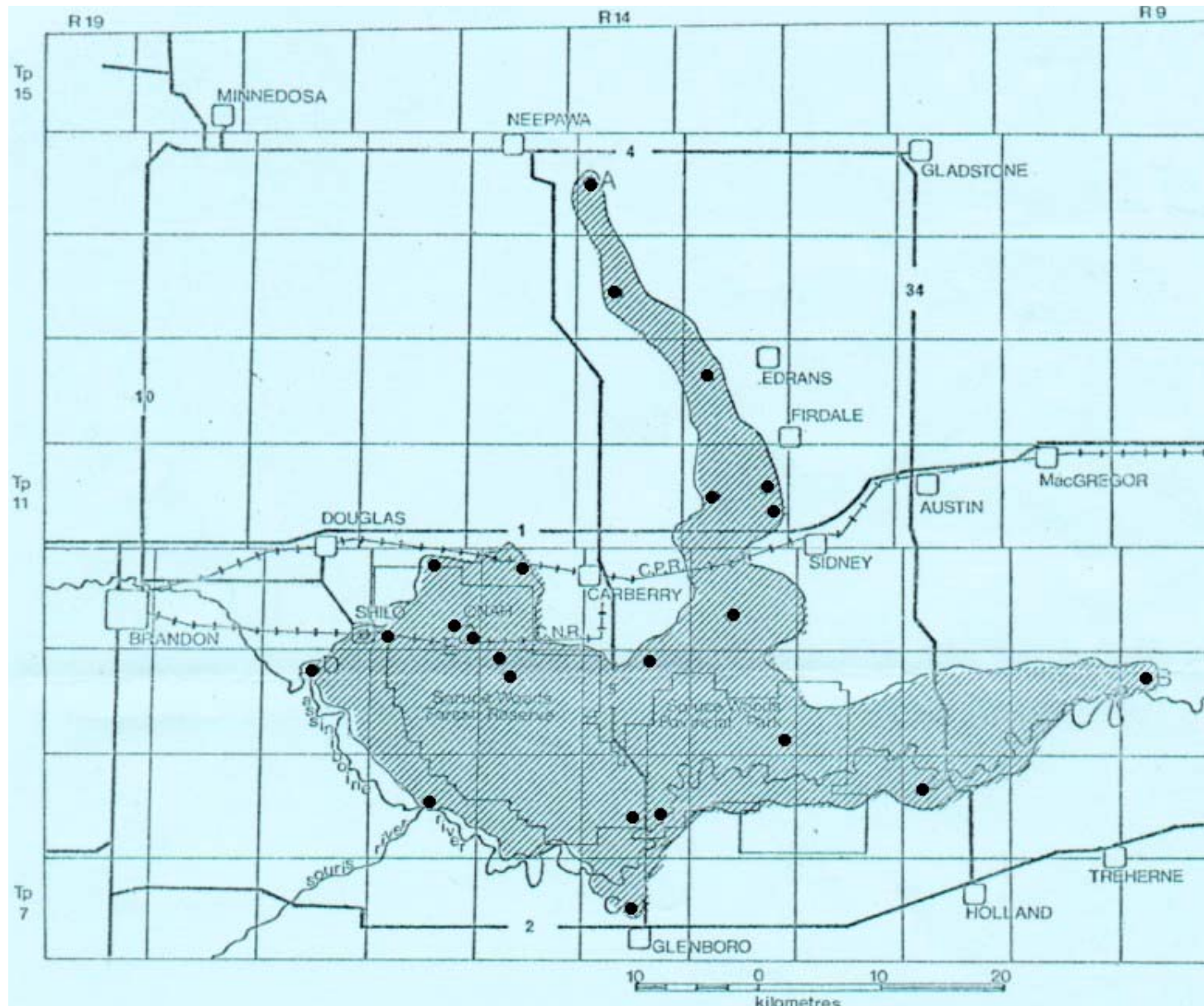


Figure 4. Prairie Skink range in Manitoba. Hatched area is the extent of the suitable habitat for skinks. Dots are where Prairie Skinks have been found.

Within the Carberry Sandhills Prairie Skink populations are naturally fragmented because of the distribution of the appropriate soil types. There are 3 main units of appropriate soil types:

- 1) an area south of the Assiniboine River.
- 2) an east-west unit running south of Carberry and north of the Assiniboine River. The Douglas Marsh extends more than 15 km into the east-west unit, separating northern and southern populations of skinks in this area.
- 3) a north-south section north of Carberry consisting of patches of various sizes. A number of these patches are separated by a 20 km long band of clay loam (Wellwood Association) running north of Carberry.

There are also a number of small units of conducive soil, particularly east of Carberry, that are isolated or nearly isolated from other patches of Stockton Loamy Sand and Miniota Sand.

