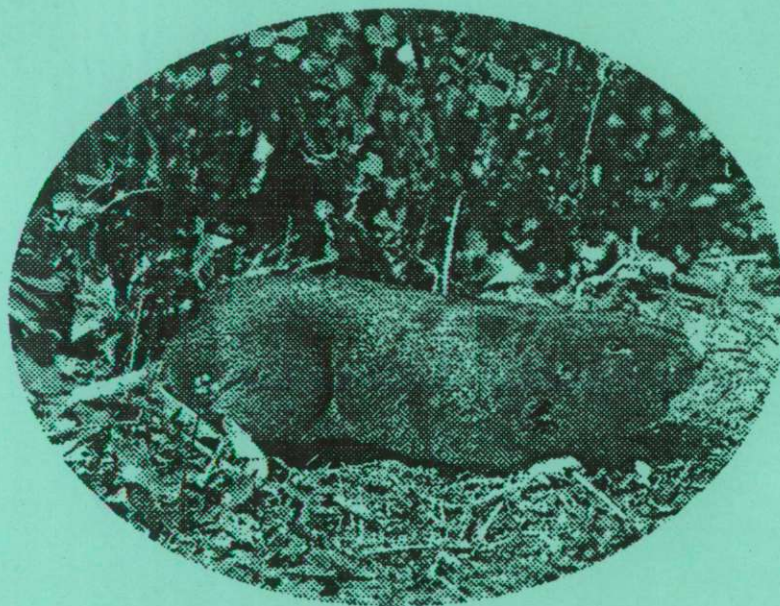


# Update COSEWIC STATUS REPORT

on  
**Plains Pocket Gopher**  
(*Geomys bursarius*)

QL  
88  
573



**Marcia Dewandel**

**NOT AT RISK  
1998**

COMITÉ CANADIEN  
COSEWIC  
ON THE STATUS  
OF ENDANGERED WILDLIFE  
IN CANADA



COMITÉ SUR LA SITUATION  
DES ESPÈCES EN PÉRIL  
AU CANADA  
COSEPAC

Rég. Québec Biblio. Env. Canada Library



38 000 849

For additional copies contact:

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

Tel: (819) 997-4991/(819) 994-2407/(819)953-3215

Fax: (819) 994-3684

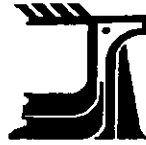
E-mail: [sylvia.normand@ec.gc.ca](mailto:sylvia.normand@ec.gc.ca)

[shirley.sheppard@ec.gc.ca](mailto:shirley.sheppard@ec.gc.ca)

[shirley.hamelin@ec.gc.ca](mailto:shirley.hamelin@ec.gc.ca)

**Cover illustration:**

Plains Pocket Gopher -Courtesy of Illinois Natural History Survey



## Plains Pocket Gopher

**Reason for status:** Restricted to a small area of southern Manitoba but widespread within its range. Population has recently expanded its range and habitat may be increasing. [Designated rare (vulnerable) in 1979 and delisted in 1998.]

**Occurrence:** Manitoba

### NOTES

COSEWIC status reports are working documents used in assigning status. Reports are released in their original form in the interest of making scientific information available to the public.

Reports are the property of COSEWIC and the author. They may not be presented as the work of any other person or agency. Anyone wishing to quote or cite information contained in status reports may do so provided that both the author and COSEWIC are credited. The report may be cited as follows:

DeWandel, Marcia. 1998. COSEWIC Status report on the Plains Pocket Gopher, *Geomys bursarius*. Committee on the Status of Endangered Wildlife in Canada. 15 + v pp.

### COSEWIC

A committee of representatives from federal, provincial and private agencies that assigns national status to species at risk in Canada and the chairs of the scientific species specialist groups

### COSEPAC

Un comité de représentants d'organismes fédéraux, provinciaux et privés qui attribue un statut national aux espèces canadiennes en péril ainsi que des président(e)s des groupes des spécialistes scientifiques.

**Update**  
**COSEWIC Status Report**

on

**Plains Pocket Gopher**  
*(Geomys bursarius)*

by

**Marcia DeWandel**  
Box 1106  
Fort Smith, Northwest Territories  
X0E 0P0

**Funding provided by Canadian Wildlife Service,  
Environment Canada**

## Table of Contents

List of Figures	ii
Executive Summary	iii
Résumé	iv
Introduction	1
Distribution	1
Habitat	4
Protection	4
Population Size and Trends	5
General Biology	5
Reproductive capabilities and dispersal	5
Food habits	6
Predators	8
Limiting Factors	8
Special Significance of Species	9
Recommendations /Management Options	10
Evaluation	10
Acknowledgements	10
Biographical Summary of Author	11
Personnel Communications	11
Literature Cited	12

## List of Figures

- Figure 1.** North American distribution of *Geomys bursarius*. *Geomys bursarius bursarius* (5) is the only subspecies found in Canada (Hall 1981) 2
- Figure 2.** Past distribution records of *Geomys bursarius* (star) and *Thomomys talpides* (dots in southeastern Manitoba (Wrigley and Dubois 1973)). Present distribution of *Geomys bursarius* (squares) as indicated by Oberpichler 1989 and Wrigley *et al.*, 1991. Inset, general distribution of *Geomys bursarius* and *Thomomys talpoides* in Manitoba 3

## Executive Summary

The Plains Pocket Gopher (*Geomys bursarius*) is a fossorial herbivore so-named for the presence of two fur-lined cheek pockets used for food storage. Pocket gophers are neither nocturnal nor crepuscular and remain active throughout the year. In Canada, *Geomys bursarius* is extremely localized, found only in southeastern Manitoba. In a status report for COSEWIC, Shoesmith (1979) found *Geomys bursarius* occupying a 567 km<sup>2</sup> area east of Emerson, Manitoba and south of the Roseau River. Since this time, detailed distribution records have not been provided, however Wrigley et al. (1991) found that *Geomys bursarius* had expanded its range 0.5 km north of the Roseau River and 6.6 km west of New Rosa, Manitoba. Globally, *Geomys bursarius* is widespread, abundant and secure in its range (global rank G5). In Canada, populations are located at the northern fringe of the global range and occupy less than 3% of the province of Manitoba (provincial rank S3). Populations are considered stable with an approximate size of 8000 (COSEWIC and Shoesmith 1979). More precise population estimates are not available due to the absence of a reliable census method.

