

Management Plan for the Black-tailed prairie dog (*Cynomys ludovicianus*) in Canada

Black-tailed Prairie Dog



June 2009

About the *Species at Risk Act* Management Plan Series

What is the *Species at Risk Act* (SARA)?

SARA is the Act developed by the federal government as a key contribution to the common national effort to protect and conserve species at risk in Canada. SARA came into force in 2003, and one of its purposes is “*to manage species of special concern to prevent them from becoming endangered or threatened.*”

What is a species of special concern?

Under SARA, a species of special concern is a wildlife species that could become threatened or endangered because of a combination of biological characteristics and identified threats. Species of special concern are included in the SARA List of Wildlife Species at Risk.

What is a management plan?

Under SARA, a management plan is an action-oriented planning document that identifies the conservation activities and land use measures needed to ensure, at a minimum, that a species of special concern does not become threatened or endangered. For many species, the ultimate aim of the management plan will be to alleviate human threats and remove the species from the List of Wildlife Species at Risk. The plan sets goals and objectives, identifies threats, and indicates the main areas of activities to be undertaken to address those threats.

Management plan development is mandated under Sections 65–72 of SARA (http://www.sararegistry.gc.ca/approach/act/default_e.cfm).

A management plan has to be developed within three years after the species is added to the List of Wildlife Species at Risk. Five years is allowed for those species that were initially listed when SARA came into force.

What's next?

Directions set in the management plan will enable jurisdictions, communities, land users, and conservationists to implement conservation activities that will have preventative or restorative benefits. Cost-effective measures to prevent the species from becoming further at risk should not be postponed for lack of full scientific certainty and may, in fact, result in significant cost savings in the future.

The series

This series presents the management plans prepared or adopted by the federal government under SARA. New documents will be added regularly as species get listed and as plans are updated.

To learn more

To learn more about the *Species at Risk Act* and conservation initiatives, please consult the SAR Public Registry (<http://www.sararegistry.gc.ca/>) and the Web site of the Recovery Secretariat (http://www.speciesatrisk.gc.ca/recovery/default_e.cfm).

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Additional copies can be downloaded from the SAR Public Registry (<http://www.sararegistry.gc.ca/>).

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DECLARATION

Under the *Accord for the Protection of Species at Risk* (1996), the federal, provincial, and territorial governments agreed to work together on legislation, programs, and policies to protect wildlife species at risk throughout Canada. The *Species at Risk Act* (S.C. 2002, c.29) (*SARA*) requires that federal competent minister(s) prepare management plans for listed Special Concern species.

The Minister of the Environment presents this document as the management plan for the black-tailed prairie dog as required under *SARA*. It has been prepared in cooperation with the jurisdictions responsible for the species, as described in the Preface. The Minister invites other jurisdictions and organizations that may be involved in recovering the species to use this management plan as advice to guide their actions.

Success in the conservation of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this plan. In the spirit of the *Accord for the Protection of Species at Risk*, all Canadians are invited to join in supporting and implementing this plan for the benefit of the species and of Canadian society as a whole. The competent ministers will report on progress within five years.

AUTHORS

This strategy was written by Joanne Tuckwell, Parks Canada Agency, Winnipeg, Manitoba and Tian Everest, Calgary Zoological Society, Calgary, Alberta, and in collaboration with the Canadian Black-footed Ferret / Black-tailed Prairie Dog Recovery Team.

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Co-chairs:

Pat Fargey, Parks Canada Agency
Joanne Tuckwell, Parks Canada Agency

Members:

Bill Bristol, Agri-Environment Services Branch, Agriculture and Agri-Food Canada
Brad Dixon, Affected Landowner
Tian Everest, Calgary Zoological Society
Maria Franke, Toronto Zoo
David Gummer, Parks Canada Agency, formerly with the Royal Alberta Museum
Geoff Holroyd, Canadian Wildlife Service, Environment Canada
Karson Legault, Rural Municipality of Val Marie
Sue McAdam, Ministry of Environment, Saskatchewan

Robert Sissons, Parks Canada Agency
Lorne Veitch, Saskatchewan Agriculture and Food

Associate Members:

Steve Forrest, World Wildlife Fund (U.S.)
J. Michael Lockhart, formerly of the U.S. Fish and Wildlife Service
Travis Livieri, Prairie Wildlife Research

Special thanks are extended to the participants, organizers and financial supporters of four key workshops and meetings:

- Towards a Management Strategy for Black-tailed Prairie Dog and Black-footed Ferrets in Southwestern Saskatchewan (June 8 – 9, 2004 in Val Marie, Saskatchewan)
- International Black-footed Ferret Recovery Workshop (April 1 – 4, 2005 in Calgary, Alberta)
- Black-footed Ferret Recovery Strategy Workshop (September 8 – 10, 2005 in Val Marie, Saskatchewan)
- Black-footed Ferret/Black-tailed Prairie Dog Recovery Team meeting (Sept 5 – 7, 2007 in Toronto, Ontario).

The knowledge contributions provided by the participants of these workshops/meetings formed large sections of this document. Pat Fargey and Shelley Pruss (Parks Canada Agency) provided guidance and information on development and the requirements of this document. Axel Moehrenschrager (Calgary Zoological Society) provided support throughout the writing process. Judy Toews (Parks Canada Agency) also assisted with the editing of this document. The time and valuable insights contributed by the participants of the community focus groups are also greatly appreciated.

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STRATEGIC ENVIRONMENTAL ASSESSMENT

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals*. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making.

Recovery planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that plans may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts on non-target species or habitats. The results of the SEA are incorporated directly into the plan itself, but are also summarized below.

While this management plan will have an overall benefit on the environment by promoting the conservation of the black-tailed prairie dog, several potentially adverse effects were also considered. The plan calls for closely monitoring prairie dog activities and population demographics, as well as allowing the natural growth of prairie dog colonies in some areas and potentially growing prairie dog colonies through directed efforts in other areas. There is also the potential to use insecticidal dusting of prairie dog burrows to destroy fleas in the event of a plague outbreak. It was concluded that the effects of these activities can be effectively mitigated and the following measures have been incorporated into the plan: monitoring effects on other species at risk and implementing actions to mitigate these effects in conjunction with the relevant recovery teams, avoiding the growth of prairie dog colonies in sagebrush communities, and weighing the benefits of dusting prairie dog burrows against the harmful impacts to the ecosystem before launching into an insecticidal dusting program during a plague outbreak. Taking these mitigation measures into account, it was concluded that the plan will not entail any significant adverse effects.

PREFACE

This management plan addresses the management of black-tailed prairie dogs in Canada. Black-tailed prairie dogs are found only in southwestern Saskatchewan, which is the northern edge of their North American range.

Parks Canada and Environment Canada are competent for the recovery of this species. The Parks Canada Agency led the preparation of this recovery strategy with the members of the Canadian Black-footed Ferret/Black-tailed Prairie Dog Recovery Team. This strategy was developed in cooperation with the provincial and federal agencies responsible for this species and associated habitat (Saskatchewan Ministry of Environment, Saskatchewan Agriculture and Food, Agri-Environment Services Branch of Agriculture and Agri-Food Canada, Canadian Wildlife Service) as well as the Calgary Zoological Society, the Toronto Zoo and the Royal Alberta Museum.