There is also a small disjunct population, in the Lauder Sandhills, west of the village of Hartney and approximately 90 km southwest of the Carberry Sandhills. This population is at the western and southern limit of the species in Canada. Surveys in 2001 and 2002 suggest this population is limited to one small area (< 1 ha) (E. Bredin, unpubl. data).

HABITAT

Habitat requirements

The Prairie Skink is associated with mixed grass prairies and savannas (Breckenridge 1943, Somma and Cochran 1989). In Canada, it is only found in areas with sandy soils. Sandy soils likely allow skinks to burrow beneath the frost line and may also allow easier nesting for females. A preliminary habitat association analysis indicates that Prairie Skinks in Manitoba are associated with shrub and grass communities but avoid deciduous and coniferous forests (J. Scott, pers. comm., 2003).

With one exception, all observations of Prairie Skinks in Manitoba are on occurrences of Stockton Loamy Sand and Miniota Sands of the Assiniboine Delta (Bredin 1989). Stockton Loamy Sands cover an area of approximately 140 000 ha in southern Manitoba, while the Miniota Sands occupy roughly 3700 ha. Within these areas, skinks appear to be more numerous on south- and west-facing slopes (Bredin 1989). The one known population outside the Assiniboine Delta is in the Lauder Sandhills approximately 90 km to the southwest. The Souris Sands of the Lauder Sandhills cover over 60 000 ha but skinks appear to be limited to about 1 ha of this (Bredin 1989). The Lauder Sandhills population is disjunct from the other populations, separated by an area of heavier soils.

Female Prairie Skinks nest under cover objects or in subterranean burrows (Nelson 1963). Artificial cover objects are more commonly used than natural objects.

Typical artificial nesting sites are under sheets of tin, old boards, plywood, shingles, or even discarded carpets (Bredin 1989, Somma 1990). Natural nesting sites are under flat rocks (Somma 1990) although the habitat in Manitoba is generally rock free (Bredin 1989). Skinks will also nest under fallen trees, generally White Spruce (*Picea glauca*), and clumps of Little Bluestem (*Schizachyrium scoparium*) grasses (Bredin in press).

Prairie Skinks hibernate in gravel deposits in Minnesota and Iowa (Scott and Sheldahl 1937, Breckenridge 1943) and skinks hibernate at depths exceeding 1 m (Scott and Sheldahl 1937). Under experimental conditions, skinks successfully overwintered in enclosures when they buried themselves 0.3 m below ground (Breckenridge 1943). An aggregation of 52 Prairie Skinks found at one hibernation site in Iowa (Scott and Sheldahl 1937) suggests communal hibernation may be common. However, Prairie Skinks in Minnesota were found to overwinter individually (Nelson 1963). There are no data on hibernation habitats in Canada.

Trends

The limits of the Prairie Skink's range in Manitoba likely have not changed over the last couple of decades. Given the extensive surveys undertaken by Errol Bredin over the last few decades, it is unlikely that the range of the species will be extended by further investigation because skinks require mixed grass prairie on sandy soils and this habitat is limited in its distribution in Manitoba. Within the Carberry Sandhills, as in the rest of North America (Samson and Knopf, 1994), the amount of mixed grass prairie habitat has declined throughout the 20th century as a result of numerous factors, including cultivation, urbanization, road construction, fire suppression resulting in the succession of prairie to Aspen Parkland, and the invasion of the exotic Leafy Spurge.

Potato farming has greatly increased in the Carberry area. In 1961 only 1320 ha were planted in potatoes, but by 2000 this had increased to 7287 ha (Town of Carberry 2003). Potato fields now border CFB Shilo and may have resulted in the loss of skink habitat. In a study of mixed grass prairie conducted by the province of Manitoba at 83 sites, it was found that 5004 ha of mixed grass prairie were lost to the plow from 1995-1998 and an additional 1125 ha of mixed grass prairie was slated for cultivation and cultivation was identified as the major threat to mixed grass prairie (Mansell and Moore 1999). Effects on Prairie Skinks of pesticide/fungicide applications on potato crops are not known.

Mixed grass prairie is also being lost to succession to Aspen Parkland, partly as a result of fire suppression. On 1000 ha of crown land over 22% of the prairie was lost to aspen encroachment from 1946-1994 (Mansell and Moore 1999). It is estimated that Aspen Parkland is increasing by approximately 7% per year even on grazed pasture lands (G. Oliver, pers. comm., 2003). To date, skinks are now absent from a minimum of four areas because of succession (E. Bredin, unpubl. data 2003). Succession to aspen parkland is occurring primarily on unused portions of Canadian Forces Base Shilo and throughout Spruce Woods Provincial Park (Bredin 1993; J. Scott, pers. comm., 2003). There are burn restrictions on crown land surrounding Spruce Woods

Provincial Park, and even though some burns have occurred within the park to maintain major prairie sites, there has still been a significant loss of mixed grass prairie over the last few decades (G. Oliver, pers. comm., 2003). Succession is not occurring on active portions of the range at CFB Shilo largely due to grass fires set accidentally as a result of military exercises. Range Control at CFB Shilo are currently doing a number of controlled burns in a limited number of areas (Bredin 1999).

