

COSEWIC
Assessment and Status Report

on the

Sprague's Pipit
Anthus spragueii

in Canada



THREATENED
2010

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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Production note:

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COSEWIC Assessment Summary

Assessment Summary – April 2010

Common name

Sprague's Pipit

Scientific name

Anthus spragueii

Status

Threatened

Reason for designation

Approximately 80% of the global breeding population of this species occurs in Canada. It is a habitat specialist that needs large tracts of intact native grassland for breeding. Threats at both breeding and wintering grounds include ongoing habitat loss, degradation and fragmentation. The species has experienced long-term declines with no evidence of recovery.

Occurrence

Alberta, Saskatchewan, Manitoba

Status history

Designated Threatened in April 1999. Status re-examined and confirmed in May 2000 and April 2010.



COSEWIC
Executive Summary

Sprague's Pipit
Anthus spragueii

Wildlife species description and significance

Sprague's Pipit is a medium-sized, cryptically coloured songbird with a thin bill and a distinctive tail pattern that has white outer feathers contrasting with brown inner feathers. No subspecies or genetic variants are recognized.

The species is considered one of high conservation and stewardship priority for Canada because most of its distribution and core breeding range occurs in Prairie Canada.

Distribution

The breeding range of Sprague's Pipit is limited to the Great Plains of North America. The Canadian range extends from south-central and southeastern Alberta and southern Saskatchewan to southwest Manitoba. In the U.S., the species extends south to southern Montana, northern South Dakota, and northwestern Minnesota. Sprague's Pipits over-winter in the south-central U.S. states and northern Mexico.

Habitat

Sprague's Pipit is most commonly associated with grassland habitat in the Moist Mixed and Mixed Grassland Ecoregions of Prairie Canada. It prefers to nest in open native grasslands of intermediate height and density with moderate litter accumulation and no or low shrub density. The species is rarely found in cultivated lands and is usually less abundant in areas where native grasslands have been replaced with introduced grasses, although it will breed in tame forages in some regions of Prairie Canada. Sprague's Pipits are considered area-sensitive as their densities and productivity increase with grassland patch size.

Biology

Sprague's Pipits arrive on the breeding grounds beginning in late April, when males establish relatively large territories (0.7 - 4.7 ha). Females lay 3 - 6 eggs per nest and the female alone incubates the clutch for 11 - 15 days. Predation accounts for 50 - 70% of nest loss, with higher survival during incubation than the nestling stage. Young leave the nest 11 - 14 days after hatch and move progressively farther from the nest until they leave the natal area. Sprague's Pipits begin to leave the breeding grounds by late August or early September. Generation time is estimated at between two and four years and individuals begin breeding at one year of age.

Population sizes and trends

The Canadian population of Sprague's Pipit is estimated at 720,000 birds (range: 500,000 - 1 million). Long-term trend analyses (1968 - 2008) from Breeding Bird Surveys (BBS) show a non-significant annual rate of change of -4.4% per year. If populations declined at this rate, Sprague's Pipit numbers in Canada would have decreased by 83% during the last 40 years. Over the last 10 years (approximately three generations), however, the best trend estimate, which is based on an analysis combining data from the BBS and the Grassland Bird Monitoring program, shows a non-significant rate of change of +1.5%.

Threats and limiting factors

Extensive cultivation of native prairie over the last century has greatly restricted the amount of breeding habitat available to Sprague's Pipits throughout their range. Currently, habitat loss and degradation on the breeding and wintering grounds, predation from avian and mammalian predators and climate change resulting in variable and severe weather events all threaten Sprague's Pipit populations.

Protection, status, and ranks

Sprague's Pipit was designated as Threatened by COSEWIC in May 2000 and is currently listed as such on Schedule 1 of the *Species at Risk Act*. The species is ranked as apparently secure (N4B) in Canada and the U.S., apparently secure in Alberta and Saskatchewan and imperiled in Manitoba. Sprague's Pipit is protected from hunting and collecting under the *Migratory Birds Convention Act* of 1994 in Canada.

TECHNICAL SUMMARY

Anthus spragueii

Sprague's Pipit

Pipit de Sprague

Range of Occurrence in Canada: Alberta, Saskatchewan, Manitoba

Demographic Information

Generation time (usually average age of parents in the population; indicate if another method of estimating generation time indicated in the IUCN guidelines(2008) is being used)	Likely 2 to 4 yrs
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Unknown
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
Estimated percent reduction in total number of mature individuals over the last [10 years, or 3 generations].	Populations showed no significant trend
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	Unknown
Are the causes of the decline clearly reversible and understood and ceased?	N/A
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence Based on a minimum convex polygon of the species range map shown in Figure 2	580,000 km ²
Index of area of occupancy (IAO)	> 2000 km ²
Is the total population severely fragmented?	No
Number of "locations" [*]	N/A
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	No
Is there an [observed, inferred, or projected] continuing decline in number of populations?	N/A
Is there an [observed, inferred, or projected] continuing decline in number of locations?	N/A
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat? Habitat has been degraded from trails and roads associated with gas wells and pipelines.	Yes
Are there extreme fluctuations in number of populations?	N/A
Are there extreme fluctuations in number of locations*?	N/A
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

* See definition of location.

Number of Mature Individuals (in each population)

Population	N Mature Individuals
Total:	720,000 (range: 500,000-1,000,000)

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	Not done
--	----------

Threats (actual or imminent, to populations or habitats)

<ol style="list-style-type: none"> 1. Loss and degradation of native grasslands on breeding and wintering grounds: habitat conversion, habitat fragmentation from oil and gas development, fire, and haying may reduce the amount and quality of habitat. 2. Predation: Avian and mammalian predators depredate nests and young; leading factor reducing the reproductive success of Sprague's Pipits. 3. Severe climatic conditions: inclement weather periods: a) drought may lead to reduced food supply, resulting in reduced reproductive success; b) cool, wet weather may lead to death of young due to exposure or starvation.

Rescue Effect (immigration from outside Canada)

Status of outside population(s)? U.S. population has been declining.	
Is immigration known or possible?	Yes
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Likely, but quality is declining
Is rescue from outside populations likely?	Limited rescue because 80% of population is in Canada and populations that do occur in U.S. are decreasing

Current Status

COSEWIC: Threatened (April 2010)

Status and Reasons for Designation

<p>Status: Threatened</p>	<p>Alpha-numeric code: Does not meet any of the criteria, but designated Threatened because of a substantial decline in the population since the late 1960s and a projected loss and fragmentation of habitat likely to affect this area-sensitive grassland specialist.</p>
<p>Reasons for designation: Approximately 80% of the global breeding population of this species occurs in Canada. It is a habitat specialist that needs large tracts of intact native grassland for breeding. Threats at both breeding and wintering grounds include ongoing habitat loss, degradation and fragmentation. The species has experienced long-term declines with no evidence of recovery.</p>	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Does not meet criterion. Although there is a substantial long-term decline, the populations over the last three generations show no significant trend.
Criterion B (Small Distribution Range and Decline or Fluctuation): Does not meet criterion, range exceeds thresholds.
Criterion C (Small and Declining Number of Mature Individuals): Does not meet criterion, population size exceeds thresholds.
Criterion D (Very Small Population or Restricted Distribution): Does not meet criterion, both population size and distribution exceed thresholds.
Criterion E (Quantitative Analysis): None conducted.