Populations exist in areas yielding abundant food with light textured, porous soils. Large forbed plants attract pocket gophers and thus, fields of alfalfa (*Medicago sativa*) and hay are much preferred over cereal crops and fallow. Abandoned land, field edges and banks of roads, ditches and railroads also support *Geomys bursarius* activity. Extensive areas uninhabited by pocket gophers are presumably due to low land relief, allowing excess water to flood these lowlands in the spring. Low aeration of clay soils in the Red River Valley also makes burrowing in some areas very difficult.

*Geomys bursarius* distributions are geographically and ecologically directed in Manitoba. Fossorial in nature, this rodent may be limited by water, soil, and frost resulting in range, density, number and phenotypic variations in population. Altered habitats due to agricultural expansion, and the surrounding distributions of the Northern Pocket Gopher (*Thomomys talpoides*) may have both positive and negative implications for *Geomys bursarius*.

There are no provincial or federal laws protecting *Geomys bursarius* in Canada. Forage producers in Manitoba consider the rodent a pest and use various management techniques to control its activity. The Natural Grass Prairie Preserve, near Tolstoi, Manitoba, is the only area (21.7 km<sup>2</sup>) where the gophers are protected from pest control methods. *Geomys bursarius* has survived numerous eradication attempts by forage producers, extensive flooding, and adverse environmental conditions. Since the vulnerable status assigned in 1979 by COSEWIC, *Geomys bursarius* has expanded its range into areas occupied by *Thomomys talpoides*. As long as suitable habitat exists, this trend will likely continue as the *Geomys* species remains dominant over *Thomomys*. For these reasons, this report down lists the status of *Geomys bursarius* to "Not at Risk".



## Résumé

Le gauphre à poches (*Geomys bursarius*) est un herbivore fouisseur dénommé ainsi du fait de la présence de deux abajoues fourrées qui servent de réserve à aliments. Les gauphres à poches ne sont ni nocturnes ni crépusculaires et ils ont actifs à longueur d'année. Au Canada, *Geomys bursarius* est extrêmement localisé et ne se trouve que dans le sud-est du Manitoba. Dans un rapport d'état pour le CSEMDC, Shoemith (1979) a trouvé que *Geomys bursarius* occupait une zone de 567 km<sup>2</sup> à l'est d'Emerson, au Manitoba, et au sud de la rivière Roseau. Depuis ce temps-là, on n'a pas fourni de rapports détaillées de sa répartition; cependant, Wrigley et autres (1991) ont trouvé que *Geomys bursarius* a agrandi son aire de distribution de 0,5 km au nord de la rivière Roseau et de 6,6 km à l'ouest de New Rosa, au Manitoba. Mondialement *Geomys bursarius* est très répandu, se trouve en grand nombre et en sécurité dans son aire de distribution (rang global G5). Au Canada, les populations se trouvent à la lisière nord de l'aire de distribution globale et occupent moins de 3 p. 100 de la province du Manitoba (rang provincial S3). On considère que les populations sont stables et comptent environ de 8 000 individus (CSEMDC et Shoemith, 1979). Des estimations plus précises de la population ne sont pas disponibles par suite du manque d'une méthode fiable de recensement.

Les populations existent dans des zones qui produisent une nourriture abondante, avec des sols légèrement texturés et poreux. De grandes graminées attirent les gauphres à poches et de ce fait, les champs d'alfalfa (*Medicago sativa*) et le foin sont préférés aux cultures de céréales et aux jachères. Les friches, les bordures des champs et les bas-côtés des routes, les fossés et les voies ferrées soutiennent aussi l'activité de *Geomys bursarius*. Le fait que de vastes zones ne sont habitées que par les gauphres à poches tient probablement à leur relief de terres basses, permettant à un excédent d'eau d'inonder ces basses terres au printemps. Une faible aération des sols argileux de la vallée de la Rivière rouge rend très difficile de creuser des terriers dans certaines zones.

Au Manitoba, les répartitions de *Geomys bursarius* sont influencées géographiquement et écologiquement. Fouisseur par nature, ce rongeur peut être limité par l'eau, le sol et les gelées, d'où découlent des variations en distribution, en densité, en nombre et en phénotype dans la population. Les habitats modifiés par l'expansion agricole et les répartitions environnantes du gaufre gris (*Thomomys talpoides*) peuvent avoir des conséquences positives et négatives pour *Geomys bursarius*.

Il n'y a aucune loi fédérale ou provinciale qui protège *Geomys bursarius* au Canada. Les producteurs de fourrage du Manitoba considèrent le rongeur comme un ravageur et utilisent diverses techniques de gestion pour lutter contre son activité. La Réserve de prairie d'herbes longues, près de Tolstoi, au Manitoba, est la seule zone (21,7 km<sup>2</sup>) dans laquelle les gauphres sont à l'abri des méthodes de lutte contre les ravageurs. *Geomys bursarius* a survécu à de nombreuses tentatives d'éradication



faites par les producteurs de fourrage, à des inondations extensives et à des conditions environnementales défavorables. Depuis le statut d'espèce vulnérable attribué en 1979 par le CSEMDC, *Geomys bursarius* a agrandi son aire pour comprendre des zones occupées par *Thomomys talpoides*. Aussi longtemps qu'existera un habitat adéquat, cette tendance va probablement se poursuivre car *Geomys bursarius* reste dominant par rapport à *Thomomys talpoides*. Pour ces raisons, ce rapport ramène l'état de *Geomys bursarius* à «Non en péril».

## Introduction

The plains pocket gopher (*Geomys bursarius*) is a fossorial herbivore distinguished by the presence of two fur-lined cheek pockets used for food storage (Schwartz and Schwartz 1981, Case 1983). Morphologically and physiologically adapted to fossorial activity, it is the only species of *Geomys* found in Canada. The head is broad and flattened, equipped with small eyes and ears, and long, sharp grooved incisors (Banfield 1974, Oberpichler 1989). The lips close behind the incisors to prevent soil from entering the mouth while excavating (Banfield 1974, Jones *et al.*, 1983). The powerful shoulders support short forelimbs with claws up to 3 cm in length (Wrigley and Dubois 1973). The short and relatively hairless tail serves a sensory function as gophers move through dark tunnels.