Habitat is also being reduced as a result of the exotic and invasive Leafy Spurge (*Euphorbia esula*). Leafy Spurge displaces many other plant species and apparently renders the microhabitat unsuitable for Prairie Skinks because the skinks are not found where spurge has taken over (Bredin, 1988). It has been conservatively estimated that there are over 130 000 ha of land with Leafy Spurge in Manitoba affecting over 40 000 ha of public land mainly in the Assiniboine and Souris Rivers basins (Anonymous 2002). To date, a minimum of three sites no longer have skinks as a result of Leafy Spurge taking over the understory (Bredin, 1988).

Protection/ownership

Approximately 75% of the 1770 km² Carberry Sandhills is on publicly owned land of some kind (Bredin 1988, 1989). Skinks occur in Spruce Woods Forest Reserve (601 km²), Spruce Woods Provincial Park (249 km²), Canadian Forces Base Shilo (233 km²), provincial crown land or Wildlife Management Areas (168 km²), and community pastures (93 km²). They are not present in any national parks (J. Tuckwell, pers. comm., 2003). Skinks are also present on at least one of the parcels of land making up the Nature Conservancy of Canada's Yellow Quill Mixed Grass Prairie (842 ha) near CFB Shilo (G. Fortney, pers. comm., 2003). It is important to stress that skinks are not found in many parts of these areas. For example, less than 25% of Spruce Woods Provincial Park is now prairie habitat. Although these are "protected" areas, this does not mean that the habitat is maintained for skinks. As noted under habitat trends, very little of Spruce Woods Provincial Park or the surrounding land is allowed to burn and forest encroachment is a serious threat. In addition, aspen encroachment is occurring even on grazed pasture land. Remote sensing data indicates that forests now make up significant amounts of some of these areas. Mixed grass prairie now occupies less than 60% of CFB Shilo (S. Punak, pers. comm., 2003) and only approximately 25% of Spruce Woods Provincial Park.

All of the Lauder Sandhills (93 km²) is owned by the province and is designated a Wildlife Management Area. Although this is a large area, skinks appear limited to one small habitat patch (< 1 ha).

BIOLOGY

General

The Prairie Skink is a small, insectivorous lizard growing to approximately 85 mm SVL (Bredin 1988, 1989). Females may grow larger than males (Nelson 1963, Bredin

1989). Juveniles have bright blue tails. The bright blue coloration fades by the time most juveniles reach approximately 45 mm SVL after their first winter (Nelson 1963). Although Prairie Skinks are largely terrestrial, they have been observed to dive into water to avoid capture. They have not been observed to climb trees or shrubs (Nelson 1963), unlike the closely related Five-lined Skink. Skinks are able to thermoregulate while under cover and hence are rarely seen. They require loose soil to allow them to bury deep enough to avoid freezing during winter.

Reproduction

Breeding occurs in the spring. Males develop orange breeding colour on the chin at this time and are aggressive to other males. Females lay 4-18 eggs, with larger females laying more eggs than smaller females (Somma 1987b); however, the number of eggs laid by a particular female can vary markedly from one year to the next (Nelson 1963). During drought years, females laid an average of only 1.8 eggs (n=5) compared with an average of 8.4 eggs (n=8) in wetter years (Bredin 1988). Eggs are laid from late June to early July and they hatch approximately 30 days later (Nelson 1963, Bredin 1988).

Females will nest communally and up to 3 nests have been found under a single cover object in Manitoba (Bredin, personal observation) and in Iowa (Freese, pers. com., 2003). The eggs are laid under cover and females remain with the eggs until hatching. In the only population that has been tracked using radioactive tags, females constructed subterranean nests 3-9 cm below the surface of the sand despite the presence and the use of cover objects during other parts of the year (Nelson 1963). The nests were small oval cavities dug in open sandy areas with no cover objects. Hatching success in the lab is less than 40% (Somma and Fawcett 1989) although there are data on natural nests. Females generally remain with the hatchlings for a few days after they hatch (Somma 1987a). Hatchlings average approximately 25 mm SVL (Breckenridge 1943, Nelson 1963, Bredin 1989). Sexual maturity is reached at approximately 65 mm SVL and females breed for the first time after their second or third winter (Breckenridge 1943, Bredin 1989). Females typically breed annually and frequently return to the same general area to nest (Nelson 1963). Longevity of Prairie Skinks is unknown. Few marked skinks have been captured in more than two years although one skink first caught as an adult was re-captured 5 years later, suggesting a longevity of at least 7 years (Bredin 1999).