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. Species designated at meetings of the full committee are added to the list. 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 for 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 entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2010)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife 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 wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* 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. Definition of the (DD) category revised in 2006.



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

COSEWIC Status Report

on the

Sprague's Pipit *Anthus spragueii*

in Canada

2010

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WILDLIFE SPECIES DESCRIPTION AND SIGNIFICANCE

Name and classification

Class: Aves
Order: Passeriformes
Family: Motacillidae
Genus: *Anthus*
Species: *Anthus spragueii*
English common name: Sprague's Pipit
French common name: Pipit de Sprague

Morphological Description

Sprague's Pipit is a medium-sized (15 - 17 cm, 23 - 28 g), ground-nesting passerine, endemic to the Northern Great Plains of North America (COSEWIC 2000). The plumage is buffy in colour on the belly and flanks, with brown striping on the upper breast. Sprague's Pipit may be distinguished from similar-looking grassland sparrows by a thinner bill, relatively large brown eyes and a distinctive tail feather pattern. During flight, the white outer tail feathers contrast with the inner brown feathers.

Sprague's Pipits are secretive birds that are heard more often than they are seen. Males are most often detected by their song, a series of tinkling, ethereal, descending notes delivered from high in the air. Females are not usually seen unless flushed from a nest. Females are slightly smaller than males, but otherwise sexes are similar in appearance (Robbins and Dale 1999).

Population spatial structure and variability

No geographical, ecological, or behavioural barriers to movement are known for Sprague's Pipit that might create genetic structure or strong demographic isolation.

Recent work has identified 11 genetic markers within a Saskatchewan population (based on 21 individuals; Crawford *et al.* 2009). These markers will be valuable tools for a range of future studies including, parentage, dispersal patterns, and genetic diversity of Sprague's Pipit populations throughout their range.

Designatable units

There are no recognized subspecies of Sprague's Pipit in Canada nor are there other distinctions that warrant assessment below the species level. This report is based on a single designatable unit.

SPECIAL SIGNIFICANCE

First collected by Edward Harris and John Graham Bell in 1843 (Allen 1951) and named after the artist, Isaac Sprague, Sprague's Pipit is one of the few grassland songbirds that are truly endemic to the Northern Great Plains (Knopf 1994). Sprague's Pipit is popular among birdwatchers because of its limited distribution, and it is one of only two pipit species occurring in North America. Sprague's Pipit is an indicator of grassland health in Prairie Canada and is a suitable flagship for other rare and endangered grassland species (Environment Canada 2008). No Aboriginal Traditional Knowledge was available at the time this report was prepared.

DISTRIBUTION

Global range

Sprague's Pipit is endemic to North America (Mengel 1970) where it breeds from the foothills of the Rocky Mountains in southern and central Alberta to southwestern Manitoba and south to southern Montana, northern South Dakota, and northwestern Minnesota (Figure 1; Robbins and Dale 1999). Sprague's Pipits primarily over-winter in the south central U.S. states (Texas, Louisiana, Oklahoma, New Mexico, and Arizona) and northern Mexico (Robbins and Dale 1999).



Figure 1. Distribution of Sprague's Pipit in North America (from Robbins and Dale 1999).

Canadian range

An estimated 60% of the global breeding range of Sprague's Pipit occurs in Canada (Figure 2; P. Blancher, pers. comm.).

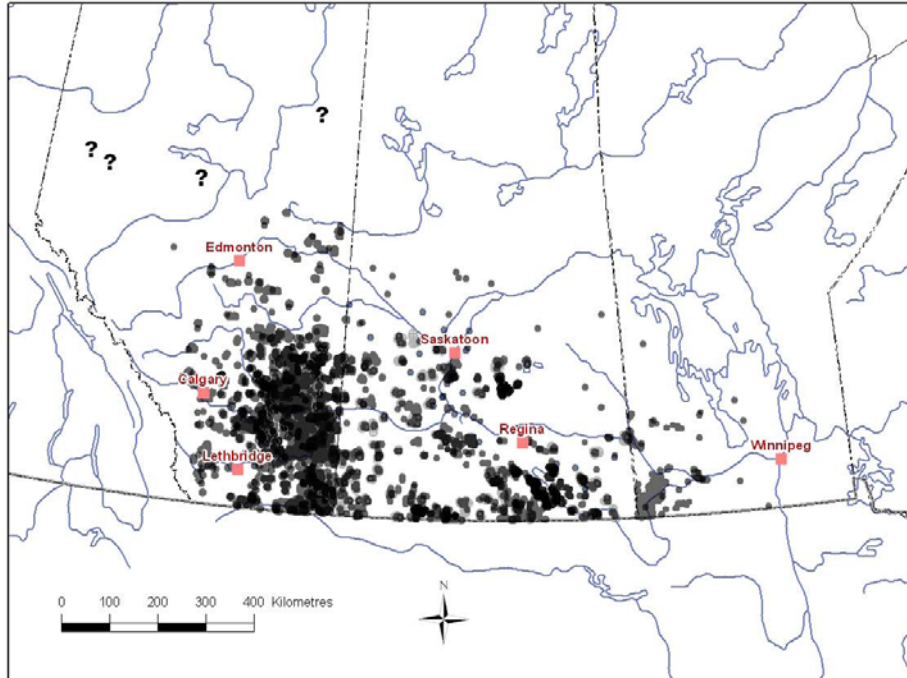


Figure 2. Canadian distribution of Sprague's Pipit based on all known observations (dark grey points) from 1994 to present. Datasets used to determine the range of the species were BBS data, CDC data, and province-wide or major surveys in AB, SK, and MB.

In British Columbia, breeding Sprague's Pipits have been observed in the Riske Creek area of south-central British Columbia, but such sightings are extremely rare (McConnell *et al.* 1993).

In Alberta, the species regularly nests/occurs as far north as Beaverhill Lake and east to the Saskatchewan border at Wainwright in central Alberta. It is also sporadic up to the northern edge of the parkland (D. Prescott, pers. comm.). The majority of breeding records are in southeastern Alberta, south of the Red Deer River. The species' distribution in Alberta has been relatively stable over the past 20 years (The Federation of Alberta Naturalists [FAN] 2007).

In Saskatchewan, Sprague's Pipits are found throughout the south, with the highest densities in the southwestern portion of the province. The species is a rare breeder at the northernmost extent of its range along the border of the Aspen Parkland/Boreal Transition Ecoregions (Smith 1996, Saskatchewan Conservation Data Centre 2008).

In Manitoba, the breeding range of Sprague's Pipits has contracted dramatically since the mid-1800s. It is a regular breeder in the southwest of the province, but has disappeared from eastern Manitoba (east of Winnipeg) since the 1990s (Manitoba Naturalists Society 2003).

In Ontario, there are records of singing males during the breeding season, but no confirmed breeding records. The species is considered accidental in the province (Project WILDSPACE 2005).

Sprague's Pipits have been recorded on the Siksika and Blood First Nation Reserves (western edge of its range) in Alberta and on the Nekaneet Treaty Land Entitlement (TLE), the Piapot TLE and the Piapot First Nation but not on the Assiniboine First Nation Reserve in southern Saskatchewan (Stevens and Wellicome 2005).