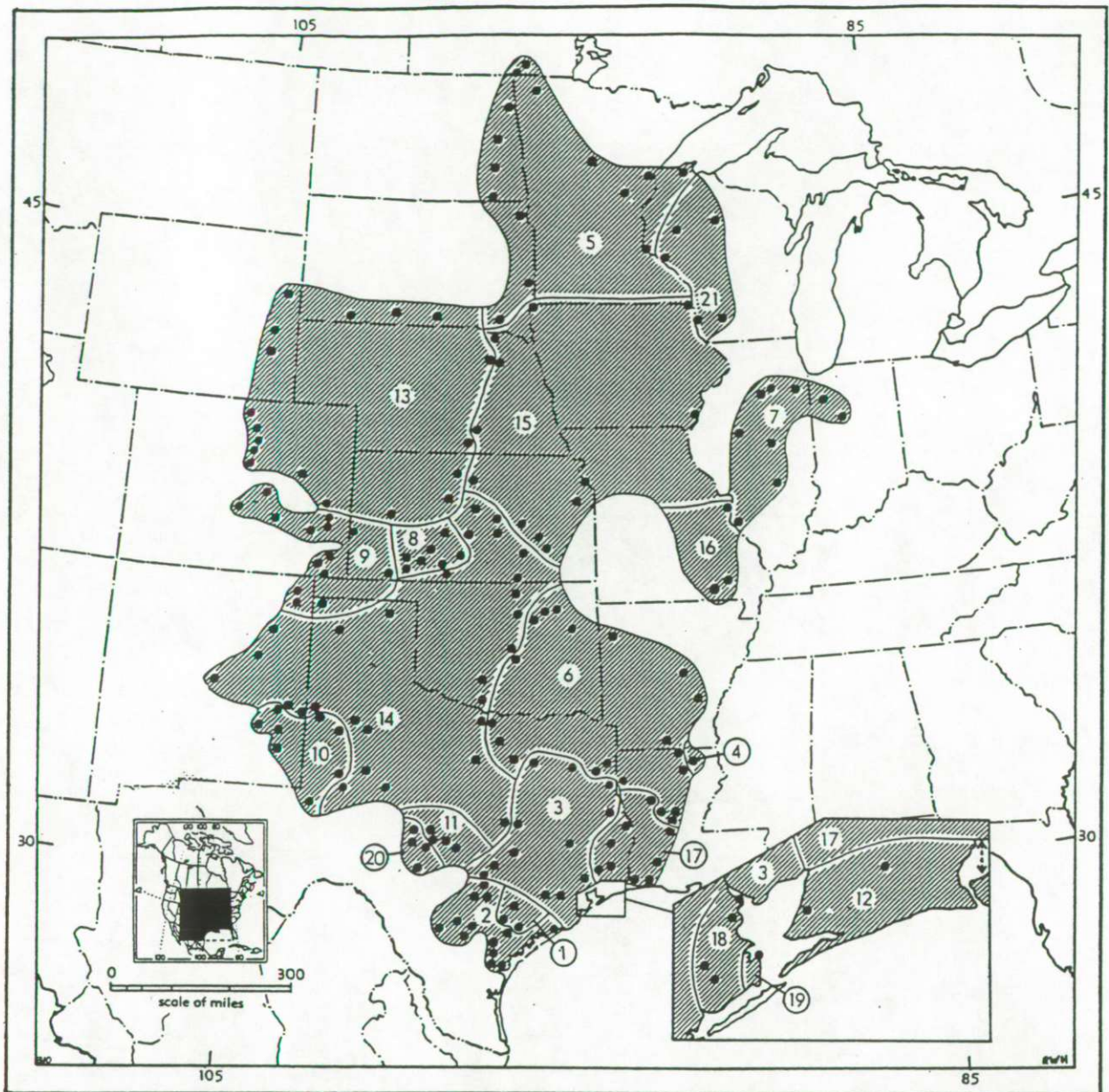
The plains pocket gopher can be distinguished from other species of pocket gophers by the presence of grooves on each upper incisor (Schwartz and Schwartz 1981, Oberpichler 1989). Adult *Geomys bursarius* in Manitoba have weights that vary from 185 grams to 442 grams, with males significantly larger than females (Wrigley *et al.*, 1991). Fur colouration is typically light brown, although lighter and darker variations have been found in the United States (Vaughan 1962).

## Distribution

*Geomys bursarius* is distributed throughout the Eastern Great Plains region of North America (Banfield 1974), extending from the north central States (along the Canadian border) to the Gulf of Mexico (Chase *et al.*, 1982, Marsh 1985). This range occupies eastern Colorado and Wyoming and stretches to northeastern Indiana (Banfield 1974) (Figure 1). In Canada, *Geomys bursarius* is extremely localized, restricted to a small area in southern Manitoba.

The area surrounding this range in Canada is occupied by the Northern Pocket Gopher (*Thomomys talpoides*), a species widespread throughout the prairies. Comparative histories of both species suggest that *Thomomys* dispersed from the southwest, whereas *Geomys* moved in from the southeast. This pattern of dispersal is reflected in their present day distribution. Both species are highly competitive with the larger, more aggressive *Geomys* partially excluding *Thomomys* from its present range. Distributions of the two species in Manitoba are parapatric (Wrigley and Dubois 1973).

Past distribution records by Wrigley and Dubois (1973) indicated that the general distribution of *Geomys bursarius* ranged from a small area east of Manitoba's Red River, extending north to the Roseau River (Figure 2). In 1989, a further 140 specimens were collected in the areas of Emerson, Gardenton, Ridgeville, Fredensthal, Green Ridge, Overstoneville,



Map 310. *Geomys bursarius*

Guide to kinds  
 1. *G. b. ammophilus*  
 2. *G. b. attwateri*  
 3. *G. b. brazensis*  
 4. *G. b. breviceps*  
 5. *G. b. bursarius*