EXECUTIVE SUMMARY

The black-tailed prairie dog (*Cynomys ludovicianus*) is a diurnal, herbivorous member of the squirrel family. Prairie dogs are highly social, burrowing mammals that live in large colonies. The black-tailed prairie dog's range spans North America's grasslands from southern Saskatchewan in Canada to Chihuahua, Mexico. In Canada, prairie dogs occur only in southwest Saskatchewan adjacent to and in the west block of Grasslands National Park. Canada's prairie dog population has remained relatively stable since 2001 and evidence suggests they were not more widely distributed during early European settlement. Across their entire range they are considered to be pests that are not welcome on most lands due to competition with grazing livestock and the possible loss of income from this competition. Many land managers hunt and poison prairie dogs and are determined to continue to do so.

Many species depend on prairie dogs; they are an important prey item and their burrows provide habitat for many species. The primary threat to prairie dogs is sylvatic plague, a disease for which no effective treatment or control measure is currently known. Studies show that sylvatic plague is present in southern Saskatchewan, although no cases have been documented in Canadian prairie dogs. Lower level threats include natural diseases (tularemia), habitat loss/degradation, predation, human persecution, drought, floods and severe winters. Sustainable grazing practices are not considered threats to prairie dogs as prairie dogs exist and even grow in areas that are managed for grazing.

The goal of this management plan is to prevent the Canadian prairie dog from becoming threatened or endangered by ensuring the population maintains at least 90 percent probability of persistence in 100 years. Within Grasslands National Park (Parks Canada Agency) the populations will be allowed to fluctuate in response to natural processes such as drought or predation. Regular monitoring will detect population changes so that appropriate actions can be taken in the event of dramatic declines that threaten the viability of the Canadian prairie dog population or if the prairie dog colonies' expansion negatively impacts other species at risk.

Research activities may occur within Grasslands National Park to develop management strategies and field methods to initiate, expand or restrict prairie dog colonies. All prairie dog colonies on land managed by the Agri-Environment Services Branch of Agriculture and Agri-Food Canada or the Province of Saskatchewan either on community pastures or crown lease land will be allowed to expand or contract within their natural levels of variation. However, due to concerns of land managers over a loss of income, management measures may be implemented by the affected land manager under the authority of a permit issued by Saskatchewan Ministry of Environment if the colonies expand beyond their 2007 boundaries. Non-lethal management measures will be encouraged to prevent unwanted expansion of prairie dogs. Stewardship agreements may also be arranged between affected landowners/managers and stewardship agencies to mitigate the effect of prairie dog expansion.

The management goals and objectives, stakeholder considerations, actions completed to date, knowledge gaps, management actions, threat mitigation, monitoring and research activities, and effects on other species are also described in this management plan.

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1. SPECIES INFORMATION

1.1. Species Assessment Information from COSEWIC (2000)

Date of Assessment: November 2000

Common Name (population): Black-tailed prairie dog

Scientific Name: *Cynomys ludovicianus*

COSEWIC Status: Special Concern

Reason for Designation: The small Canadian population is isolated from American populations, but most of its range is in a national park. Population appears to be increasing but there is a risk of sylvatic plague.

Canadian Occurrence: Saskatchewan

COSEWIC Status History: Designated Special Concern in 1978. Status re-examined and confirmed in April 1988, April 1999 and November 2000. Last assessment based on an existing status report.

1.2. Description

The black-tailed prairie dog (herein referred to as “prairie dog”) is a diurnal member of the squirrel family (Sciuridae). Adult prairie dogs have a total body length of 35 to 40 cm (Pizzimenti 1975) and weigh 500 to 1500 g (Hoogland 1995) – slightly smaller than a house cat. Both sexes have relatively long black-tipped tails (6 to 11 cm, > 20% of the total body length), brownish-tan or reddish-brown fur with off-white coloured under parts, small ears and short legs (Hollister 1916; Clark et al. 1971; Pizzimenti 1975; Hoogland 1995). Prairie dogs spend most of their time underground, are mainly herbivorous and live in family groups within colonies. In Canada, prairie dogs hibernate underground for approximately four months each winter (Gummer 2005). Aside from foraging and burrowing activities, the prairie dogs most distinctive behaviour is the territorial ‘jump-yip’ display in which they stretch out vertically, throwing their forefeet high in the air and emitting a barking sound (Hoogland 1995).

1.3. Populations and Distribution

With a historical range spanning up to 160 million hectares of grassland from Saskatchewan, Canada to Chihuahua, Mexico (Figure 1; Hall 1981), the black-tailed prairie dog is the most widely distributed of the five prairie dog species. It is closely related to the Mexican prairie dog, which appears to be a geographically isolated relict population of the black-tailed prairie dog

(Pizzimenti 1975; Hoogland 1995). The World Conservation Union lists black-tailed prairie dogs as Lower Risk Near Threatened, due largely to extensive habitat loss (Hafner 2000).

Canadian Distribution

Black-tailed prairie dogs are listed as a species of special concern in Canada (COSEWIC 2000). They are found only in extreme southern Saskatchewan adjacent to and in the lower Frenchman River valley in the Grasslands National Park area. Historical records suggest at one time prairie dogs existed only slightly further upstream along the Frenchman River (Soper 1938, 1944). In 2007, the Canadian prairie dog population consisted of 23 colonies occupying approximately 1044 ha. A single U.S. colony lies 20 km away, with the next closest being at a distance of 50 km (Gummer 1999). Overall the Canadian prairie dog population has remained relatively stable with total colony area fluctuating from a low of 1015 ha in 2000 to a high of 1275 ha in 2007 (Parks Canada unpublished data).

Global Distribution

The historical range of the black-tailed prairie dog in the U.S. included portions of Arizona, Colorado, Kansas, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas and Wyoming. The prairie dog was extirpated from Arizona and from much of the eastern fringe of its range stretching from Texas to the Dakotas (U.S. Fish and Wildlife Service 2004) and from most of Montana north of the Milk River (Montana Prairie Dog Working Group 1999). The prairie dog is listed as extirpated in Arizona and rare or uncommon in Texas, but does not have any protective status listing in other areas of its U.S. range.

Mexico's Chihuahua and Sonora states make up the southern limit of the black-tailed prairie dogs distribution. Prairie dogs are currently listed as threatened in Mexico (SEMARNAT 2002). In 2005 prairie dogs occupied approximately 14,796 ha in Mexico (R. List unpublished data). This represents a 27 percent decline since initial population assessments in 1988 conducted by Ceballos et al. (1993). Though their distribution and abundance continue to decline in Mexico, Chihuahua still has one of the largest remaining prairie dog complexes in the world.