Survival

Little is known about the mortality of any size or age class of Prairie Skinks. Like most reptiles, Prairie Skinks are apt to be most vulnerable at the egg and hatchling/juvenile stages. Skinks, particularly juveniles, are fed upon by a variety of birds, mammals, snakes and even other Prairie Skinks (Breckenridge 1943). American Kestrels may be a significant predator as observations on a nesting pair revealed numerous skinks were fed to the young. Bredin (1989) observed an American Kestrel dive and carry off a skink. House cats have also been reported to kill skinks (Bredin 1989). Adult predation levels are probably low given the amount of time Prairie Skinks

spend under cover or underground; however 77% of adults either were missing their tails or had a regrown tail in Minnesota (Nelson 1963). This suggests that attempted predation may be common.

The fact that females brood their eggs may increase nesting success compared with other reptiles that abandon their eggs. Egg mortality is significantly reduced when the female remains with her eggs (Somma and Fawcett 1989). Egg mortality increases with very low or very high soil moisture contents. Hatchling size is positively correlated with soil moisture (Somma 1989). Larger hatchlings likely have a higher survival rate but there are no studies on juvenile survival or recruitment in this species. Overwinter mortality has not been assessed in this species, but it could be a significant source of mortality especially for hatchling skinks.

Physiology

Prairie Skinks emerge from hibernation in mid- to late April in Manitoba (Bredin 1988). Males generally emerge first and juveniles tend to emerge 3-4 weeks after adults (Nelson 1963). Prairie Skinks enter hibernation by mid-September and hibernate for over 7 months of the year. Hibernation sites are generally not within the summer home range, but up to 25 m from the summer home range. Skinks do not hibernate communally but sometimes return to the same site year after year. Prairie Skinks hibernate at depths up to 66 cm below the surface (Nelson 1963).

Through basking, Prairie Skinks can maintain a body temperature greater than the ambient air or substrate temperature (Nelson 1963). Preferred body temperatures appear to range from 22-35°C and the lethal thermal limit is 41-44°C (Nelson 1963). On a diurnal basis, skinks are often not active until late morning, with activity declining by mid-afternoon. Prairie Skinks spend the night under cover or buried 5-8 cm under the sand (Nelson 1963).

Movements/dispersal

Prairie Skinks make limited movements over the course of the active season and are frequently found under the same piece of cover within a year and even from one year to the next (Bredin, personal observation). Home ranges are typically small. Some Prairie Skinks remain in an area of only 30 m in diameter for up to 4 years while the maximum known home range length is approximately 100 m (Nelson 1963). Prairie Skinks may occasionally make larger movements. A single skink was observed along a railway line running through a Tamarack bog, over 1 km from the edge of the bog (Bredin 1989). There are no data on the dispersal of hatchlings; however, Five-lined Skink hatchlings have been observed to move over 100 m (Seburn 1993).

Nutrition and interspecific interactions

Prairie Skinks feed on a wide variety of invertebrates and it is unlikely that food is a limiting resource to this ectotherm. Adults eat mainly crickets, grasshoppers and spiders

in Minnesota (Breckenridge 1943). By frequency of occurrence, the diet consists of orthoptera (27%), arachnida (29.5%), and homopterans (mainly leaf hoppers), coleopterans and lepidopterans (mainly larvae; 28%). The diet of hatchlings is similar, consisting of spiders (46%), orthopterans (15%), dipterans (15%) and homopterans (13%) mainly in the 4-9 mm length (Nelson 1963). Ants, a common invertebrate, were only found in one adult's stomach (Breckenridge 1943) and in none of the hatchlings examined (Nelson 1963). Cannibalism can also occur and Breckenridge (1943) found one adult female had consumed a yearling skink. Captive feeding experiments suggest Manitoba skinks prefer spiders and crickets (Bredin 1989). Grasshoppers and meal worms were only consumed if captive skinks had gone without eating for several days. Beetles, caterpillars and a chopped meat mixture were all refused.

Behaviour/adaptability

Prairie Skinks appear to tolerate and possibly even benefit from many human modifications to the landscape. Skinks are often very numerous in areas with lots of debris such as old dumps (Bredin 1988). They also adapt to low density human modification and use woodpiles, debris, porches, etc. as cover and nest sites. However, they are vulnerable to predation by pets, especially cats. They are also common in some areas that are grazed by cattle. The largest threat to their habitat is through succession to Aspen Parkland as a result of humans suppressing fire or through the invasion of Leafy Spurge.