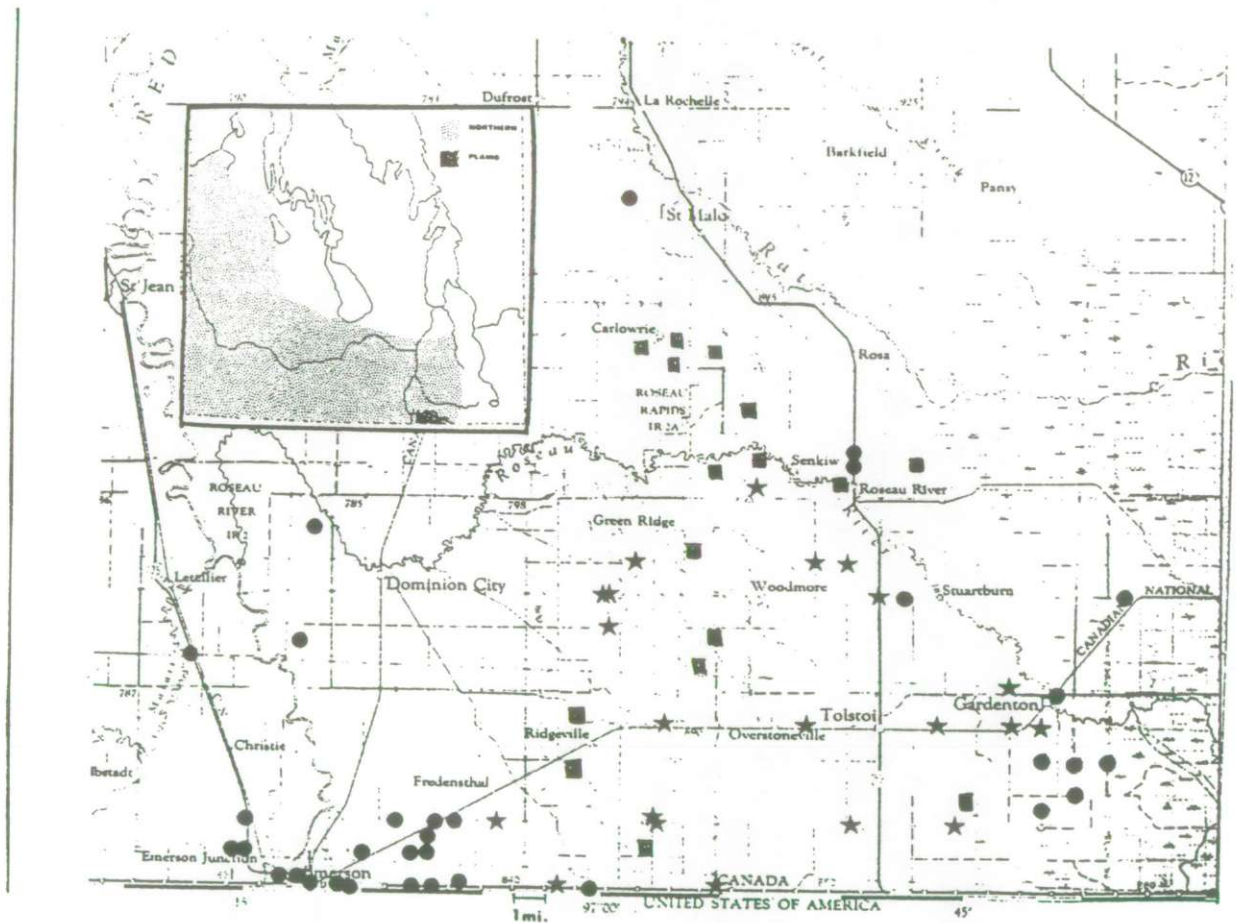
6. *G. b. dutcheri*  
 7. *G. b. illinoensis*  
 8. *G. b. industrius*  
 9. *G. b. jugossicularis*  
 10. *G. b. knoxjonesi*  
 11. *G. b. llanensis*

12. *G. b. ludemani*  
 13. *G. b. lutescens*  
 14. *G. b. major*  
 15. *G. b. majusculus*  
 16. *G. b. missouriensis*  
 17. *G. b. pratincola*

18. *G. b. sagittalis*  
 19. *G. b. terricolus*  
 20. *G. b. texensis*  
 21. *G. b. wisconsinensis*

**Figure 1:** North American distribution of *Geomys bursarius*. *Geomys bursarius bursarius* (5) is the only subspecies found in Canada (Hall 1981).





**Figure 2:** Past distribution records of *Geomys bursarius* (stars) and *Thomomys talpoides* (dots) in southeastern Manitoba (Wrigley and Dubois 1973). Present distribution of *Geomys bursarius* (squares) as indicated by Oberpichler 1989 and Wrigley et al. 1991. Inset, general distribution of *Geomys bursarius* and *Thomomys talpoides* in Manitoba.

Roseau River, Stuartburn, Tolstoi, Woodmore, Senkiw and New Rosa (Wrigley *et al.*, 1991). These records, combined with Shoemith (1979) estimate that *Geomys bursarius* occupies an area 21.5 x 33.6 km ENE of Emerson, with the northern record 0.5km N, 6.6km W Rosa (Figure 2). Since the previous status report by Shoemith (1979), *Geomys bursarius* has expanded its range north, crossing the Roseau River and forcing out *Thomomys talpoides*. At present, *Geomys bursarius* occupies less than 3% of the province, with an approximate range of 725.7 km<sup>2</sup>.

### Habitat

*Geomys bursarius* is a fossorial herbivore, using extensive tunnel systems to access food items and provide shelter. Although soil type does not seem to be an absolute limiting factor in the distribution of the species, populations are likely to exist in areas yielding abundant food, with light, textured, porous soils, allowing for firm tunnels and adequate gas exchange (Wrigley and Dubois 1973, Case 1988). The majority of southeastern Manitoba consists of a sandy lacustrine soil material of various thickness, overlying a till layer. This soil type is imperfectly to poorly drained (Eilers, pers. comm. 1996).

Distribution patterns evolved along with the vegetative changes that occurred in the North American Great Plains during the Holocene. The tall-grass and mixed grass prairies are typical habitats, however, forage fields that have replaced many of these areas in Manitoba seem to support the largest populations (Wrigley and Dubois 1973). Vegetative communities associated with pocket gopher presence include; alfalfa (*Medicago sativa*), quack grass (*Elytrigia repens*), legumes, and other mixed-grasses (Bonney 1994). An increase in total improved land (altered for use as forage) in southeastern Manitoba has provided a preferred habitat for *Geomys bursarius* (Oberpichler 1989). The species seems to acclimate to both cultivated and non-cultivated areas. The vast distribution range of *Geomys bursarius* throughout North America can be attributed to its ability to tolerate both coarse textured and compact soil types, as well as survive on a variety of vegetation.

### Protection

There are no provincial or federal laws protecting *Geomys bursarius*. The geographical range of *Geomys* is found almost entirely in the United States, with a small portion extending over the Canadian border. Due to its limited range and population in Canada, COSEWIC designated the species as "Rare" in 1979 (Shoemith 1979), and revised this status to "Vulnerable" in 1990.

*Geomys*, like *Thomomys*, is considered a pest to forage producers. Surface mounds smother crops and can cause economic loss due to machine damage during harvesting and crop consumption. Both species have been controlled (using various techniques) on forage fields since the 1930's (Case 1983).

Although there is no legal protection for *Geomys bursarius* in Canada, some individuals occur in the Tall Grass Prairie Preserve (near Tolstoi, MB.). This is the only protected area within its range, covering 21.7 km<sup>2</sup>(approximately 3% of the present range in Manitoba).