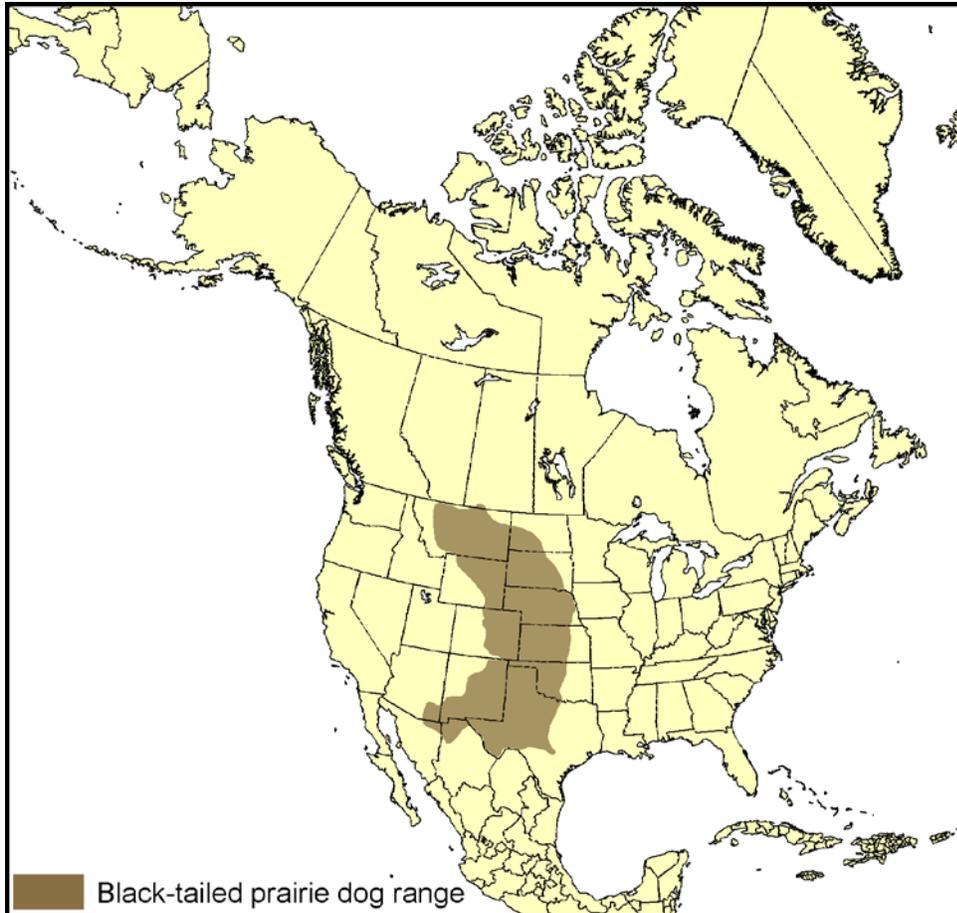


Figure 1. Geographic range of the black-tailed prairie dog (Hall 1981, Patterson et al. 2005).

1.4. Needs of the Black-tailed Prairie Dog

1.4.1. Habitat and biological needs

Black-tailed prairie dogs live in large colonies in broad, flat river valleys or upland grasslands. Prairie dogs are fossorial (burrowing) mammals that construct burrows where they sleep at night, seek protection from weather, hibernate, breed, rear their offspring and escape predators. Burrows often have multiple entrances and are typically five to ten meters long and two to three meters deep, although they can reach 33 metres in length and five metres deep (King 1955; Sheets et al. 1971). As a result, prairie dogs require soils that support extensive underground burrow systems. In Grasslands National Park, prairie dogs most often occupy deep colluvial (87%) and alluvial (13%) clay soils, but rarely exist on glacial sediments (< 1% - Parks Canada unpublished data).

Prairie dog colonies comprise territories of many family groups. Each family group typically consists of a dominant adult male, three to four adult females and several non-breeding yearlings and juveniles (Hoogland 1995). Although there is much variation, the average territory size for a

family group is approximately one-third of a hectare (Hoogland 1995). Prairie dogs breed in early spring with the young emerging from the burrow several weeks after birth. Infanticide prior to weaning and emergence appears to be a major cause of juvenile mortality (Hoogland 1995). Females can live as long as eight years while males do not typically live more than five years (Hoogland 1995). Dispersal of individuals occurs both within a colony and between colonies, although dispersal between families within a colony is most common (Garrett and Franklin 1988). Throughout most of their range prairie dogs are not considered hibernators. However, Canadian black-tailed prairie dogs hibernate for four months of the year due to adverse winter weather conditions at their northern extremity (Gummer 2005).

Black-tailed prairie dogs are herbivorous, feeding mainly on grasses and forbs (broad-leaf non-woody plants), although they sometimes eat insects such as grasshoppers and beetles (Costello 1970; O'Meillia et al. 1982). The vegetation within prairie dog colonies is shorter than adjacent areas (Koford 1958; Tileston & Lechleitner 1966) due to the prairie dogs' intense grazing and their habit of clipping of tall plants to facilitate predator detection (Hoogland 1995). Prairie dogs often colonize areas where vegetation is already short (Koford 1958; Snell 1985; Knowles 1986) thereby achieving efficient visual predator detection with minimal landscape modification (Hoogland 1995).

1.4.2. Ecological role

Prairie dogs play an important ecological role for many species. They influence biodiversity, nutrient cycling, environmental heterogeneity, hydrology and landscape-level processes (Coppock et al. 1983; Uresk 1985; Archer et al. 1987; Cid et al. 1991; Weltzin et al. 1997). Over 100 vertebrate species have been documented to use prairie dog colonies as habitat; (Sharps & Uresk 1990) as well, prairie dog communities support higher diversity and density of small mammals, terrestrial predators and avian species than surrounding areas (Hansen & Gold 1977; O'Meillia et al. 1982; Agnew et al. 1986; Krueger 1986; Reading et al. 1989). Prairie dogs also have an important impact on arthropod communities. Their burrow systems and above-ground mounds provide important habitats for multiple trophic and taxonomic groups of arthropods resulting in increased arthropod abundance and species richness (Davidson & Lightfoot 2007). Prairie dogs are prey for many species including Golden Eagles (*Aquila chrysaetos*), Ferruginous Hawks (*Buteo regalis*), prairie rattlesnakes (*Crotalus viridis*), swift foxes (*Vulpes velox*), red foxes (*Vulpes vulpes*), coyotes (*Canis latrans*), black-footed ferrets (*Mustela nigripes*) and badgers (*Taxidea taxus*). Their burrows also provide important breeding and resting sites for a number of species such as the Burrowing Owl (*Athene cunicularia*).

1.4.3. Limiting factors

Prairie dogs have a restricted distribution in Canada making them vulnerable to natural and human-induced landscape changes or catastrophes. The more northerly location of Canada's prairie dogs relative to other prairie dog populations also appears to impose additional constraints on their seasonal activities and survival. Throughout the rest of their North American range, grassland conversion to crops, combined with poisoning, sport-shooting and outbreaks of sylvatic plague have dramatically decreased prairie dog populations.

1.5. Threats

Each of the threats outlined in this section are ranked and discussed as if they occur individually. The cumulative effects of several threats occurring either together or in succession may result in a greater impact on the population than has been identified here. For example, predation is ranked as low level of concern, but when combined with other threats such as drought or harsh winter, the impact may be much more significant. Further details are found in Table 1.