POPULATION SIZES AND TRENDS

An accurate survey of the present number and size of populations of Prairie Skinks in Canada is not available. For example, of the 21 "populations" described in the first COSEWIC report, over 60% of them have not been re-visited in over a decade (Table 1). Density estimates of 63-231 individuals per hectare have been made for old fields in Minnesota (Pitt 2001). Areas where Prairie Skinks are relatively easy to catch are habitat patches with abundant artificial cover. The number or density of skinks in such areas is likely artificially high. Skinks likely occur in areas without artificial cover, constructing burrows under clumps of vegetation or under woody debris, but they are almost impossible to census in such areas. Skink density also appears to be higher on south facing ridges and slopes.

Within the Lauder Sandhills, it was estimated that only approximately 2500 ha of the 60 000 ha area was potential skink habitat (Bredin 1989). The amount of suitable habitat is difficult to quantify because the habitat occurs in small patches not readily detected by remote sensing (J. Duncan pers. comm., May 2004). Skinks were only discovered on <1 ha in the Lauder Sandhills in 1985 and at that time it was presumed they were more widespread in the area. However, subsequent surveys by Errol Bredin and Ken De Smet of the Manitoba Conservation Data Centre in 2001 and 2002 confirmed that skinks were present only in the original area surveyed in 1985. The placement of cover objects in many other locations within the Lauder Sandhills failed to

locate any additional sites with skinks. It is therefore highly probable that skinks are limited to the one site (<1 ha). It is uncertain if skinks were ever more widespread throughout the Lauder Sandhills. In any case, this population is at risk of extinction because of isolation.

Table 1. Historic records of Prairie Skinks.		
ID #	Location	Most Recent Observation
1	N side of Assiniboine R, W of PR 242	1988 ¹
2	NE of #19	1988 ¹
3	Mouth of Cypress R	1988 ¹
4	Approx 4 km E of Steel Ferry Overlook	2002 ²
5	12 km SW of Carberry	1999 ¹
6	10 km NW of Sydney	1988 ¹
7	4 km W, 5 km N of Sydney	1988 ¹
8	3.5 km W, 3.2 km N of Sydney	1988 ¹
9	2.4 km S, 3.2 km W of Edrans on PR 352	1988 ¹
10	Local Dump about 5 km E of Wellwood	2002 ²
11	3.5 km NE of Glenboro	1988 ¹
12	Bald Hills area	1995 ¹
13	Spruce Woods Provincial Park E. of Hwy #5	2003 ³
14	Spruce Woods Provincial Park E. of Hwy #5	2003 ³
15	Spruce Woods Provincial Park E. of Hwy #5	2003 ³
16	Spruce Woods Provincial Park E. of Hwy #5	2003 ³
17	Spruce Woods Provincial Park E. of Hwy #5	2003 ³
18	Spruce Woods Provincial Park E. of Hwy #5	2003 ³
19	Approx. 6 km N of Epinette Creek on Hwy #5	2002 ²
20	Approx. 6 km N of Epinette Creek on Hwy #5	2002 ²
21	11 km SW of Carberry	1999 ¹
22	10 km S, 7 km E of Neepawa	1988 ¹
23	6 km SW of Neepawa	1988 ¹
24	Shilo Military Base	2001 ²
25	Approx. 7 km W of Carberry	2002 ²
26	Approx. 7 km W of Carberry	2002 ²
27	9 km W of Carberry	2003 ¹
28	7.2 km W of Carberry	2000 ¹
29	E of junction of Souris & Assiniboine R	1988 ¹
30	Onah Station	2001 ¹
31	CFB Shilo dump	1988 ¹
32	Camp Hughes	1988 ¹
33	6 km S of CFB Shilo	2001 ¹
34	Lauder Sandhills	2002 ¹

1. Bredin, E., pers. com.

2. Fuerst, G., pers. com.

3. Scott, J., pers. com.

It is unclear how well connected populations are in the Carberry Sandhills. Long term monitoring of various sites suggests that either populations have continued to persist over the last 20 years or that re-colonizations occur quickly. The latter seems less likely given the species' limited dispersal ability. Egg production appears to be dramatically reduced in very dry years (Bredin 1988), although it is unclear what effect this has on demography. Presumably a number of exceptionally dry years in a row would reduce population levels and it is possible that a lengthy drought could eliminate populations.

Prairie Skinks are not territorial and males are only aggressive to other males during the breeding season. Skinks are frequently caught repeatedly under the same cover object over time and typical home range is likely only a few square meters, although individuals may make some home range shifts over the course of the season. Given the general secretiveness of skinks they are usually not directly persecuted by humans.