### Population Size and Trends

The only reported estimates of population size for *Geomys bursarius* in Canada were available from the Manitoba Conservation Data Centre (MCDC) and the original status report by Shoesmith (1979). Due to the fossorial nature of the species and its activities in different habitats, the development of an accurate census method has been difficult. The status report by Shoesmith (1979) gave an estimated population size of 8000 gophers in Manitoba. This is consistent with the MCDC estimation of 3000-10,000 individuals.

Although uncommon throughout Manitoba, the population is considered stable. In the U.S., the plains pocket gopher population is demonstrably widespread and "ineradicable under present conditions"( MCDC 1997).

Population size fluctuates seasonally with temperature, water levels, freezing line level, and human disturbance. Long term trends on the species have not been recorded in Manitoba, however (Wrigley *et al.*, 1991) state that the species distribution has expanded north since the COSEWIC status report in 1979. This would suggest a rising population trend for *Geomys bursarius* in Manitoba.

### General Biology

Little is known about the general biology of *Geomys bursarius* in Canada although extensive studies have taken place in the United States. The information provided will review the published literature, making note of the differences that may occur in Canada.

#### Reproductive capabilities and dispersal

Pocket gophers are territorial, with an individual defending the vicinity of its burrow. They are not colonial as individuals are solitary and show little tolerance of other individuals within the territory. This behaviour is relaxed during the breeding season, when tunnel systems will support dual occupants (Hansen and Miller 1959). The species produces one litter a year in Manitoba (Wrigley *et al.*, 1991). Gestation has been estimated at 51 days (Sudman *et al.*, 1986) and an approximate average litter size of 4, with a range of 1 to 8 (Wrigley *et al.*, 1991, Vaughan 1962). (Wrigley *et al.*, 1991) anticipated that births in Manitoba populations are restricted to the period from mid-April to late July. Breeding season onset was difficult to determine as *Geomys bursarius* is inaccessible in early spring as snow covers the ground. The extended

breeding season of *Geomys bursarius* has adaptive value as pocket gophers have little opportunity to meet the opposite sex because of their subterranean existence and often isolated home ranges (Wrigley *et al.*, 1991). In the early spring, frozen ground restricts accessibility of mates to those that live in adjacent burrows.

Young pocket gophers begin to eat solid food at 17 days and attain 92% of full adult size by 4-5 months (Andersen 1978). Competitive behaviour is evident by 50 days, at which time the young are expelled from the maternal burrow (Anderson 1978). Vaughan (1962) and (Sudman *et al.*, 1986) estimated that young dispersed from the maternal burrow when they weighed 80-100g.

Females reach reproductive maturity in their first season, whereas males do not have reproductive capabilities until the following year. Successful breeding activity in males has been loosely related to larger adult size (Daly and Patton 1986). Historically, *Geomys bursarius* was believed to be polygamous, due to the skew in sex ratio which favoured females over males (Howard and Childs 1959). There has been recent evidence, however, that *Geomys bursarius* practices serial monogamy, as males have been discovered caring for the young in maternal nests (Reichman *et al.*, 1982). Evidence of consistent courtship behaviour has not been observed in *Geomys bursarius* (Andersen 1978).

Intra-specific aggression is the key factor in the dispersal of immature individuals from the maternal burrow (Vaughan 1962, Williams and Cameron 1984). In comparison to surface dwelling rodents, the pocket gopher has a very low dispersal rate which is due to their fossorial nature (Williams and Cameron 1984). There is a correlation between the first sign of young pocket gophers and the percent dispersal. This relationship is clouded by a long reproductive season and the level of tolerance for the young displayed by the adults (Williams and Cameron 1984). These factors, among others, allow for the gradual incorporation of juveniles into the existing population.

In dispersal studies, Vaughan (1962) observed a number of injuries on young and female gophers trapped before and during the time of expected dispersal. These injuries were a result of aggressive behaviour between the mother and other siblings in the burrow, which eventually pressured individuals to disperse (Vaughan 1962). Case (1988) speculates that the mortality of young during aboveground dispersal is as high as 90%.

### **Food habits**

*Geomys bursarius* is a general herbivore, due to the high cost involved in foraging by burrowing. Other species of pocket gophers are generally similar in life history and morphology, however, they differ in food preferences and available resources. It is the primary non-ungulate consumer of grass on rangelands in Colorado (Myers and Vaughan 1964). Unlike *Thomomys*, whose diet consists largely of forbs,



*Geomys bursarius* is well adapted to a diet high in grass. In Manitoba, a wide variety of grasses and forages are consumed, of which include: *Medicago sativa* (alfalfa), *Elytrigia repens* (quack grass), *Taxacum officinale* (common dandelion), *Achillea banulosa* (western yarrow), and *Andropogon gerardii* (big bluestem) (Ward and Keith 1962, Vaughan 1967). A difference in food resources can have a large effect on the demographic attributes of the pocket gopher, namely body size and growth rates (Smith and Patton 1980, Williams and Cameron 1990).

As the availability of appropriate food items decreases, pocket gophers will move greater distances to obtain sufficient resources. Pocket gopher populations are considered to be food limited (Andersen and MacMohan 1981). *Geomys bursarius* shows a distinct seasonal change in preferred plant species, shifting from forbs to grasses. This shift is thought to reflect the abundance of available plants, as March through August yields forb growth and September through February is abundant in grasses (Myers and Vaughan 1964). When faced with a shift in plant species, other pocket gophers (*Thomomys talpoides*) do not fare as well. In a study done by Ward and Keith (1962), a 37% decrease in forb plants caused a population drop of 87% in *Thomomys*, whereas *Geomys* thrived. An analysis of the *Geomys bursarius* diet revealed that perennial dicots were preferred over annual dicots and grasses (Williams and Cameron 1990).

Foraging strategies within territories are not dependent on plant biomass as burrowing instinctively continues at a level set by internal energy stores (Andersen 1987). High burrowing rates provide an abundance of information on habitat quality, as well as increase the chances of encountering food. The cost of a tunnel system is offset somewhat by the fact that the gopher can travel back to profitable areas without having to repeat the search process, or rely on spatial memory (Andersen 1990). The combination of results on forage strategies indicate that the behavioural drive to burrow may not hinge directly on food availability. Burrowing may function to wear down the incisors and foreclaws, as well as to simply fulfill an exploratory drive (Andersen 1987).