The global breeding range of this species encompasses approximately 1,158,000 km², of which 690,000 km² or 60% is in Canada (P. Blancher, pers. comm.) based on NatureServe version 3.0 digital range maps. Extent of occurrence in Canada is 580,000 km², measured as a minimum convex polygon based on the range map shown in Figure 2. The index of area of occupancy in Canada cannot be estimated with precision, but based on a 2x2 km² grid intersecting known areas of occupancy it is greater than 2000 km².

HABITAT

Habitat requirements

Breeding and foraging habitat

Sprague's Pipit is most commonly associated with grassland habitat in the Moist Mixed and Mixed Grassland Ecoregions of Prairie Canada and to lesser extents with the Aspen Parkland and Lake Manitoba Plains Ecoregions. The species is rarely found in cultivated lands and is less abundant in areas where native grasslands have been replaced with introduced grasses (Owens and Myres 1973, Dale *et al.* 1997, Davis and Duncan 1999, McMaster and Davis 2001). It prefers to nest in open native grasslands of intermediate height (10 - 30 cm) and density with moderate litter accumulation and low shrub density (Robbins and Dale 1999, Davis and Duncan 1999, Davis *et al.* 1999, Madden *et al.* 2000, Davis 2005, Government of Canada 2008). Such areas tend to occur in lightly to moderately grazed grasslands or where vegetation is periodically removed by haying or burning (Prescott and Wagner 1996, Dale *et al.* 1997, Madden *et al.* 1999).

Although the species is most abundant on native grassland, it will breed in tame forages in some regions; however, the conditions under which this occurs are unknown (S. Davis, pers. comm.). Male Sprague's Pipits have been observed defending territories in some non-native grasslands where the structure of the vegetation is similar to that of native vegetation (Sutter and Brigham 1998, Davis *et al.* 1999, Davis and Fisher 2009, Dohms 2009). Sprague's Pipits will also occasionally nest in seeded hayfields. In Saskatchewan, nests have been found both historically and currently in seeded hayfields at Last Mountain Lake National Wildlife Area (LML NWA; Dale *et al.* 1997, S. Davis, unpubl. data). Sprague's Pipits have been rarely found in perennial

cover planted for waterfowl production on the Canadian prairies (Dale and McKeating 1996, Prescott and Murphy 1996), or for soil control in Canada (McMaster and Davis 2001) or the U.S. (Johnson and Schwartz 1993).

Sprague's Pipits are considered area-sensitive as their densities increase with grassland patch size (Davis 2004, Davis *et al.* 2006). In southern Saskatchewan, Sprague's Pipits were more likely to be found on larger patches (minimum patch size: 145 ha, 95% Confidence Interval (CI): 60 - 314 ha) with a smaller edge-to-area ratio (Davis 2004). Sprague's Pipit density and the number of young fledged per successful nest are also positively correlated with grassland patch size (Davis *et al.* 2006).

Although Sprague's Pipits are influenced by patch size, it is unclear how Sprague's Pipit distribution is affected by the amount of grassland in the surrounding landscape at other spatial scales. At the survey route level, the occurrence of Sprague's Pipits in central Alberta was 15 times higher on native grassland-dominated survey routes than on routes dominated by cultivation (Owens and Myres 1973). Similarly, the average number of Sprague's Pipits recorded on Breeding Bird Survey (BBS) and Grassland Bird Monitoring (GBM) routes dominated by grassland was over six times greater than on routes with less than 50% grassland (B. Collins and B. Dale, unpubl. data, Environment Canada 2008). Recent research at larger spatial scales in south-central Saskatchewan and southeastern Alberta suggests that Sprague's Pipit abundance is higher in native compared to tame grasslands, regardless of the amount of grassland in a 32-km² area (S. Davis, unpubl. data). In southern Alberta, the amount of grassland within 800 – 1200 m buffers is positively related to Sprague's Pipit abundance (Franken *et al.* 2003), although Sprague's Pipit density in southern Alberta was more strongly related to local vegetation and distance to other habitats (e.g., water, crop/forage, road edges) than to the amount of grassland within a 5-km radius (Koper and Schmiegelow 2006).

Microhabitat requirements

Sprague's Pipits nest on the ground, in open grassland (Robbins and Dale 1999). In Saskatchewan and Montana, nests are typically located in dense tufts of grass, in relatively tall vegetation, with low forb density and little bare ground (Sutter 1997, Dieni and Jones 2003). Davis (2005) found Sprague's Pipit nests in native grasslands were situated in sites with sparse shrub cover compared to random sites; and with relatively taller and denser grass cover, and a higher density of forbs <10 cm tall compared to other grassland passerines. Sprague's Pipit occurrence and nest site selection were strongly influenced by the amount of residual vegetation remaining from the previous year's growth (Davis and Duncan 1999, Dieni and Jones 2003, Davis 2005). Vegetation structure immediately surrounding the nest site was not a critical factor in nest survival in Saskatchewan; however, nest survival did increase with increasing distance from shrubs (Davis 2005).

Wintering habitat

On the wintering grounds, Sprague's Pipit is associated with the arid grasslands of the southern Gulf States and northern Mexico. The grasslands of the Chihuahuan Desert (450,000 km²), which extend from southeastern Arizona across southern New Mexico, west Texas and south into north-central Mexico, are known wintering habitat for Sprague's Pipits (Levandoski *et al.* 2008, A. Montoya, pers. comm.). This biologically important region includes native grasses such as Tobosa (*Pleuraphis mutica*) and several grama species (*Bouteloua* spp.) and shrublands, often dominated by Creosote-bush (*Larrea tridentata*; Desmond and Montoya 2006).

The wintering habitat in Mexico is structurally similar to the breeding habitat (S. Davis, pers. comm.). Sprague's Pipits are found in areas with grasses that are intermediate in height and density and they are absent from areas with high densities of Mesquite (*Prosopis* spp.), though scattered patches are tolerated (S. Davis, pers. comm.). Sprague's Pipits may be more tolerant of bare ground on the wintering grounds than on the breeding grounds (S. Davis, pers. comm.). Recent surveys throughout the Chihuahuan Desert in Mexico suggest that abundance may be lower in halophytic (i.e., saline tolerant) grasslands (Levandoski *et al.* 2008).

Habitat trends

Breeding habitat

At least 75% of the native grasslands on the Canadian prairies have been lost since European settlement, primarily due to agricultural conversion (Samson and Knopf 1994, Gauthier and Wiken 2003). The greatest proportion of remaining intact grassland habitat in Canada exists in southeast Alberta (i.e., Special Areas and Milk River Basin) and southwest Saskatchewan. Between 2001 and 2006 in Alberta and Saskatchewan, annual changes in native grassland have been <0.5% (Statistics Canada 2006, Saskatchewan Agriculture and Food 2006). The area of unimproved lands (includes native pastureland) declined <1% per year from 1996 to 2001 (Manitoba Agriculture, Food and Rural Initiatives 2005). A recent analysis of changes in habitat area from 1985 to 2001 in the Prairie Habitat Joint Venture (PHJV) delivery area (based on 153 habitat monitoring transects) show that native grassland habitats have declined by 10% during this time (Watmough and Schmoll 2007). The majority of native grassland loss was attributed to the cultivation of small remnant grassland pieces within an agriculture-dominated landscape. Moreover, acres of seeded pasture across Canada increased nearly 19% between 2001 and 2006 to meet the feed requirements of livestock not sent to slaughter because of the bovine spongiform encephalopathy crisis (Statistics Canada 2006). Watmough and Schmoll (2007) reported a 3% increase in seeded pasture and a 4% increase in tame hay from 1985 to 2001 within the PHJV. Neither habitat is preferred by Sprague's Pipits.