LIMITING FACTORS AND THREATS

Prairie Skinks are at their northern limit in southern Manitoba. Within this area, they are limited by the presence of mixed grass prairie on sandy soils. In winters with poor snow cover, skinks may be killed in their hibernacula when freezing temperatures penetrate more deeply. This winter kill can be a limiting factor (Bredin, 1989). Prairie Skinks are limited to a small area of southwestern Manitoba and mixed grass prairie in this area is decreasing and becoming increasingly fragmented. Habitat loss is resulting from succession to Aspen Parkland, invasion by the exotic Leafy Spurge, cultivation, tree planting programs, and home and road construction.

Fire suppression is encouraging the succession of mixed grass prairie towards Aspen Parkland. With over 20% of prairie lost to forest succession at one site over the last half century (Mansell and Moore 1999) habitat loss is a significant threat to Prairie Skinks (Figure 5). Fire suppression may also reduce habitat quality by increasing the layer of thatch – dead plant material. Such accumulation may insulate the ground and reduce the potential active season. Although this hypothesis has not been tested, Prairie Skinks are more abundant on old fields that are burned regularly (Pitt 2001). Grazing by cattle is not adequate to prevent this succession, for even in grazed pastures, the amount of land covered by aspen increases on average 7% per year in Manitoba (G. Oliver, pers. comm., 2003). There are fire restrictions on the land surrounding Spruce Woods Provincial Park. Within the park, controlled burns have occurred to maintain major prairie sites but the park is not attempting to reclaim prairie lost to forest encroachment over the last few decades (G. Oliver, pers. comm., 2003).

Tree planting programs have also reduced skink habitat by increasing forest cover and destroying prairie soils. For example, in 1994, the Manitoba Agro Woodlot Program plowed almost 3 ha of mixed grass prairie supporting a population of Prairie Skinks in Spruce Woods Provincial Forest. Then over 200 Boy Scouts and Girl Guides planted 14 000 Scots Pines (*Pinus sylvestris*). From the mid-1980s to mid-1990s, Scouts and



Figure 5. Photo illustrating isolation of mixed grass prairie areas as a result of forest succession. Photo by Errol Bredin.

Guides planted approximately 80 000 Scots Pine trees in this area, thereby eliminating considerable areas of the rare mixed grass prairie required by Prairie Skinks.

Leafy Spurge (*Euphorbia esula*) is an herbaceous, deep-rooted perennial of the Spurge (Euphorbiaceae Family). It can reproduce vegetatively or by seed. It was first observed in North America in 1827 in Massachusetts (Britton 1921). Leafy Spurge was first noted in Manitoba in 1900 (Bird 1961). Bird (1961) wrote, Leafy Spurge “is now widely established. This is particularly well demonstrated in the Spruce Woods Forest Reserve, where many hundreds of patches now occur. On a special survey of the Shilo area alone, by the Manitoba Weeds Commission in 1950, 1435 patches were counted.” The US Department of Agriculture has a Leafy Spurge team dedicating to controlling and eradicating this species (Team Leafy Spurge website, www.team.ars.usda.gov/). They estimate that there are approximately five million acres of land in Canada and the US with Leafy Spurge and that the amount of acreage has doubled every 10 years since the early 1900s.

The vast majority of prime skink habitat throughout the Carberry Sandhills is threatened by colonization of Leafy Spurge. In dense patches of Leafy Spurge, there is an average of 96 stems/m² (Bredin 1988). South-facing slopes have often become completely covered in Leafy Spurge in areas of the Carberry Sandhills. Such locations are preferred Prairie Skink habitat, yet in three areas, with the colonization of Leafy Spurge, the south-facing slopes were abandoned by the skinks (Bredin 1988). Leafy

Spurge also negatively affects other species. In areas of high Leafy Spurge infestation, there are fewer nests of ground-nesting birds (Scheiman et al. 2003). To date grazing by goats has proven to be an effective control (G. Oliver, pers. com., 2003). Controlled burns are not effective, because rootstocks can extend more than 3 m below ground and survive a grass fire. Manitoba Agriculture and Food is distributing flea beetles to farmers to control Leafy Spurge, but it can take up to 10 years for a large population of beetles to build up and become an effective control (J. Thornton, pers. comm., 2003). Indeed, there is evidence of dramatic reduction in Leafy Spurge where flea beetles were released in Spruce Woods Provincial Park several years ago in a control program operated by Manitoba Parks and Natural Areas Branch (W. Watkins, pers. comm. 2003).

Cultivation of mixed grass prairie is a major threat to the Prairie Skink. Over 5000 ha of mixed grass prairie was lost from 1995-1998 as a result of cultivation (Mansell and Moore 1999). In the Carberry area alone approximately 7000 ha of land has been lost to potato farming from 1961-2000 (Town of Carberry 2003).