1.5.1. Description of threats

Threat 1 - Sylvatic plague

Sylvatic plague, caused by the exotic bacterium *Yersinia pestis*, has been one of the most serious threats to the conservation of prairie dogs since the middle of the last century. Plague outbreaks have occurred in prairie dog colonies in several locations in the western United States resulting in 90 to 100 percent mortality (Cully & Williams 2001; Antolin et al. 2002; Stapp et al. 2004; Lorange et al. 2005). It is the only disease known to threaten prairie dog populations with high mortality and local extinction (Anderson et al. 1986; Miller et al. 1994; Biggins & Kosay 2001; Cully & Williams 2001; Pauli et al. 2006). Although it was thought that prairie dogs cannot survive in the presence of even low levels of plague, recent evidence suggests that the disease can exist in prairie dog colonies without causing widespread mortality (Hanson et al. 2007).

The main plague transmission route in prairie dogs is via the bites of infected fleas (Butler et al. 1982; Thomas et al. 1989; Castle et al. 2001; Rocke et al. 2004). The sociality of prairie dogs also facilitates rapid spread of the disease between individuals and colonies. Plague-resistant mammals, such as coyotes (*Canis latrans*) and some rodents, may serve as reservoir hosts. Disease modeling suggests that typically fleas are important in the initial introduction and establishment of plague in prairie dog colonies, but that transmission from a different short-term reservoir, such as a plague-resistant rodent species, drives a plague outbreak (Webb et al. 2006). Recent evidence suggests that, under some conditions, reservoir species may be unimportant in maintaining plague in an enzootic¹ state in the prairie dog ecosystem and that some prairie dogs may be enzootic hosts of plague (Hanson et al. 2007).

The dynamics of plague at the landscape level are currently unclear. Plague outbreaks typically appear in a limited number of colonies in a small area and then spread in a regular pattern to additional colonies over periods of two to five years (Augustine et al. 2007b). Landscape modeling suggests that roads, streams and lakes may serve as barriers to plague outbreaks in prairie dog colonies by affecting the movement of, or habitat quality for either plague hosts or fleas (Collinge et al. 2005).

Control of fleas through the application of insecticides to prairie dog burrows has been successful in curtailing plague outbreaks in the U.S. The effectiveness of several insecticides to control flea populations on prairie dogs and in prairie dog burrow systems has been investigated (Karhu & Anderson 2000; Seery et al. 2003; Hoogland et al. 2004). These studies show that

¹ An enzootic disease is constantly present in an animal population, but usually only affects a small number of animals at any one time.

dusting burrows with the insecticide deltamethrin during the early stages of an outbreak can stop the spread of plague, but application during later stages does not. It has also been shown that the effect of insecticide application on flea populations persists for two or more years. Development of a plague vaccine for prairie dogs that can be given in oral baits is in the experimental stage. Monitoring for the presence of the disease in both vertebrates and invertebrate vectors of plague can provide early warning of an outbreak.

Sylvatic plague is considered the greatest threat to prairie dogs in Canada because of the dramatic impact that a plague outbreak would likely cause. The close proximity of many prairie dog colonies may also facilitate rapid transfer of plague between the colonies. While sylvatic plague has not been documented in prairie dogs in Canada, antibodies for plague have been found in domestic dogs and cats in rural southern Saskatchewan including areas near Grasslands National Park (Leighton et al. 2001). The overall frequency of plague antibody detection was 7.5% (n = 482), with the Grasslands National Park region showing a frequency of 4.2% (n = 120). A study underway in Grasslands National Park and the surrounding area confirms potential flea vectors of plague on prairie dogs and Richardson's ground squirrels (*Spermophilus richardsonii*) and the presence of plague antibodies in coyotes in 2006/2007 (Jardine & Crawshaw unpublished data). However, with no documented outbreaks of plague in Canada, the probability of this threat occurring is unknown.

. A plague response plan for Grasslands National Park will be developed in partnership with other organizations such as Health Canada. The plague response plan will describe actions to be taken at different levels of plague detection.

Threat 2 - Other diseases

Tularemia, caused by the bacterium *Francisella tularensis*, is an endemic disease in North America affecting a number of animal species as well as humans. Tularemia is typically associated with rabbit and rodent species, including prairie dogs, although the wild animal reservoirs for this pathogen have not been fully characterized in North America (Zeidner et al. 2004). Infection in both animals and humans occurs through blood-feeding arthropods, animal bites and scratches, urine contaminated water, and inhalation of infectious aerosols. One of the best-documented outbreaks occurred in Texas in 2002. During this outbreak, 250 of an estimated population of 3600 prairie dogs died within 30 days (Zeidner et al. 2004). Tularemia has also been responsible for several die-offs of wild-caught prairie dogs in the U.S.

The overall frequency of tularemia antibody detection in rural domestic dogs and cats on Canada's southern prairie was 9.2% (n = 482), with the Grasslands National Park region showing a frequency of 8.9% (n = 120; Leighton et al. 2001). Wobeser et al. (2007) also reported a large die-off of deer mice (*Peromyscus maniculatus*) due to tularemia in southern Saskatchewan in 2005. Although tularemia is present within the prairie dog management region, no documented cases have been recorded in Canadian prairie dogs. This disease is considered a low risk threat because occurrences are typically localized and do not affect population levels. Should an outbreak occur in the prairie dog population, the local community and health officials will be notified due to the potential for transmission of the disease to humans.

Threat 3 - Habitat loss or degradation

Across much of the prairie dog range in North America, prairie dog populations have declined significantly due to habitat loss or degradation through cropland conversion, urbanization and commercial development and shrub invasion (Johnson & Collinge 2004; U.S. Fish and Wildlife Service 2004; Ceballos et al. 2005). Fortunately, habitat loss or degradation is not a major concern in Canada, as approximately two-thirds of the Canadian prairie dog population is located within Grasslands National Park where it is protected from habitat loss or degradation threats. The remaining prairie dog colonies occur on provincial and federal community pastures and on deeded lands. If current land management practices continue it is unlikely that habitat loss or degradation would occur at levels requiring mitigation measures. The sizes of prairie dog colonies in GNP and the other lands managed for cattle production have remained relatively stable or increased in recent years.

Threat 4 - Predation

A number of animals prey on prairie dogs including Golden Eagles (*Aquila chrysaetos*), Ferruginous Hawks (*Buteo regalis*), prairie rattlesnakes (*Crotalus viridis*), swift foxes (*Vulpes velox*), red foxes (*Vulpes vulpes*), coyotes (*Canis latrans*) and badgers (*Taxidea taxus*). Under current conditions, prairie dog populations are not threatened by existing predation pressures. However, the reintroduction of black-footed ferrets to Canada will introduce a predator to which the Canadian prairie dog population has not been exposed for 70 years. Although ferret reintroductions in the U.S. and Mexico have not been linked to declines in prairie dog populations, possible impacts on prairie dog populations in Canada are unknown. The ferret action plan will include recommendations to identify the level of impact of ferrets on prairie dogs that would be considered detrimental and to develop a contingency plan specifying the steps that could be taken if this level of impact is observed.