Although grassland loss has slowed, soaring crop prices since 2007 have resulted in the loss of perennial cover and remaining native prairie. Marginal native habitat is being cultivated in southwest Saskatchewan (S. Davis, pers. comm.). Concurrently, cattle numbers have been declining since 2006 (Statistics Canada 2007) and this, coupled with increased grain prices, results in the cultivation of rangeland (Statistics Canada 2007). The long-term outcome of this economic change on grassland conservation is unknown.

Remaining habitat is also threatened by the recent increase in energy sector development (i.e., oil, gas, and wind) on large areas of native grasslands in southeastern Alberta and southern Saskatchewan (CPPF 2004, Askins *et al.* 2007). These developments result in habitat loss and fragmentation and, in addition, pipelines and trails serve as conduits for invasive plant species, which degrade native prairie (Askins *et al.* 2007). From 1987 to 2005, the number of gas and oil wells nearly tripled in Alberta and increased 2.4 times in southern Saskatchewan (CAODC 2007). Half of these wells were drilled since 2000 (Figure 3; FAN 2007; Saskatchewan Industry and Resources 2008). As a result, over 30,000 ha of grassland habitat has been fragmented by well sites, trails, or pipelines and 65,000 ha of edge habitat has been created by seismic lines. This trend is not likely to reverse as approximately 8,000 new wells are forecast in Alberta and Saskatchewan in 2010 alone (<http://www.cbc.ca/money/story/2010/01/27/drilling-forcast.html>). Land used by the oil and gas industry overlaps with about 60% of the remaining grassland in Alberta and 30% in Saskatchewan (S. Davis, unpubl. data). If 50% of oil and gas developments are in grassland and drilling continues at current rates, then 691,200 ha of grassland are predicted to be lost or degraded within a decade. These developments could potentially affect 34.6% of Sprague's Pipit habitat. Given this species is known to respond negatively to habitat loss and fragmentation, and appears to avoid wells or associated trails (Askins *et al.* 2007, Linnen 2008, B. Dale, unpubl. data), these energy-related activities have the potential to significantly affect this species.

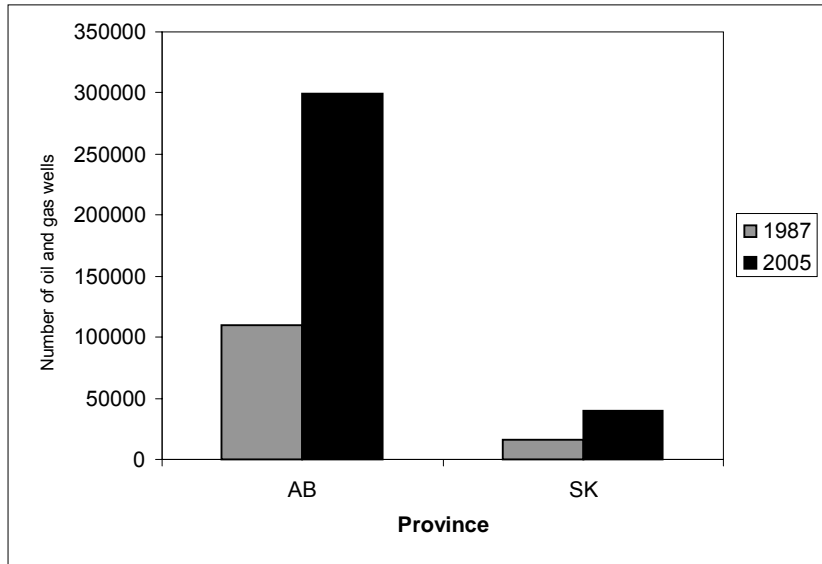


Figure 3. Number of oil and gas wells in Alberta and Saskatchewan in 1987 and 2005.

The effects of wind energy development are largely unknown but the roads and trails associated with wind turbines can be expected to have effects similar to those shown for roads and trails elsewhere (B. Dale, pers. comm.).

Wintering habitat

Throughout its winter range, grassland habitats have been impacted due to historic over-grazing, cultivation, altered fire regimes, shrub encroachment and eradication of prairie dog colonies (Rich *et al.* 2004, Desmond and Montoya 2006, Macias-Duarte *et al.* 2009). Parts of the Chihuahuan Desert within the southern extent of Sprague's Pipit winter range currently are undergoing unprecedented cultivation (Desmond and Montoya 2006, Macias-Duarte *et al.* 2007). Since 2003, more than 600 km² of grasslands in the Tarabillas valley (Mexico) have been sold for conversion to crops (approximately half has already been cultivated; Macias-Duarte *et al.* 2007) and since 2005 approximately 30,000 ha of grassland in the Sueco area has been converted and more is anticipated for the Chihuahua area (Macias-Duarte *et al.* 2007). This grassland is critical wintering habitat for migratory grassland birds from the U.S. and Canada, including Sprague's Pipit (Macias-Duarte *et al.* 2007).

BIOLOGY

Life cycle, reproduction and diet

Life cycle

Sprague's Pipits arrive on the breeding grounds beginning in late April when males establish territories (Davis 2003), which range from 0.7 - 4.7 ha in native fields to 1.1 - 4.4 ha in seeded hayfields (S. Davis, unpubl. data). The majority of nests are initiated during the third week of May (Robbins and Dale 1999, Davis 2003) and to a lesser extent in mid-July (S. Davis, unpubl. data). The mating system of Sprague's Pipit has not been studied, although Dohms and Davis (2009) found evidence of polygyny at one site in southern Saskatchewan.

Females lay 3 - 6 eggs per nest (Manitoba mean: 4.8 eggs; range: 4.3 - 5.8; De Smet 1992; Saskatchewan mean: 4.8; SE: ± 0.11 ; Davis 2003); and the female alone incubates the clutch (K. Dohms and S. Davis, unpubl. data) for 11 - 15 days (Robbins 1998, Davis 2003, 2009). Both parents participate in feeding nestlings and nest sanitation (Dohms and Davis 2009). Young leave the nest 9 - 13 days after hatch (Robbins and Dale 1999, Davis and Fisher 2009) when they are at least 70% of adult mass (K. Dohms and S. Davis, unpubl. data). Young nestlings and fledglings were observed as late as mid-August in southeastern Alberta (C. Wershler, unpubl. data).

Sprague's Pipits typically leave the breeding grounds by late August or early September (C. Wershler, unpubl. data), although the species has been recorded at LML NWA in October (Prescott 1997).

Generation time

Sprague's Pipits acquire adult plumage by one year of age (Pyle 1997) and begin breeding at this age (S. Davis, pers. comm.). Information from banding data suggests that the generation time is likely between 2 and 4 years (S. Davis, pers. comm.).