The pressures for gophers to effectively utilize space in relation to neighbours and resources is enormous, due to the high costs of burrowing. In non-fossorial species, home ranges tend to overlap, as well as shift periodically. The burrow system of *Geomys bursarius* is an entity unto itself, influenced by the food resources available, the size of the individual and the soil type. The species has linear, branching systems with an adaptive geometry of spacing between individuals. The spacing within and between burrow systems is remarkably constant for all sizes and sexes (Reichman *et al.*, 1982). The patterns of burrow placement are very complex and non-random, as burrows do not intersect each other (Reichman *et al.*, 1982). The extreme uniformity of spacing, shape and configuration found with each population suggests that individuals follow an intrinsic placement and burrow architecture. This hypothesis is supported by other burrow construction studies (Vleck 1981, Andersen 1987).

*Geomys bursarius* has the ability to space burrows without encountering another individual systems. This phenomenon has left scientists perplexed. Food detection is limited by the lack of light and air movement below ground (Andersen 1987). Pocket gophers can pass as close as 10 cm from a food item without detecting it. However, *Geomys bursarius* must be consciously aware of neighbours because abandoned systems (from trap removal) are quickly taken over by other individuals (Reichman *et. al.*, 1982).

### **Predators**

The plains pocket gopher is the target of several predators. Some of these predators, namely weasels (*Mustela frenata*, *Mustela erminea*), and striped skunk (*Mephitis mephitis*), are able to breach the tunnel systems (Case 1988). Pocket gophers can be dug out of their burrows and attacked while foraging or dispersing above ground by other mammalian predators including the badger (*Taxidea taxus*), coyote (*Canus latrans*), fox (*Vulpes vulpes*), and domestic cats and dogs (Case 1988). Avian predators include the owl (*Bubo virginianus*), and hawk (*Accipiter gentilis*, *Buteo jamaicensis*) (Case 1988). Pocket gophers will respond to an intruder by assuming a threat posture and attacking. In general, smaller rodents, such as squirrels and kangaroo rats actively avoid the aggressive pocket gopher. Pocket gophers will also plug any tunnel that has been breached or disturbed in any way.

### **Limiting Factors**

Factors limiting population size and distribution of *Geomys bursarius* in Canada include: natural barriers, environmental conditions, and human disturbance. The principal regulatory factor determining the density of *Geomys bursarius* populations is the suitability of the habitat; food, cover, soil type and moisture (Chase *et al.*, 1982).

Snow melt and resulting high water tables may be critical factors related to the survival of *Geomys bursarius*. The Roseau River and its tributaries extending throughout the *Geomys* range swelled with the flooding of the Red River Valley in 1997. Although the actual flood zone documented by the Department of Natural Resources (1997) did not include the *Geomys bursarius* range, many fields that supported populations were under water in May, 1997. Areas surrounding the Gardenton Community Pasture and along the Vita drain (west of Vita, Manitoba) experienced flooding, which could have accounted for the low population numbers reported in these areas. (Kevin Johnson: Manager, Gardenton Community Pasture, pers. comm. 1997). At best, the plains pocket gopher is an average swimmer (Hickman 1977) and under recent flood conditions the likelihood of transversing the swollen Roseau River or surviving in flooded areas was low. Intermittent fluctuations in population size from high water, however, are not uncommon in Manitoba.

Although *Geomys bursarius* does not seem to be restricted to specific soil types and can survive on an array of vegetation (Wrigley and Dubois 1973), they do have preferences. These areas include nutrient rich vegetation (eg. *Medicago sativa*), loose soils and marginal slopes (Case 1988, Runnells 1988). Upon crossing the Roseau River, non-preferred soil types were likely encountered (Oberpichler 1989, Wrigley *et al.*, 1991). Much of the area surrounding the present range of *Geomys bursarius* is unsuitable habitat (swamps, forests, grain crops), thus restricting the species.

Temperature may also play a role in determining the success of the species. Cold winters and deep frosts penetrate burrow systems contributing to the annual mortality of *Geomys bursarius*.

*Geomys bursarius* has survived repeated extermination efforts in the US and Manitoba (Shoesmith 1979). For example, favourable sites such as alfalfa and tame hay fields are cultivated prematurely as a means of gopher control. A movement from forage production towards grain and oilseeds would also reduce the available prime habitat for *Geomys bursarius*. Other common control methods used in Manitoba include trapping and rodenticide use (Luce *et al.*, 1981, Barnes *et al.*, 1982, Hegarty 1984, Oberpichler 1989, Deniset 1994, Entz *et al.*, 1995, Dewandel 1997). Most of these methods are initially effective, however pocket gophers are quick to repopulate forage fields and pastures (Dewandel 1997).

#### Special Significance of the Species

Along with the bison (*Bison bison*) and prairie dogs (*Cynomys spp.*), *Geomys bursarius* has contributed greatly to the formation of the prairie soil (Mielke 1977, Forsyth 1985). When the North American prairies were grazed by the bison, dense vegetation was trampled, accelerating forb growth on which the gophers thrived. *Geomys*, in turn, worked the soil, thus increasing fertility and vegetation for the bison (Mielke 1977, Chase *et al.*, 1982). Although difficult to evaluate, constant soil displacement must be beneficial to soil formation and vegetative growth over time. Large populations can also cause changes in plant composition. Ellison and Aldous (1952) reported that when pocket gophers were present, the common dandelion (*Taxaxacum officinale*) decreased and rhizomatous species, grasses, sedges, and forbs increased. By changing soil condition, pocket gophers can often grow their own food (Turner *et al.*, 1973). Overall, fossorial activity deepens the soil profile, improves soil porosity and provides fresh seedbeds for annuals, weeds and early succession flowering plants (Schwartz and Schwartz 1981, Jones *et al.*, 1983, Deniset 1994, Dewandel 1997). This holds special significance because the World Wildlife Fund (1988) designated the prairie to be one of the most endangered ecosystems in Canada.

The plains pocket gopher also provides a scientific value (van Zyll de Jong and Nero 1971, Oberpichler 1989). *Geomys bursarius* would make an excellent subject for the study of limiting factors of temperature, water, soil, and interspecific competition.

These factors can result in density, range, number and phenotypic variations in Canadian populations (Smith 1980, Odum 1983).

### **Recommendations/Management Options**

The recommendations/management options are on file with the Terrestrial Mammals Species Specialist Group, the jurisdiction and the COSEWIC Secretariat. If you wish additional information please contact Dr. James Duncan, Acting Chief, Biodiversity Conservation Section, Wildlife Branch, Department of Natural Resources, Government of Manitoba, Ébox 24, 200 Saulteaux Crescent, Winnipeg, Manitoba, R3J 3W3.