Canadian prairie dogs are the only population of this species known to rely on extensive torpor and repetitive hibernation cycles to facilitate winter survival (Gummer 2005). While torpor and hibernation accomplish substantial metabolic savings, this approach to improving survival over the winter increases susceptibility to predators, like black-footed ferrets, that can access the prairie dogs' burrows. Torpid prairie dogs are unresponsive to external stimuli and require up to 16 hours to fully arouse from torpor (Gummer 2005). Unlike southern prairie dog species, Canadian black-tailed prairie dogs use extensive hibernation to facilitate over-winter survival (Gummer 2005). White-tailed prairie dogs in the U.S. hibernate and sustain predation by ferrets, but they are much more dispersed and solitary during winter whereas Canadian black-tailed prairie dogs hibernate in large family groups (Gummer 2005). This behaviour may predispose black-tailed prairie dogs in Canada to particularly intensive predation by ferrets.

Ongoing research by Stephens et al. (pers. comm.) is evaluating the viability of the prairie dog population and its sensitivity to predation levels under various scenarios of management and weather/climate.

Threat 5 - Human persecution of prairie dogs

Persecution by humans, principally by poisoning and shooting, is one of the leading causes of prairie dog population declines in the U.S. and Mexico. Most land managers consider prairie dogs to be pests or nuisance animals because they intensively graze the area immediately

surrounding the prairie dog colony to such an extent that grasses are no longer available for foraging cattle and horses. This means a potential lower stocking rate for their land and an associated loss of income.

In Canada, approximately two-thirds of the prairie dog population is located within Grasslands National Park where it is protected from human persecution. The remaining prairie dog colonies occur on provincial and federal community pastures and on deeded lands where killing prairie dogs by poisoning and shooting could occur if licensed by the responsible land-management agencies. To date, the Saskatchewan government has issued an annual licence to kill prairie dogs to only one landowner who currently uses it on the lands he owns/manages to restrict prairie dog dispersal and expansion beyond the current colony perimeters. The threat of human persecution of prairie dogs will be mitigated through continued enforcement of existing federal and provincial legislation and by providing permits for regulated prairie dog management when there are conflicts with agricultural producers. This document provides the guidelines for this regulated management.

Threat 6 - Drought

Prairie dog reproductive success varies directly with body mass (Hoogland 1995). Body mass and other measures of body condition vary directly with the quality and quantity of available vegetation which in turn, is largely dependant on precipitation in semi-arid grassland environments. Knowles (1987) observed that prairie dog litter sizes positively correlated with precipitation in the previous summer. Drought appears to decrease prairie dog densities up to 80 percent in Grasslands National Park (Parks Canada unpubl. data). Many studies suggest that climate change will result in the northern Great Plains experiencing increasing drought conditions with decreased precipitation and increased mean annual temperature (Karl & Heim 1991; Rizzo & Wiken 1992; Lemmen et al. 1997). Such changes will undoubtedly affect primary productivity in the prairie ecosystem and negatively impact prairie dogs.

Threat 7 - Floods

Seasonal flooding occurs on portions of some colonies during the spring melt, resulting in prairie dog mortality. Flooding is ranked as a low threat because the majority of prairie dog colonies are free from flooding under normal spring conditions. However, most of the prairie dog colonies occur within the flood plain of the Frenchman River leaving them vulnerable to rare events such as 100-year floods or flooding as a result of damage to an upstream dam.

Threat 8 - Severe winter

The extent to which Canadian prairie dogs rely on extensive torpor and hibernation suggests that winter is a particularly difficult period even during average winter conditions (Gummer 2005). For many hibernating rodents, such as Belding's ground squirrels and yellow-bellied, hoary and olympic marmots, survival of juveniles in their first year is lower when winters are harsh (Armitage & Downhower 1974; Morton & Sherman 1978; Barash 1989). Severe winters also increase the physiological demands facing prairie dogs and may affect their survival. The northern latitude of Canadian prairie dog colonies may make them especially vulnerable to winters that are longer or colder than average.

1.5.2. Threat classification

Table 1. Threat classification table. (Local refers to Canadian populations; Range-wide refers to North American populations)

1 Sylvatic Plague		Threat Information		
Threat Category	Exotic species	Extent	Widespread	
			Local	Range-wide
General Threat	Sylvatic plague	Occurrence	Anticipated	Current
		Frequency	Recurrent	
Specific Threat	Increased incidence or prevalence of disease	Causal Certainty	High	
		Severity	High	
Stress	Increased mortality, reduced population size	Level of Concern	High	
2 Other Diseases		Threat Information		
Threat Category	Natural Processes or activities	Extent	Widespread	
			Local	Range-wide
General Threat	Tularemia	Occurrence	Anticipated	Historic
		Frequency	Recurrent	Recurrent
Specific Threat	Increased incidence or prevalence of disease	Causal Certainty	Low	Low
		Severity	Unknown	Low
Stress	Increased mortality, reduced population size	Level of Concern	Low	
3 Habitat loss or degradation		Threat Information		
Threat Category	Habitat loss or degradation	Extent	Widespread	
			Local	Range-wide
General Threat	Commercial and industrial development	Occurrence	Anticipated	Current
		Frequency	Continuous	Continuous
Specific Threat	Building roads, oil & gas development, cultivation	Causal Certainty	High	High
		Severity	Moderate	High
Stress	Limits population size	Level of Concern	Low	
4 Predation		Threat Information		
Threat Category	Natural processes or activities	Extent	Widespread	
			Local	Range-wide
General	Natural predators –	Occurrence	Current	Current

Threat	ferrets, badgers, prairie rattlesnakes, Golden Eagles, Ferruginous Hawks, red foxes, swift foxes, coyotes	Frequency	Continuous	Continuous
Specific Threat	Predation	Causal Certainty	Low	Low
		Severity	Low	Low
Stress	Direct mortality	Level of Concern	Low	
5 Human persecution of prairie dogs		Threat Information		
Threat Category	Disturbance or persecution	Extent	Localized	
			Local	Range-wide
General Threat	Discriminate killing	Occurrence	Current	Current
		Frequency	Recurrent	Recurrent
Specific Threat	Direct poisoning and shooting of prairie dogs	Causal Certainty	High	High
		Severity	Low	High
Stress	Increased mortality	Level of Concern	Low	
6 Drought		Threat Information		
Threat Category	Climate and natural disasters	Extent	Widespread	
			Local	Range-wide
General Threat	Vegetation changes	Occurrence	Current	
		Frequency	Continuous	
Specific Threat	Loss of habitat	Causal Certainty	High	
		Severity	Unknown	
Stress	Decrease in productivity	Level of Concern	Medium	
7 Floods		Threat Information		
Threat Category	Climate and natural disasters	Extent	Localized	
			Local	Range-wide
General Threat	Floods	Occurrence	Anticipated	Unknown
		Frequency	Seasonal	Seasonal
Specific Threat	Collapse and flooding of burrows	Causal Certainty	Medium	Medium
		Severity	Unknown	Unknown
Stress	Increased mortality and decrease in productivity	Level of Concern	Low	
8 Severe Winter		Threat Information		
Threat Category	Climate and Natural Disasters	Extent	Localized	
			Local	Range-wide

General Threat	Temperature extremes and duration	Occurrence	Anticipated	Anticipated
		Frequency	Recurrent	Recurrent
Specific Threat	Physiological tolerance	Causal Certainty	Medium	Medium
		Severity	Moderate	Low
Stress	Direct mortality and decreased productivity	Level of Concern	Low	

1.6. Actions Already Completed or Underway

A number of initiatives have been completed or are underway to consolidate knowledge about black-tailed prairie dogs in Canada, the U.S. and Mexico. Much of this work has been done through the development of the *Recovery Strategy for Black-footed Ferrets in Canada*. As black-footed ferrets and prairie dogs are tightly linked species, a joint species national recovery team was formed. Prairie dog management was a key component in the workshops and meetings that focused on strategies for reintroducing black-footed ferrets to Canada.