Nest success

In Saskatchewan, nest success (i.e., at least one young hatched per nest) ranged from 22 - 33% (Maher 1973, Davis 2003) and survival during the incubation stage was higher than the nestling stage (Davis 2005). On average, about 3 (2.3 to 4.3) juveniles fledged per successful nest (Davis 2003, 2009). In southern Manitoba, De Smet (1992) found 64% (n = 20) nest success and an average of 2.1 young fledged per initiated nest. Similarly, Davis and Sealy (2000) found an average of 2.7 young (95% CI: 2.4 - 3.0) fledged per successful nest.

Information on fledgling survival has been examined only at LML NWA (Davis and Fisher 2009, R. Fisher and S. Davis, unpubl. data). Here, mean survival up to 27 days after fledging (i.e., based on the life of the transmitter that had been used to find fledglings) was 29% (95% CI: 17 - 44), with higher survival in native grasslands than seeded hayfields (R. Fisher and S. Davis, unpubl. data). Post-fledging survival beyond 27 days until migration is unknown (Davis and Fisher 2009).

Nest failure occurs at the rate of 35 - 78% among Sprague's Pipits (De Smet 1992, Davis 2003, S. Davis, unpubl. data). Re-nesting is not common, but if females do re-nest, it is usually one to three weeks after the first nest has failed (Sutter *et al.* 1996). Davis (unpubl. data) found no evidence of Sprague's Pipits initiating a nest after successfully fledging a previous nest at LML NWA.

No information on lifetime reproductive success exists.

Diet

Adult Sprague's Pipits forage on the ground and are primarily insectivorous during the breeding season, consuming a variety of arthropods, such as grasshoppers and spiders. Young are also fed a variety of insects including grasshoppers, beetles, dragonflies and damselflies, and adult and larval butterflies (Robbins and Dale 1999, K. Dohms and S. Davis, unpubl. data).

Predation and nest parasitism

Predation is the primary cause of nest loss in Sprague's Pipit (Davis 2003, Davis and Fisher 2009, S. Davis, unpubl. data, J. Lusk and N. Koper, unpubl. data). Sprague's Pipits and their eggs are a source of food for predators such as the Northern Harrier (*Circus cyaneus*), Black-billed Magpie (*Pica hudsonia*), American Crow (*Corvus brachyrhynchos*), Merlin (*Falco columbarius*), Striped Skunk (*Mephitis mephitis*), Thirteen-lined Ground Squirrel (*Spermophilus tridecemlineatus*), deer (*Odocoileus* spp.) and various small mammals (Davis and Fisher 2009, Davis *et al.* unpubl. data). In Saskatchewan, predation accounts for 53 - 70% of all nest losses, with raptors being significant predators of fledglings (COSEWIC 2000, Davis 2003, Davis and Fisher 2009, S. Davis, unpubl. data). In Manitoba, 53% of all Sprague's Pipit nests were destroyed by predators (Davis and Sealy 2000).

Sprague's Pipits are uncommon hosts to Brown-headed Cowbirds (*Molothrus ater*), with parasitism rates low compared to other grassland nesting species (Davis and Sealy 2000, Davis 2003). In Saskatchewan, Maher (1973) found no instances of nest parasitism in 49 monitored nests, but Davis (2003) found 15.4% of nests parasitized from among 65 monitored nests. At LML NWA, rates ranged from 0 - 3% (2004 - 2008; S. Davis, unpubl. data). In southwestern Manitoba, 15% (n = 20; De Smet 1992) to 18% (n = 17; Davis and Sealy 2000) of Sprague's Pipit nests were parasitized by Brown-headed Cowbirds. In Manitoba and Saskatchewan, cowbirds reduced pipit clutch size and hatching success, with an overall cost of 1.3 - 1.6 host young per parasitized nest

(Davis and Sealy 2000, Davis 2003). In southwestern Manitoba, nests were parasitized by Brown-headed Cowbirds on relatively small grassland patches (22 ha; Davis and Sealy 2000).

Physiology

Little information is available on the physiology of Sprague's Pipits (Robbins and Dale 1999). Sutter (1996) estimated the daily energy expenditure of an incubating female at 86.8 kJ/d. Displaying males may reach an estimated minimum power speed (V_{mp}) of 5.9 m/s, a maximum range speed (V_{mr}) of 10.4 m/s and may expend approximately 2% of body mass within a 3-hour period (Robbins 1998).

Migration, dispersal, and site fidelity

Sprague's Pipits are mid-distance migrants, travelling each year from the wintering grounds in the southwestern United States and northeastern and central Mexico to the breeding grounds in the northern Great Plains of the United States and Canada. Adults begin to arrive on the Canadian breeding grounds in late April (COSEWIC 2000) and depart for the wintering grounds in mid-September (Robbins and Dale 1999). Sprague's Pipits are typically solitary during migration but may congregate in groups (Prescott and Dale 1999). Former accounts describe large mixed flocks of Sprague's Pipits, Horned Larks (*Eremophila alpestris*) and longspurs (*Calcarius* spp.) on breeding grounds before migration (Bent 1950), although such large flocks are not as common today. Stable isotope (deuterium:hydrogen) ratios of feathers collected from Sprague's Pipits in southern Saskatchewan since 2004 suggest that the birds from the LML NWA in south central Saskatchewan are over-wintering in northern Mexico and the south-central United States (K. Brewster, unpubl. data).

In Saskatchewan, young tend to stay within 100 m of the nest during the first week post-fledging (Davis and Fisher 2009). Beginning in the second week, they move over 100 m per day (range on day 8: 101 - 261 m) away from the nest and do this for approximately 20 days before they leave the natal area; young do not appear to use different habitats than adults (Davis and Fisher 2009). Of 160 nestlings banded between 1997 and 2005 in Montana, none returned to their natal grounds (Jones *et al.* 2007)

Little information exists on breeding site fidelity. At LML NWA in south-central Saskatchewan, 4% of 100 adult males banded from 2004 to 2006 were re-captured in 2007 (S. Davis, unpubl. data). In north-central Montana, Jones *et al.* (2007) found 2.1% of 48 banded adult males returned to the same breeding areas where they were originally banded. Stable isotope (deuterium:hydrogen) ratios of feathers collected from Sprague's Pipits in southern Saskatchewan since 2004 found that 37 - 50% of adult males ($n = 189$) exhibited breeding site fidelity, while in Montana 15 - 22% ($n = 27$ caught between 2001 and 2006) of males returned to their breeding sites (K. Brewster, unpubl. data).

Interspecific interactions

There are few observations of interactions between Sprague's Pipit and other species. A displaying male in North Dakota was observed chasing a lone male Chestnut-collared Longspur (*Calcarius ornatus*) that flew through its territory (Robbins 1998). A male Sprague's Pipit at LML NWA was observed chasing a Savannah Sparrow (*Passerculus sandwichensis*) out of a suspected territory (R. Fisher, pers. comm.).

Adaptability

Sprague's Pipits are habitat specialists, preferring unfragmented native grasslands. However, this species may use planted grasslands if structurally similar to native prairie. Whether Sprague's Pipits have adapted to using planted grassland as breeding habitat or whether Sprague's Pipits are forced to use non-native breeding habitat when native habitat is limited or absent is currently unknown (S. Davis, pers. comm.).