### **Evaluation**

The amount of habitat available to *Geomys bursarius* in Manitoba has changed since 1979. Improved land altered for forage use has increased throughout its range, providing optimum habitat (Oberpichler 1989). Areas surrounding the present range are considered less than optimal with wet and wooded habitats generally avoided (Wrigley and Dubois 1973, Oberpichler 1989). According to (Wrigley *et al.*, 1991), the range of *Geomys bursarius* has increased, crossing the Roseau River to a maximum of 0.5 km N, 6.6 km W of Rosa. *Thomomys talpoides* was encountered in these new areas, however (Wrigley *et al.*, 1991) suggest that the more aggressive *Geomys* species was able to partially exclude *Thomomys*.

Controlling *Geomys bursarius* on forage fields in Manitoba is still common practice for producers. The species has survived numerous control strategies and natural disasters (1997 flood) in Manitoba with no direct evidence of a downward population trend at this time. Globally ranked a G5 by the Heritage Conservancy, the species is widespread and abundant throughout the United States. In Manitoba, *Geomys bursarius* is at the northern fringe of its distribution and occupies approximately 3% of the province. However stable in population, it is ranked S3 provincially.

For these reasons, the authors suggests that *Geomys bursarius* be downlisted to "Not at Risk". Efforts should still be made, however, to monitor the species and habitat, noting any change in population number and habitat loss.

### **Acknowledgements**

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) provided financial support for the preparation of this report. I thank Bob Jones (Manitoba Department of Natural Resources), Dr. Rick Baydack (Natural Resources Institute, University of Manitoba) and David Nagorsen (Curator of Mammalogy, Royal British Columbia Museum) for giving me the opportunity to write the report. Special thanks is given to Jack Dubois (Associate Curator of Mammalogy, Manitoba Museum)

and Mel Dubois (Natural Resources Institute) for sharing their knowledge of the species, reviewing earlier versions of the document and providing distribution maps of the *Geomys* range. Thanks is also extended to Steve Malcolm (Park Warden, Riding Mountain National Park) for his assistance and insight in the field. And finally, thanks to Francis Blouin at the Manitoba Conservation Data Centre for his prompt replies regarding the provincial and global ranks of the species under study.

### **Biographical Summary of Author**

David Nagorsen, Co-chair Mammals Species Specialist Group has lost touch with the author, so no biographical summary is available.

### **Personnel Communciations**

Bonnefoy, G. 1994. Secretary/Treasurer. Manitoba Forage Council. Winnipeg, Manitoba.

Eilers, R. 1996. Soils Branch. Department of Agriculture. Winnipeg, Manitoba

Johnson, K. 1997. Manager. Gardenton Community Pasture. Gardenton, Manitoba.

## Literature Cited

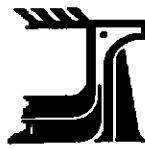
- Andersen, D.C. 1978. Observations on reproduction, growth and behaviour of the northern pocket gopher (*Thomomys talpoides*). *Journal of Mammalogy*, 59:418-422
- Andersen, D.C. 1987. *Geomys bursarius* burrowing patterns: influence of season and food patch structure. *Ecology*, 68: 1306-1318.
- Andersen, D.C. 1990. Search path of a fossorial herbivore: *Geomys bursarius*, foraging in structurally complex plant communities. *Journal of Mammalogy*, 71(2): 177-187.
- Andersen, D.C. and J.A. MacMahon. 1981. Population dynamics and bioenergetics of a fossorial herbivore, *Thomomys talpoides* (Rodentia: Geomyidae), in a spruce-fir sere. *Ecological Monographs*, 51(2): 179-202.
- Banfield, A.W.E. 1974. *The Mammals of Canada*. University of Toronto Press. Toronto. 438pp.
- Barnes, V.G., R.M. Anthony, J. Evans, G.D. Lindsay. 1982. Evaluation of zinc phosphide bait for pocket gopher control on forest land. *Proceedings of the 10th Vertebrate Pest Conference*, Davis, California. 6pp.
- Case, R. M. 1983. *Pocket Gophers*. University of Nebraska. Lincoln, Nebraska. 14pp.
- Case, R. M. 1988. Managing damage to alfalfa caused by plains pocket gophers. P. 160-161. *In the 9<sup>th</sup> Great Plains Wildlife Damage Control Workshop: Proceedings of the workshop*. Fort Collins, Colorado.
- Chase, J.D., W.E. Howard, and J.T. Roseberry. 1982. Pocket gophers, p. 239-255. *In* J.A. Chapman and G.A. Feldhamer (eds.), *Wild mammals of North America*. John Hopkins University Press, Baltimore.
- Daly, J. C. and J. L. Patton. 1986. Growth, reproduction and sexual dimorphism in *Thomomys bottae*, pocket gophers. *Journal of Mammalogy*, 67: 256-265.
- Deniset, Y. 1994. Northern Pocket Gopher (*Thomomys talpoides*) control in Agro-Manitoba. MNRM Practicum. Natural Resources Institute, University of Manitoba. Winnipeg, Manitoba.
- Department of Natural Resources (DNR). 1997. Flood Zone Map: 1997 Flooding of the Red River. Winnipeg, Manitoba.

- DeWandel, M. L. 1997. Management strategies for the control of northern pocket gophers (*Thomomys talpoides*) in Agro-Manitoba. MNRM Practicum. Natural Resources Institute, University of Manitoba. Winnipeg, Manitoba.
- Ellison, L., and C.M. Aldous. 1952. Influence of pocket gophers on vegetation of subalpine grassland in central Utah. *Ecology*, 33(2): 177-186.
- Entz, M.H., W.J. Bullied, F. Katepa-Mupondwa. 1995. Rotational benefits of forage crops in Canadian prairie cropping systems. *Journal of Production Agriculture*, 8:521-529.
- Forsyth, A. 1985. *Mammals of the Canadian Wild*. Camden House Publishing Ltd., Camden East, Ontario. 351pp.
- Hall, E.R. 1981. *Mammals of North America*. Vol. 1., 2nd. Ed., John Wiley and Sons. New York. 600pp.
- Hansen, R.M., and R.S. Miller. 1959. Observations on the plural occupancy of pocket gopher burrow systems. *Journal of Mammalogy*, 140(4): 577-5.
- Hegarty, P.J. 1984. Effects of the plains pocket gopher (*Geomys bursarius*) on hay meadows and irrigated alfalfa in the Nebraska Sandhills. M.S. Thesis, University of Nebraska, Lincoln. 139pp.
- Hickman, G.C. 1977. Swimming behaviour in the representative species of the three genera of North American geomyids. *Southwestern Naturalist*, 21(4): 531-538.
- Howard, W.E., and H.E. Childs. 1959. Ecology of pocket gophers with emphasis on *Thomomys bottae mewa* Hilgardia, 29: 277-358.
- Jones, J.K., D.K. Armstrong, R.S. Hoffman, and C. Jones. 1983. *Mammals of the Northern Great Plains*. University of Nebraska Press, Lincoln, Nebraska. 379pp.
- Luce, D.G., R.M. Case, and J.L. Stubbendieck. 1981. Damage to alfalfa fields by the plains pocket gopher. *Journal of Wildlife Management*, 45(1) 258-260.
- Marsh, R.E. 1985. Problems and solutions of common formulation and storage factors leading to poor quality rodent baits. *International Pest Control*, 27(5): 119, 121.
- Mielke, H.W. 1977. Mound building by pocket gophers (*Geomyidae*): their impact on soils and vegetation in North America. *Journal of Biogeography*, 4:171-180.