Combined, these losses of habitats are increasing the fragmentation of the naturally fragmented distribution of the Prairie Skink. Populations are cut off from one another by rivers, streams and large wetlands. The expansion of aspen Parkland surrounds pockets of prairie occupied by skinks (e. g. Figure 5), and these areas shrink every year such that many of these “islands” will be lost within a decade or less (Bredin pers. obs.). This separation and shrinkage of habitat is particularly important in a species with low population densities, limited ability to disperse and at its extreme northern limit.

SPECIAL SIGNIFICANCE OF THE SPECIES

The Prairie Skink is the only lizard that occurs in Manitoba and therefore is a unique member of the fauna of this province. It is also the only Canadian reptile unique to Manitoba. The skink's complete association with the mixed grass prairie sandhill ecosystems of southwestern Manitoba makes it an indicator of this rare landform. The disjunct Prairie Skink populations of Manitoba probably became isolated from the continuous range of the species to the south some time after the end of the Hypsithermal approximately 4000 years ago. Canadian populations may be genetically distinct from populations to the south. Genetic studies are currently underway (G. Fuerst, pers. comm., 2003).

EXISTING PROTECTION OR OTHER STATUS

Globally, the Prairie Skink does not have any ranking according to the IUCN Red Book. The Global Heritage Status Rank for the Prairie Skink is G5, indicating that the species is widespread and abundant (NatureServe Explorer 2002). The National Heritage Status Rank is N5 for the US and N2 for Canada. COSEWIC status was

Special Concern in 1989 (Bredin 1989). Within Manitoba, the Prairie Skink is ranked S2, very rare. It is not listed under the Manitoba Endangered Species Act, but this legislation only covers species designated Threatened or Endangered. The Manitoba Endangered Species Advisory Committee recommended the Prairie Skink be noted as "Vulnerable" several years ago (J. Duncan, pers. comm. 2003). This skink is covered by the provincial Wildlife Act, which regulates human use of wildlife. Activities involving Prairie Skinks (from research to collecting) are prohibited without a permit. The species occurs on federal lands in the Department of Natural Defence, CFB Shilo. Across the range, it is ranked S1 in Louisiana, S2/S3 in North Dakota, S3 in Iowa, S4 in Kansas, Oklahoma, and Wisconsin, S5 in Nebraska, South Dakota and Texas, and S? in Arkansas, Minnesota and Missouri (NatureServe Explorer 2002).

SUMMARY OF STATUS REPORT

The Prairie Skink is a small insectivorous lizard. Canadian populations are disjunct from US populations and are limited to two small areas (<1770 km²) in southwestern Manitoba. The main area is the Carberry Sandhills, with most observations within 25 km of Carberry. A small disjunct population (<1 km) is also known from the Lauder Sandhills, approximately 90 km southwest of the Carberry Sandhills.

The Prairie Skink is dependent upon sandy soils of mixed grass prairie areas in Manitoba. This habitat is under significant threat from cultivation. Mixed grass prairie is also being lost to succession to Aspen Parkland largely as a result of fire suppression. In addition, the invasive exotic Leafy Spurge is taking over many mixed grass prairie habitats. Areas with high concentration of Leafy Spurge apparently are no longer habitable by Prairie Skinks. The loss of mixed grass prairie is eliminating and fragmenting skink habitat. This is particularly important in a species with low population densities, limited dispersal abilities and at its extreme northern limit.

Accurate information on the number or size of populations is not available. This is due in part to the secretive nature of this species and the lack of recent surveys across the Canadian range. Significant, and likely rapid, declines have certainly occurred recently due to habitat loss, but the size of the decline cannot be precisely quantified.