Workshops and meetings

- Potential of Black-footed Ferret Recovery in Canada (May 24–25, 2003 in Val Marie, Saskatchewan)
- Towards a Management Strategy for Black-tailed Prairie Dogs and Black-footed Ferrets in Southwestern Saskatchewan (June 8 – 9, 2004 in Val Marie, Saskatchewan)
- International Black-footed Ferret Recovery Workshop (April 1–4, 2005 in Calgary, Alberta)
- Black-footed Ferret Recovery Strategy Workshop (September 8–10, 2005 in Val Marie, Saskatchewan)
- Community Focus Groups (November 14–17, 2006 in Val Marie, Saskatchewan)
- Black-footed Ferret/Black-tailed Prairie Dog Recovery Team meeting (December 5–6, 2006 in Val Marie, Saskatchewan)
- Black-footed Ferret/Black-tailed Prairie Dog Recovery Team meeting (Sept 5–7, 2007 in Toronto, Ontario)

Research and monitoring

- Biennial mapping of all Canadian black-tailed prairie dog colonies (Parks Canada and Saskatchewan Ministry of Environment 1998–ongoing)
- Annual black-tailed prairie dog density counts in Grasslands National Park (Parks Canada 2002–ongoing)
- Assessment of disease risks to black-tailed prairie dogs in Grasslands National Park, Saskatchewan (Jardine et al. 2006–ongoing)
- Evaluation of the viability of the black-tailed prairie dog metapopulation in Canada (Stephens et al. 2007–ongoing)

Stakeholder Considerations

Focus group surveys of regional stakeholders were conducted during the fall of 2006 to assess their support for the reintroduction of black-footed ferrets. This process highlighted the significant concerns of landowners regarding the expansion of prairie dog colonies beyond the Grasslands National Park onto deeded and leased lands. Many landowners want adequate compensation if prairie dogs negatively impact their land, as well as options and resources for managing any new prairie dog populations that may expand onto their land (Bowman 2006).

The management goal (Section 2.1) and actions (Section 2.3) outlined in the plan will provide for the continued persistence of prairie dogs at their current levels and adequately address the concerns of the local stakeholders.

1.7. Knowledge Gaps

Prairie dogs have been studied quite extensively in the U.S. but very little research has been conducted on prairie dogs in Canada. This leaves many unknowns around the behaviour and biological and ecological attributes of prairie dogs at the northern edge of their range. The following are the key knowledge gaps around the behaviour, management and research of prairie dogs in Canada:

1. Very little is known about the behaviour, demographics or population dynamics of prairie dogs at the northern edge of their range. This includes, but is not limited to, sociality, survival, productivity, inter and intra-colony movement/dispersal, diet and foraging patterns, anti-predator behaviours and genetic diversity.
2. The fine-scale habitat requirements of prairie dogs in Canada are unknown. This includes potential relationships between prairie dog occurrence/dynamics and elements such as soil characteristics, plant community structure and the potential for elements such as roads and waterways to serve as barriers to movement.
3. The effects of colony expansion on habitat required by other species at risk, primarily Greater-Sage Grouse (*Centrocercus urophasianus urophasianus*), are currently unknown.
4. Research has been conducted in the U.S. on a range of methods to expand, restrict and initiate prairie dog colonies such as deferred grazing, visual barriers, mowing, controlled burns and translocation techniques (Snell & Hlavachick 1980; Cable & Timm 1988; Franklin & Garrett 1989; Hygnstrom 1995; Robinette et al. 1995; Hof et al. 2002; Roe & Roe 2003; Bly-Honness et al. 2004; Johnson & Collinge 2004; Roe & Roe 2004; Foster-McDonald et al. 2006; Milne-Laux & Sweitzer 2006; Augustine et al. 2007a). However, effective management techniques to initiate, expand and restrict Canadian prairie dog colonies in a directed manner have not yet been tested.
5. Sylvatic plague is a major factor in the decline of prairie dogs in the U.S. and Mexico. Plague has been detected in domestic dogs and cats in rural southwestern Saskatchewan

(Leighton et al. 2001). Plague levels are unknown in wild dog and rodent populations although preliminary results from a study currently underway have demonstrated plague antibodies in coyotes in the Grassland National Park area (Jardine & Crawshaw unpublished data). The species that act as reservoirs and/or vectors for this disease in Canada are currently unknown.

6. Insecticidal dusting of prairie dog burrows has been used in many areas in the U.S. to reduce the risk of sylvatic plague outbreaks. The long-term impact of dusting on invertebrate populations and other species inhabiting prairie dog colonies, such as Burrowing Owls, is unknown at this time.
7. The impact of the reintroduction of a new predator, the black-footed ferret, on prairie dogs is unknown. Unlike southern conspecifics, Canadian black-tailed prairie dogs use extensive hibernation in dense family groups to facilitate over-winter survival (Gummer 2005). This behaviour may predispose black-tailed prairie dogs in Canada to particularly intensive predation by ferrets.
8. Climate change may alter species population levels and distribution. Evidence suggests that drought decreases prairie dog populations in Grasslands National Park (Parks Canada unpublished data), underlining the importance of researching the impacts of weather and climate on prairie dog survivorship, productivity, distribution and predator/prey interactions. Understanding the impacts of climate change may become increasingly important to sustaining prairie dogs over the long term.

2. MANAGEMENT

2.1. Goal

The goal of the Prairie Dog Management Plan is to prevent the Canadian prairie dog population from becoming threatened or endangered by ensuring the population maintains at least 90 percent probability of persistence in 100 years.

2.2. Objectives

1. Monitor prairie dog population trends to ensure management goals are met and maintained.
2. Develop a better understanding of prairie dog population dynamics in Canada.
3. Mitigate threats of disease and predation.
4. Develop and maintain broad sector support around prairie dog management and conservation, with emphasis on key stakeholders and the local community.
5. Identify management strategies and field methods to strategically initiate, increase or restrict prairie dog colonies.

6. Integrate prairie dog management into larger, unified conservation planning and actions for co-existing prairie species.