- Myers, and T.A. Vaughan. 1964. Pocket gopher food habits. *Journal of Mammalogy*, 45(4): 582-597.
- Oberpichler, M. 1989. The Plains Pocket Gopher (*Geomys bursarius*) in Manitoba - An assessment of its biology, habitat requirements, and management options. Practicum. Natural Resources Institute. University of Manitoba. Winnipeg, Manitoba.
- Odum, E.P. 1983. *Basic Ecology*. Saunders College Publishing. Toronto, Ontario. 613pp.
- Reichman, O.J., T.G. Whitman, and G.A. Ruffner. 1982. Adaptive geometry of burrow spacing in two pocket gopher populations. *Ecology*, 63: 687-695.
- Runnells, J. 1988. Some aspects of population dynamics within a southern Saskatchewan population of northern pocket gophers. M. S. Thesis, University of Regina, Saskatchewan. 117pp.
- Schwartz, C., and E. Schwartz. 1981. *The Wild Mammals of Missouri*. University of Missouri Press, Columbia, Missouri. 166-171.
- Shoesmith, M. 1979. Status of the plains pocket gopher in Manitoba in The Committee on the Status of Endangered Wildlife in Canada (COSEWIC): history and progress. *Canadian Field Naturalist*, 98(1): 63-70.
- Smith, R.L. 1980. *Ecology and Field Biology*. 3rd ed. Harper and Row, New York, N.Y. 835pp.
- Smith, M.F., and J.L. Patton. 1980. Relationships of pocket gophers (*Thomomys bottae*) of the lower Colorado River. *Journal of Mammalogy*, 61: 733-756.
- Sudman, P.D., J.C. Burns, and J.R. Choate. 1986. *Texas Journal of Science*, 38: 91-94.
- Turner, G.T., R.M. Hansen, V.H. Reid, H.P. Tietjen, and A.L. Ward. 1973. Pocket gophers and Colorado mountain rangeland. *Colorado State University Experimental Station Bulletin*. 554S. 90pp.
- van Zyll de Jong, C.G., and R. Nero. 1971. *Extinct, Rare, and Endangered Wildlife of Manitoba*. Manitoba Department of Mines, Resources, and Environmental Management, Winnipeg, Manitoba. #71-2. 55pp.
- Vaughan, T.A. 1962. Reproduction of the plains pocket gopher in Colorado. *Journal of Mammalogy*, 43(1): 1-13.

- Vleck, D. 1981. Burrow structure and foraging costs in the fossorial rodent, *Thomomys bottae*. *Oecologia* (Berl), 49:391-396.
- Ward, A.L., and J.O. Keith. 1962. Feeding habits of pocket gophers on mountain grasslands, Black Mesa, Colorado. *Ecology*, 43(4): 746-749.
- Williams, L.R., and G.N. Cameron. 1984. Demography of dispersal in Attawater's Pocket Gopher (*Geomys attawateri*). *Journal of Mammalogy*, 65 (1): 67-75.
- Williams, L.R., and G.N. Cameron. 1990. Intra specific response to variation in food resources by Attawater's Pocket Gopher. *Ecology*, 71(2):797-810.
- World Wildlife Fund. 1988. Prairie Conservation Action Plan: 1989-1994. World Wildlife Fund Canada. Toronto, Ontario. 38pp.
- Wrigley, R.E. and J.E. Dubois. 1973. Distribution of the pocket gophers *Geomys bursarius* and *Thomomys talpoides* in Manitoba. *The Canadian Field Naturalist*, 87:167-169.
- Wrigley, R.E., J.E. Dubois, and H.W.R. Copland. 1991. Distribution and ecology of six rare species of prairie rodents in Manitoba. *The Canadian Field Naturalist*, 105: 1-12.



## MANDATE

**COSEWIC** determines the national status of wild species, subspecies, varieties and nationally significant populations that are considered to be at risk in Canada. Designations are made on all native species for the following groups: fish, amphibians, reptiles, birds, mammals, molluscs, lepidoptera, vascular plants, mosses and lichens.

## MEMBERSHIP

**COSEWIC** is comprised of representatives from each provincial and territorial government wildlife agency, four federal agencies (Canadian Wildlife Service, Parks Canada Agency, Fisheries and Oceans Canada, and the Federal Biosystematic Partnership), three national conservation organizations (Canadian Nature Federation, Canadian Wildlife Federation, and World Wildlife Fund Canada) and the chairs of the scientific species specialist groups. The Committee meets twice a year to consider status reports on candidate species.

## DEFINITIONS

<b>Wildlife Species</b>	- A species, subspecies, variety or biographically distinct population of animal, plant or other organism, other than a bacteria or virus, that is wild by nature and (a) is native to Canada; or (b) has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
<b>Species at Risk</b>	- An extirpated, endangered or threatened species or a species of special concern.
<b>Extinct (X)</b>	- A wildlife species that no longer exists.
<b>Extirpated (XT)</b>	- A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
<b>Endangered (E)</b>	- A wildlife species that is facing imminent extirpation or extinction.
<b>Threatened (T)</b>	- A wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.
<b>Special Concern* (SC)</b>	- A wildlife species that is of special concern because it is particularly sensitive to human activities or natural events, but does not include an extirpated, endangered or threatened species.
<b>Not at Risk** (NAR)</b>	- A species that has been evaluated and found to be not at risk.
<b>Data Deficient*** (DD)</b>	- A species for which there is insufficient scientific information to support a 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.



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. COSEWIC meets annually in April each year. Species designated at this meeting are added to the list.



Environment  
Canada  
Canadian Wildlife  
Service

Environnement  
Canada  
Service canadien  
de la faune

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