TECHNICAL SUMMARY

Eumeces septentrionalis

Prairie Skink

Scinque des Prairies

Range of Occurrence in Canada: Limited to SW Manitoba

Extent and Area Information	
• <i>Extent of occurrence (EO)(km²)</i> (estimated from map Figure 4)	1,770 km ²
• <i>Specify trend in EO</i>	Declining
• <i>Are there extreme fluctuations in EO?</i>	No
• <i>Area of occupancy (AO) (km²)</i> (estimated from Figure 4, and amounts of potential habitat)	<<400 km ²
• <i>Specify trend in AO</i>	Declining
• <i>Are there extreme fluctuations in AO?</i>	No
• <i>Number of known or inferred current locations</i> (each location is a major region of appropriate soil types)	~ 6
• <i>Specify trend in #</i>	Declining
• <i>Are there extreme fluctuations in number of locations?</i>	No
• <i>Specify trend in area, extent or quality of habitat</i>	Declining
Population Information	
• <i>Generation time (average age of parents in the population)</i>	4-5 years
• <i>Number of mature individuals</i>	Unknown
• <i>Total population trend:</i>	Declining
• <i>% decline over the last/next 10 years or 3 generations.</i>	Unknown
• <i>Are there extreme fluctuations in number of mature individuals?</i>	No
• <i>Is the total population severely fragmented?</i> (most individuals found within small and relatively isolated (geographically or otherwise) populations between which there is little exchange, i.e., ≤ 1 successful migrant/year)	Yes
• <i>Specify trend in number of populations</i>	Declining
• <i>Are there extreme fluctuations in number of populations?</i>	No
• <i>List populations with number of mature individuals in each:</i>	Not available
Threats (actual or imminent threats to populations or habitats)	
1. Habitat loss is a major threat as a result of the following: <ul style="list-style-type: none"> • Cultivation of mixed grass prairie • Succession of prairie to Aspen Parkland as a result of fire suppression • Invasion of mixed grass prairie by exotic Leafy Spurge • Planting of exotic Scots Pine in mixed grass prairie 2. Possible loss of genetic variation because of small population size, fragmentation of area and isolating of Manitoba population from rest of the species.	
Rescue Effect (immigration from an outside source)	
• <i>Status of outside population(s)?</i> USA: [other jurisdictions or agencies]	Variable
• <i>Is immigration known or possible?</i>	No
• <i>Would immigrants be adapted to survive in Canada?</i>	Not applicable
• <i>Is there sufficient habitat for immigrants in Canada?</i>	No
• <i>Is rescue from outside populations likely?</i>	No
Quantitative Analysis [provide details on calculation, source(s) of data, models, etc]	Not applicable

<p>Other Status COSEWIC: Special Concern 1989 Manitoba: S2</p>

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: B1 a b (i, ii, iii, iv, v) + 2 a b (I, ii, iii, iv, v)
<p>Reasons for Designation: This lizard is confined to a small region (less than 1700 km²) in Manitoba. It requires sandy soils and mixed grass prairie. Prairie habitat is being fragmented and lost to cultivation, Aspen succession and invasion by exotic leafy spurge. The Manitoba population is isolated from the rest of the species in the USA by over 100 km.</p>	
<p>Applicability of Criteria</p>	
<p>Criterion A (Declining Total Population): not applicable because the rate of decline is unknown. Criterion B (Small Distribution, and Decline or Fluctuation): Qualifies as Endangered B1, 2 a (severely fragmented) b (i, ii, iii, iv, v). Criterion C (Small Total Population Size and Decline): not applicable because number of mature individuals unknown. Criterion D (Very Small Population or Restricted Distribution): not applicable because number of mature individuals unknown. Criterion E (Quantitative Analysis): not applicable</p>	

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BIOGRAPHICAL SUMMARY OF THE REPORT WRITERS

David Seburn has a B.A. in geography from the University of Western Ontario and an M.Sc. in biogeography from the University of Alberta. He is a consultant with 9 years experience working with amphibians and reptiles and species at risk. He is a co-author on 4 other COSEWIC reports.

Carolyn Seburn has a B.Sc. in biology and psychology from the University of Toronto and an M.Sc. in biological sciences from the University of Windsor. She conducted her master's research on the Five-lined Skink. She is a consultant with 11 years' experience working with amphibians and reptiles and species at risk. She is co-author on 4 other COSEWIC reports.

Errol Bredin has conducted field studies on the Prairie Skink in Manitoba for over 20 years. He is the author of numerous technical reports on this species. He wrote the original COSEWIC report on the Northern Prairie Skink.

AUTHORITIES CONTACTED

Cook, F. Curator emeritus, Canadian Museum of Nature, RR 3, North Augusta, ON K0G 1R0.

De Smet, K. Species at Risk Biologist, Manitoba Conservation, Box 24, 200 Saulteaux Cr, Winnipeg, Manitoba.

Duncan, J. Manager, Biodiversity Conservation Section, Wildlife and Ecosystem Protection Branch, Manitoba Conservation. Box 24, 200 Saulteaux Cres. Winnipeg, MB R3J 3W3.

Fortney, G. Director of Land Protection, Manitoba Region, Nature Conservancy of Canada.

Freese, PW. Biologist, Natural Resources Conservation Service, 510 E HWY 136, Albany, Missouri 64402.

Furst, G. M.Sc. student, studying Prairie Skinks. Dept of Biology, University of North Dakota, Box 9019, Grand Forks, North Dakota.

Oliver, G. Co-ordinator, Mixed-Grass Prairie Stewardship Program, Box 508, Carberry, Manitoba.

Scott, J. M.Sc. student, studying Prairie Skinks. Natural Resources Institute, University of Manitoba, 303-70 Dysart Road, Winnipeg, MB R3T 2N2.

Thornton, J. Grasslands Specialist, Southwestern Region, Manitoba Agriculture and Food, Brandon, Manitoba.

Tuckwell, J. Acting Species at Risk Coordinator, Parks Canada, 145 McDermot Ave., Winnipeg, Manitoba.