2.3. Actions

2.3.1. Management

Prairie dog colonies located within Grasslands National Park will be managed within their natural levels of variation. As such, these colonies will be allowed to expand or contract in response to natural processes such as drought or predation. Regular monitoring will detect population changes so that appropriate actions can be taken should dramatic declines that threaten the viability of the Canadian prairie dog population occur. Management actions may be considered in order to prevent expansion or establishment of new colonies in areas where prairie dog activity could be detrimental to other species at risk. In some instances, research within Grasslands National Park may be undertaken on methods to strategically expand, restrict or establish new colonies to achieve vegetation management (eg. control crested wheat grass, an invasive non-native grass), black-footed ferret recovery goals or to mitigate impacts on other species at risk. Before undertaking research in the park that involves prairie dog colony expansion, landowners adjacent to the affected colonies will be consulted.

Should expansion of prairie dogs threaten to cross the boundary of Grasslands National Park, the Parks Canada Agency may initiate non-lethal management measures such as live-trapping and translocation, and installation of physical barriers, to prevent expansion of prairie dogs onto neighbouring lands if such expansion is opposed. Neighbouring landowners should contact the Government of Saskatchewan if they wish to apply for a permit to kill prairie dogs that have expanded onto their land. In some circumstances, stewardship agreements may be developed between affected landowners/ managers and stewardship agencies.

Prairie dog colonies located outside of Grasslands National Park (Masefield and Dixon Community Pastures and privately managed lands) will be allowed to fluctuate within their natural levels of variation. If the colonies expand beyond their 2007 boundaries, management measures may be implemented by the affected land manager under the authority of a permit issued by Saskatchewan Ministry of Environment. No management activities will be initiated to promote prairie dog populations outside of Grasslands National Park should the colonies decline below 2007 boundaries beyond reducing the licensed killing of prairie dogs. The one exception to this might be a response to a sylvatic plague outbreak. Management strategies to address disease threats are outlined in Section 2.3.2 and will be described in detail in a disease risk assessment and a sylvatic plague response plan for Grasslands National Park.

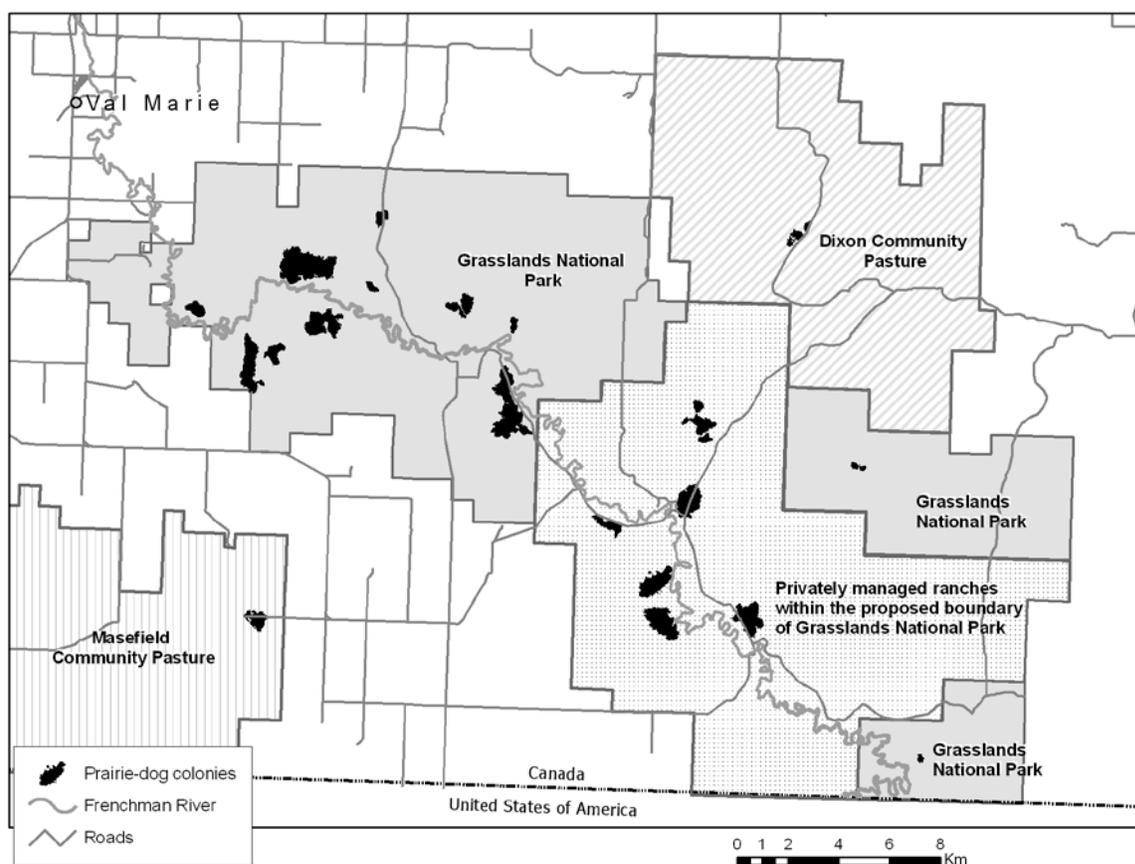


Figure 2. Black-tailed prairie dog colonies on lands managed by the different jurisdictions in Canada. The responsible jurisdictions for these lands are the Parks Canada Agency (Grasslands National Park), Saskatchewan Agriculture (Dixon Community Pasture), the Agri-Environment Services Branch, Agriculture and Agri-Food Canada (Masefield Community Pasture) and private land managers or owners.

If prairie dogs disperse outside of Grasslands National Park, or outside of the 2007 boundaries of the prairie dog colonies found outside the park, land managers can apply to the Government of Saskatchewan for a permit to control prairie dogs.

2.3.2. Monitoring and research

Regular monitoring of prairie dogs will be required to ensure the prairie dog management goal is met and to allow appropriate management actions to be taken. Research initiatives are also needed to address knowledge gaps (Section 1.7) and to develop effective management strategies for Canadian prairie dog populations. Table 2 identifies the specific monitoring and research actions required for each management objective. Management actions are also identified in Table 2.

Table 2. Management, monitoring and research actions required to maintain a population of black-tailed prairie dogs with a high probability of persistence, including performance measures that will be used to evaluate progress in 5 years.