Current populations of Sprague's Pipits may not have the flexibility to adapt to changing moisture conditions. In the past (i.e., pre-European settlement), local Sprague's Pipit populations may have simply shifted to more suitable habitats in mesic portions of their range (i.e., Moist Mixed Grassland and Aspen Parkland Ecoregions) during a period of drought (B. Dale, pers. comm.). Presently much of the suitable habitat in these more mesic ecoregions in Canada has been converted to crops and grazing is annual (B. Dale, pers. comm.). In western North Dakota local populations declined during a summer of extreme drought but partially recovered the following summer when precipitation was recorded at near normal values (George *et al.* 1992). Sprague's Pipits may, however, have a limited response to multiple years of below average precipitation, responding to changes in habitat quality (i.e., changes in litter levels; B. Dale, unpubl. data, Wiens *et al.* 2008, Government of Canada 2008) rather than reduced food availability and heat stress (George *et al.* 1992).

POPULATION SIZES AND TRENDS

Sampling effort and methods

Abundance data on Sprague's Pipit are collected using a variety of methods. Below are descriptions of the three main sources of population abundance and trend data.

Breeding Bird Survey (BBS)

Breeding Bird Surveys have been conducted annually across the continental U.S. and Canada during the peak breeding season since the late 1960s (Sauer *et al.* 2008). Volunteers stop every 800m along randomly selected routes and record all birds seen or heard during a three-minute period. The BBS covers the range of Sprague's Pipit; however, there are some shortcomings associated with this survey method when

monitoring this species: 1) there is relatively sparse coverage in areas where the bulk of the remaining grassland (and Sprague's Pipits) occur (Environment Canada 2008) and 2) surveys are restricted to roads and so may miss interior birds.

Grassland Bird Monitoring (GBM)

The Canadian Wildlife Service's GBM program was established in 1996 to increase survey coverage of grassland endemics in Alberta and Saskatchewan in grassland-dominated landscapes where BBS coverage is inadequate (Dale *et al.* 2005). The GBM program uses BBS-type methodology with the exception that 1) there is increased monitoring where remaining grassland habitat is concentrated and grassland birds such as Sprague's Pipit are relatively common and 2) the nearest passable road to the randomly selected survey route is used rather than the nearest secondary or better road. This survey is conducted away from larger roads and throughout much of the core breeding area. Therefore, its results should provide trend information for the bird in its highest quality habitat.

The best trend information for Sprague's Pipit comes from analyses that combine the results of the BBS and GBM routes. This is because the combined analysis has a larger sample size than the individual surveys and it combines surveys from both high and low quality habitat.

Christmas Bird Count (CBC)

The CBC is an annual winter survey conducted in Canada, the U.S. and Central and South America (Butcher 1990, Sauer *et al.* 1996). Volunteers count all birds they see in a 24-km diameter circle during a single day from mid-December to the second week in January. The benefit of the CBC is that data from the southern U.S. and northern Mexico provide an estimate of the global population of this species as they winter in these areas. The main limitations of this survey are that it samples only 43% of the Sprague's Pipit wintering range and the trends produced have limited reliability because of the low number of Sprague's Pipit counted.

Abundance

Based on BBS count data from the 1990s, the average estimated continental population of Sprague's Pipit during that decade was approximately 900,000 breeding birds and the Canadian population approximately 720,000 birds or 80% of the global population (Partners in Flight (PIF) Landbird Population Estimates Database http://www.rmbo.org/pif_db/laped/default.aspx). The precision of this abundance estimate is considered "moderate" because of high variance in BBS counts (PIF Landbird Population Estimates Database, Blancher *et al.* 2007), so the range on the estimate is likely between 500,000 and 1,000,000 individuals (P. Blancher, pers. comm.).

Fluctuations and trends

Breeding Bird Survey (BBS)

Long-term BBS data from Bird Conservation Region (BCR) 11, which includes 95% of the Sprague's Pipit population in Canada, show a non-significant decline of 4.4% per year ($n = 112$ routes, $P > 0.10$; 95% CI: -10.2 - 1.7) between 1968 and 2008 (Figure 4). This corresponds to a population loss of approximately 83% over the last 40 years. Short-term BBS data from the most recent 12-year period, in which the beginning (1996) and end (2008) of the trend series match moisture conditions and thus bird numbers, show a non-significant increase of 1.4% per year ($n = 79$ routes, 95% CI: -1.8 - 4.8). At this rate, the population would have increased by 15% over the last 10 years or approximately three generations.

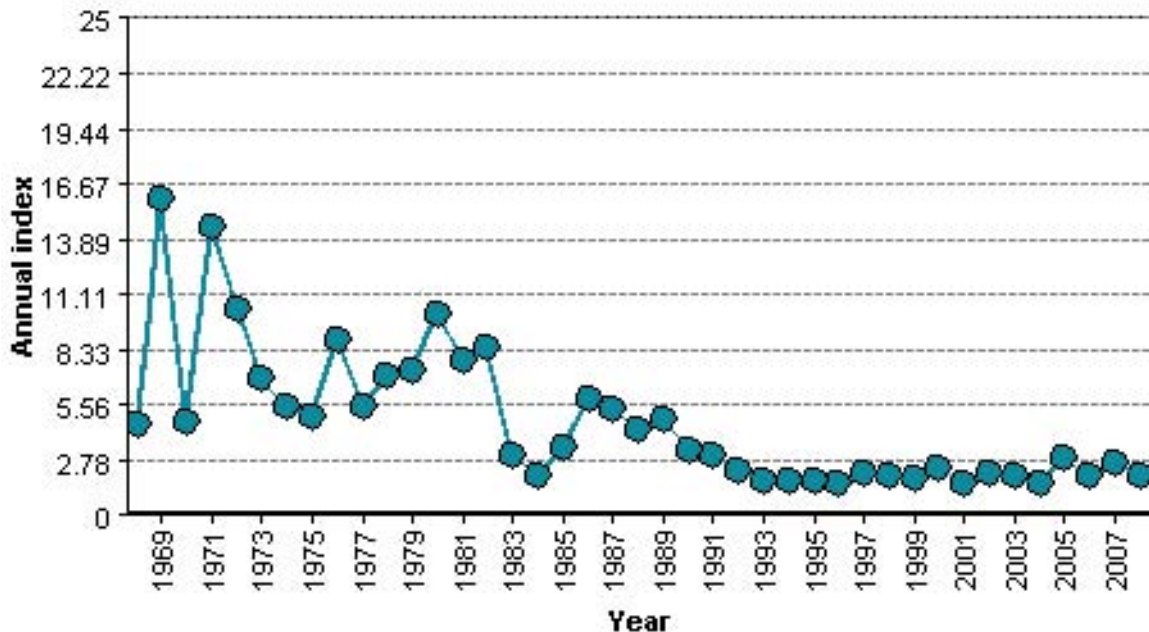


Figure 4. Annual indices (adjusted mean number of birds/route) of relative abundance based on Breeding Bird Surveys for Sprague's Pipit in Canada in Bird Conservation Region 11 between 1968 and 2008 (Downes and Collins 2009).

The BBS-wide data, which includes routes across the entire breeding range of the species, (60% is in Canada) show a non-significant increase of 0.4% per year ($n = 103$ routes, $P = 0.77$) between 1997 and 2007. At this rate, the population will have increased by 4% over the last 10 years.

Grassland Bird Monitoring (GBM)

Data from the GBM surveys, which are conducted where Sprague's Pipit habitat is relatively intact, show a non-significant annual rate of increase of 10.5% per year

(n = 11 routes, 95% CI: -46.3 - 127.3) between 1996 and 2008 (B. Collins, pers. comm.).

An analysis combining BBS and GBM routes shows a non-significant increase of 1.5% per year (n = 86 routes, 95% CI: -1.4 - 4.4) between 1996 and 2008 (Figure 5). At this 12-year rate, the population would have increased by 16% over the last 10 years or approximately three generations.

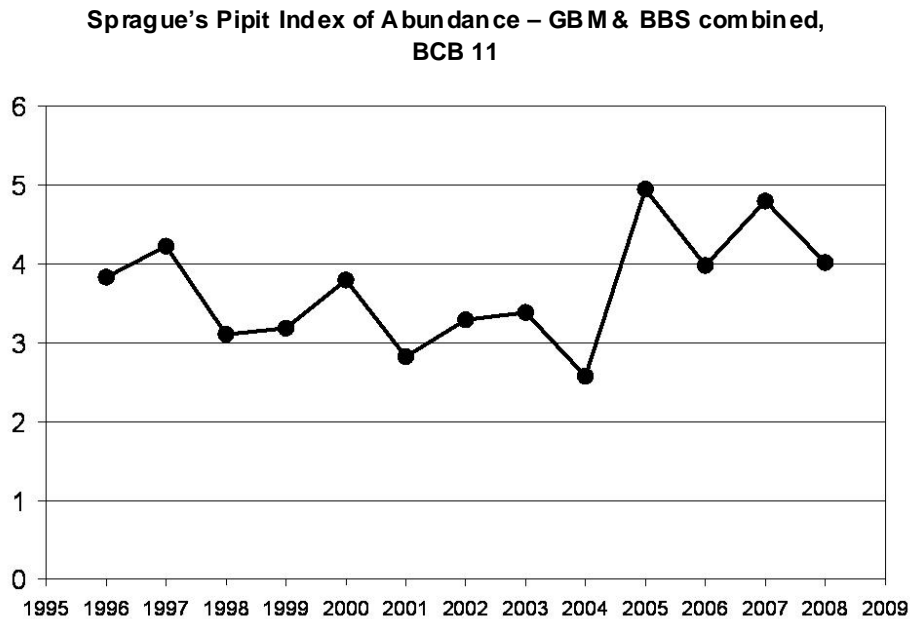


Figure 5. Annual indices (adjusted mean number of birds/route) of relative abundance based on data from Breeding Bird Surveys and Grassland Bird Monitoring for Sprague's Pipit in Canada in Bird Conservation Region 11 (Brian Collins, pers. comm.) between 1996 and 2008.

Christmas Bird Count (CBC)

Long-term CBC data show a significant decline of 2.45% per year (95% CI: -4.6 - -0.6) between 1966 and 2005, which is equivalent to a cumulative loss of 62% of the population over the last 39 years. During the most recent 10 year period (1995 - 2005), the data show a significant decline of 2.6% per year (P = 0.025), which amounts to a loss of 23% (National Audubon Society 2008).

Summary

Overall, analyses based on long-term (i.e., 1968 - 2008) BBS data show a non-significant decline suggesting a loss of approximately 83% of the Sprague's Pipit population in Canada over the last 40 years. Over the last three generations, however, the most robust analysis, which combines data from the BBS and GBM, shows a small, non-significant increase.

Rescue effect

Recent stable isotope analyses suggest that individuals from Montana breed in Saskatchewan (S. Davis, unpubl. data). Further, current habitat models suggest that suitable habitat for immigrant birds from the U.S. is not limited in Canada (S. Davis, pers. comm.). The species is also highly mobile, this in addition to the above, suggests that Sprague's Pipits in the U.S. may act as a source population of immigrants for Canada.

Despite this fact, the potential for rescue may be relatively limited. For instance, long-term BBS data for the U.S. show a non-significant decline of 2.4% per year between 1966 and 2007 ($n = 49$ routes, $P = 0.35$, Sauer *et al.* 2008). Short-term BBS data show a significant decline of 10.0% per year ($n = 28$, $P = 0.001$) between 1997 and 2007 (Sauer *et al.* 2008). At this rate, the U.S. population will have decreased by 65% in the last 10 years. Given these recent declines and the fact that 80% of the global population occurs in Canada, the potential for rescue may be limited.

THREATS AND LIMITING FACTORS

Habitat loss and degradation

Habitat loss on breeding and wintering grounds

Extensive cultivation of native prairie over the last century has greatly restricted the amount of breeding habitat available to Sprague's Pipits throughout their range. As a result, the species has disappeared in areas where grassland habitat has been completely lost. Although the rate of loss has slowed (Statistics Canada 1997), unprotected grasslands continue to be lost to cultivation, residential acreages, urban encroachment, and energy sector development (CPPF 2004). Habitat loss is also occurring on the wintering grounds. Parts of the Chihuahuan Desert are undergoing unprecedented cultivation (Desmond and Montoya 2006, Macias-Duarte *et al.* 2007), as is the Tarabillas Valley (Macias-Duarte *et al.* 2007), both of which are critical wintering areas for Sprague's Pipit.

Fragmentation

Cultivation in the prairie region has fragmented much of the remaining grassland, resulting in smaller, isolated patches of habitat (Agriculture and Agri-Food Canada 2001). Sprague's Pipit is area-sensitive in terms of both abundance (Franken *et al.* 2003, Davis 2004, Skinner 2004) and demography (Davis *et al.* 2006; see **Habitat Requirements**). Invasion by exotic plants such as Smooth Brome (*Bromus inermis*) associated with roadways, energy infrastructure (e.g., pipelines, seismic lines, trails, and buildings) and acres of broken land may also reduce habitat suitability for Sprague's Pipits (Robbins and Dale 1999). In southwest Saskatchewan, Sprague's Pipit abundance was found to increase with distance from gas wells or associated trails (Linnen 2008). Similarly, a long-term study on Suffield NWA in Alberta found pipits were negatively influenced by shrubs and higher well densities (Government of Canada 2008, Dale *et al.* 2009). While the effects of grassland fragmentation and loss may be difficult to differentiate (Fahrig 2003), increased amounts of edge habitat resulting from fragmentation may be detrimental to Sprague's Pipits because of their association with interior habitats (Davis 2004).

Livestock grazing

The response of Sprague's Pipit to livestock grazing likely varies geographically throughout Prairie Canada (Environment Canada 2008). Sprague's Pipit generally avoids heavily grazed pastures (Davis *et al.* 1999) but is tolerant of moderate grazing intensities (Leuders *et al.* 2006, Lusk 2009). Idling (i.e., fields are not grazed or hayed) grassland habitat in mesic portions of their range (i.e., Moist Mixed Grassland and Aspen Parkland Ecoregions) and overgrazing (relative to recommended stocking rates) in drier regions (i.e., Mixed Grassland Ecoregion) can result in an increase in invasive species and woody vegetation or a reduction in range condition, any of which can alter the structure of the vegetation so that it is no longer attractive to the species. Not only does overgrazing by livestock negatively influence vegetation structure but cattle may also reduce reproductive success through disturbance of breeding birds and trampling of nests in fields with high stocking densities (Paine *et al.* 1996). However, grazing intensity is likely too low in Prairie Canada to pose a direct risk to Sprague's Pipit (Koper and Schmiegelow 2007).

Haying

In areas where Sprague's Pipits occur on planted grassland fields, haying during the nesting season may lower reproductive success through mechanical destruction of nests and adults or by reducing overhead vegetative cover and exposing nests to predators and inclement weather (Dale *et al.* 1997).

Fire

Sprague's Pipit populations may be limited by degraded breeding habitat in areas where natural fire regimes have been suppressed since European settlement (Environment Canada 2008). Although prescribed burning can have negative short-term effects on Sprague's Pipit abundance and occurrence (Pylypec 1991), burning may improve habitat quality over time by reducing encroachment by woody vegetation, reducing litter build-up and slowing invasion of exotic invasive plant species (Dechant *et al.* 2003). Maher (1973) found Sprague's Pipit populations recovered two years after a burn in Saskatchewan. In North Dakota, Sprague's Pipits did not occur on grassland habitat that had not been burned for over eight years and breeding abundance was highest 2 - 7 years after a fire (Madden *et al.* 1999). In more arid regions, Sprague's Pipits were common on native pastures that had not been burned for more than 15 years (Sutter 1996). Thus, the local population response to grassland burning likely varies with frequency, soil type, and moisture regimes (Robbins and Dale 1999, Madden *et al.* 1999).

Nest predation

Predation is the leading factor reducing the reproductive success of Sprague's Pipits (Davis and Sealy 2000, Davis 2003, S. Davis, unpubl. data). Habitat structure, and landscape composition and configuration of remaining grassland habitat as well as changes in predator communities have likely increased the risk of predation. Sprague's Pipits nesting in small habitat patches near edges may suffer reduced productivity because of the increased activity of nest predators (Environment Canada 2008).

Pesticides

Agricultural pesticides may threaten Sprague's Pipit indirectly through ingestion of prey or if the chemicals reduce food supplies at a critical period of the nesting cycle (Martin *et al.* 2005, Environment Canada 2008). However, the extent to which pesticides affect survival and reproduction during the breeding and non-breeding season is unknown.

Severe climatic conditions

Climate change models predict more variable and severe weather events in Prairie Canada (Intergovernmental Panel on Climate Change 2001). Prolonged droughts result in reduced numbers of birds recorded on BBS routes (B. Dale, pers. comm.) and could reduce reproductive output (George *et al.* 1992), although Sprague's Pipits have shown resilience to drought conditions in southeastern Alberta when there has been good grass carry-over from previous years (C. Wersher, unpubl. data).

EXISTING PROTECTION, STATUS, AND RANKS

Sprague's Pipit was designated as Threatened by COSEWIC in May 2000 and is currently listed as such on Schedule 1 of the *Species at Risk Act*. This listing affords protection for Sprague's Pipit against harm, destruction or trafficking and general protection on federal lands and on critical habitat (once defined). The species is protected from hunting and collection by the *Migratory Birds Convention Act*, 1994 in Canada, and is protected from general disturbance under provincial Wildlife Acts in British Columbia, Alberta, Saskatchewan, and Manitoba. Sprague's Pipit is not listed on any appendix by the Convention on International Trade in Endangered Species of Wild Flora and Fauna.

Non-Legal status and ranks

Sprague's Pipit has also received non-legal status ranking by state and provincial governments, as well as non-government organizations. Although Sprague's Pipit is ranked as N4B in Canada and the U.S. (apparently secure) by NatureServe (2009), it is listed as vulnerable by the IUCN (World Conservation Union 2007). It is listed in Priority pool IA (High Responsibility in Bird Conservation 11) by the Canadian Prairie Partners in Flight (CPPF 2004) and is listed of "national conservation concern" on the U.S. Partners in Flight Watch list (<http://www.audubon.org/bird/watch>). The species' NatureServe (2009) sub-national rankings range from apparently secure breeding populations in Alberta and Saskatchewan to critically imperiled (vulnerable to extirpation) in Minnesota (Table 1). Such designations do not offer specific legislation or protection but they do identify risk levels throughout its breeding range, and may therefore promote research and conservation initiatives that protect habitat or restore populations.

Table 1. NatureServe (2009) ranking for Canadian provinces and U.S. states that fall within the species' breeding range.

Jurisdiction	Rank	Designation
World rank	G4	Apparently Secure
Alberta	S4	Apparently Secure
Saskatchewan	S4B	Apparently Secure, breeding
Manitoba	S2B	Imperiled, breeding
North Dakota	S3	Vulnerable
South Dakota	S2B	Imperiled, breeding
Montana	S2B	Imperiled, breeding
Minnesota	S1B	Critically Imperiled, breeding

Habitat protection/Ownership

In Alberta, the Grassland Natural Region (GNR) covers approximately 97,000 km², of which over 42,000 km² (nearly 43%) consists of native grasslands. Within these native areas, approximately 23,000 km² (55%) are under Crown ownership (Alberta

Sustainable Resource Development 2007). The Special Areas Board in south-central Alberta administers approximately 6,000 km² of publicly owned native grassland (D. Major, pers. comm.). Although not officially protected, the provincial Crown lands described above provide some level of protection from cultivation as the majority of Crown lands are used for community pastures or grazing leases (although oil and gas development is widespread). The Eastern Irrigation District distributes water for crop and forage irrigation and domestic use, and is the largest private landowner in Alberta, administering over 2,400 km² of grassland within the Mixed Grass sub-region of the GNR. Almost 80% of this land is native prairie, which is managed to benefit wildlife (Nierenberg and Ingstrup 2005). Some of the larger protected lands with Sprague's Pipits include the Suffield National Wildlife Area (458.7 km²), the Onefour Heritage Rangeland Natural Area (111 km²), and the Twin River Heritage Rangeland Natural Area (190 km²), of which the latter two are provincially owned. In total, approximately 2% (1,115 km²) of grasslands within the Prairie Ecozone (includes the GNR and the Parkland Natural Regions) of Alberta are officially protected (Gauthier and Wiken 2003).

Within the Saskatchewan Prairie Ecozone, 16,373 km² (28%) of native dominant grassland is protected within national and provincial parks, federal and provincial community pastures, Nature Conservancy of Canada (NCC) land, National Wildlife Areas and Migratory Bird Sanctuaries, ecological reserves, and land under the *Wildlife Habitat Protection Act* (Gauthier and Wilken 2003). Approximately 70% of these protected grasslands are within the Mixed Grassland ecoregion of southwestern Saskatchewan. Some of the larger protected grassland complexes include Grasslands National Park (920 km²), Prairie Farm Rehabilitation Administration pastures (820 km²), and NCC Old Man on His Back Heritage Conservation Area (53 km²).

In Manitoba, grasslands cover over 14,693 km² of the Prairie Ecozone located primarily in the Aspen Parkland and Lake Manitoba Plains ecoregions in the southwest corner of the province. However, only 637 km² of grassland habitat are officially protected (Gauthier and Wiken 2003). To date, approximately 150 provincial conservation easements targeting native grasslands have secured an additional 100 km² (K. Teneycke, pers. comm.). Canadian Forces Base Shilo includes 110 km² of secured native prairie (S.L. Punak-Murphy, pers. comm.).

Approximately 4,400 km² of cropland has been converted to perennial grassland under the Permanent Cover Program (PCP) in Alberta, Saskatchewan, and Manitoba. However, this type of perennial cover is not attractive to Sprague's Pipits (McMaster and Davis 2001).

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