Objective	Actions	Performance Indicators
1. Monitor the prairie dog population to ensure management goals are met and maintained.	<ol style="list-style-type: none"> 1. Map all prairie dog colonies according to existing protocols every other year. 2. Estimate prairie dog density on permanent sample areas annually. 3. Conduct population viability analysis. 	<ol style="list-style-type: none"> 1. Prairie dog colony maps updated every second year. 2. Prairie dog density estimates updated annually. 3. Population viability analysis completed by 2010. 4. Maintain prairie dog population in Canada with a 90% probability of persistence over 100 years.
2. Develop a better understanding of prairie dog population dynamics in Canada.	<ol style="list-style-type: none"> 1. Evaluate the dynamics of black-tailed prairie dog metapopulations in Canada. This includes assessing prairie dog demography, spatial distribution and movement, disease risk and habitat requirements/characteristics, sensitivity to drought, predation levels, etc. 2. Assess the impact of weather patterns on prairie dog populations to aid in predicting the impacts of events such as drought and climate change. 	<ol style="list-style-type: none"> 1. Increased knowledge of prairie dog demography, distribution, movement, disease risk and habitat requirements by 2013. 2. Incorporate this knowledge into a population viability analysis.
3. Mitigate threats of disease and predation.	<ol style="list-style-type: none"> 1. Develop a disease risk assessment. 2. Develop a sylvatic plague mitigation report. 3. Monitor impacts of ferret reintroduction as per Objectives 1 and 2 above and the Recovery Strategy for the Black-footed Ferret in Canada. 	<ol style="list-style-type: none"> 1. Disease risk assessment and sylvatic plague mitigation report completed by December 2008. 2. The threats of predators and disease are mitigated if they arise.
4. Develop and maintain broad sector support around prairie dog management and conservation, with emphasis on key stakeholders and the local community.	<ol style="list-style-type: none"> 1. Finalize and implement a communication strategy to effectively inform/involve local, regional and national audiences about prairie dog management and conservation. As part of this communication strategy develop visitor experience opportunities for park visitors, volunteers, and regional stakeholders to allow them to assist in research and monitoring activities as well as benefit from educational opportunities from prairie dog management specialists. 2. Assess the initial attitude of affected stakeholders, key agencies and the local community towards prairie dog conservation, and monitor attitude changes over time. 3. Provide timely information to landowners and affected stakeholders on prairie dog colony boundary location as well as prairie dog research, monitoring and management activities. 4. When appropriate, hire or recruit volunteers from local communities to assist in research, monitoring or education activities. 	<ol style="list-style-type: none"> 1. Implement communication strategy to inform and involve Canadians. 2. Support for prairie dog management and conservation has been developed and maintained.
5. Identify the best management	<ol style="list-style-type: none"> 1. Develop non-lethal cost-effective approaches to restrict the expansion of existing prairie dog 	<ol style="list-style-type: none"> 1. A study to determine the best methods to manage prairie dog

<p>strategies and field methods to initiate, increase or restrict prairie dog colonies.</p>	<p>colonies that might conflict with private landowner interests or the habitat requirements of other species such as Greater Sage Grouse.</p> <ol style="list-style-type: none"> 2. Identify the best management techniques to establish new colonies and to restrict or encourage the expansion of existing prairie dog colonies. This will only occur within Grasslands National Park and will be limited to research in support of black-footed ferret reintroductions. 	<p>colony expansion and contraction has begun by 2011.</p>
<p>6. Integrate prairie dog management into regional conservation planning and management actions for co-existing prairie species.</p>	<ol style="list-style-type: none"> 1. Integrate black-tailed prairie dog management into regional multi-species conservation planning initiatives. 2. Conduct spatial analysis to prioritize areas for prairie dog management while balancing needs of other species. 3. Participate in North American planning initiatives for black-tailed prairie dogs and co-existing species. 	<ol style="list-style-type: none"> 1. Prairie dog management has been considered and incorporated into the Saskatchewan multi-species action plan by 2013. 2. Spatial analysis completed in 2009. 3. Participate on the USFWS Black-footed Ferret Recovery Implementation Team.

2.3.3. Outreach and communication

Effective communication is very important in building the local community’s support and trust for prairie dog management and conservation as well as local, regional and national awareness of the species, its needs and its important ecological role. Some local stakeholders have concerns around any expansion of prairie dog colonies on lands they manage, limitations on control measures available to them, as well as the adequacy and availability of potential compensation for prairie dog damage. A prairie dog communication strategy will be developed to accompany, or as part of, the draft black-footed ferret communication strategy prepared by Holroyd and Franke (2005) (Table 2 – Objective 4, Action 1). The prairie dog communication strategy will include stakeholder consultation and result in effective communication with all potential local and regional stakeholders as well as wider local, regional and national audiences.

Information regarding prairie dog colony status, management actions and research activities must be communicated in a timely and effective manner. Based on feedback from focus group surveys, the local community’s preferred methods of receiving information include posting of information in the Grasslands National Park or school newsletters and through open public meetings or forums (Bowman 2006). The development of a website to provide information on areas of interest such as the latest research findings, management approaches, contact information for control measures, and easily downloadable fact sheets may also be useful for disseminating information. Utilizing the expertise of the Canadian zoological community to assist in developing and implementing the communication strategy will strengthen and broaden its impact.

2.4. Implementation Schedule

Table 3. Implementation Schedule

Action	Priority	Threats or concerns addressed	Responsibility		Anticipated Completion
			Lead	Other	
Obj 1: Monitor prairie dog population trends to ensure the management goal is met and maintained					
Map colonies every 2 nd year	High	All threats; provides current information to address stakeholder concerns	Parks Canada Agency	Canadian zoos, Saskatchewan Ministry of Environment	Ongoing
Estimate density each year	High	All threats; provides current information to address stakeholder concerns	Parks Canada Agency	University researchers	Ongoing
Estimate population viability	High	All threats: allows performance evaluation and guides recovery	Parks Canada Agency	University researchers	June 2010

Obj 2: Develop a better understanding of prairie dog population dynamics in Canada					
Evaluate dynamics of meta-populations	High	All threats	Parks Canada Agency	Canadian zoos, University of Calgary, other researchers	June 2010; also ongoing
Assess impacts of weather	High	Drought; severe winter	Parks Canada Agency	University of Calgary, other researchers	June 2010; also ongoing
Obj 3: Mitigate threats to prairie dog populations					
Develop disease risk assessment	High	Sylvatic plague; other diseases	Park Canada Agency	Canadian zoos, University of Guelph	January 2009
Develop plague mitigation report	High	Sylvatic plague	Parks Canada Agency	Canadian zoos, Health Canada, Canadian Cooperative Wildlife Health Centre	December 2008
Monitor Impacts of Ferret Reintroduction	High	Predation	Parks Canada Agency	Canadian zoos, University of Calgary, other researchers	Ongoing
Obj 4: Develop and maintain broad sector support and trust around prairie dog management and conservation with emphasis on key stakeholders and the local community					
Finalize and implement communication strategy	High	Habitat loss or degradation; human persecution; helps facilitate future management and research initiatives	Parks Canada Agency	Canadian zoos	September 2009
Assess & monitor stakeholder attitudes	Medium	Allows for identification of stakeholder concerns and assessment of how effective their concerns are addressed	Parks Canada Agency		
Provide timely info to landowners and affected stakeholders	High	Habitat loss or degradation; human persecution; builds stakeholder trust in communication processes	Parks Canada Agency	All associated research organizations, Agri-Environment Services Branch, & Saskatchewan Agriculture & Food	Ongoing
Hire or recruit volunteers from local communities	Medium	Lack of community support	Parks Canada Agency	All organizations involved in prairie dog research, monitoring and educational initiatives	Ongoing
Obj 5: Identify management strategies and field methods to strategically initiate, increase or restrict prairie dog colonies					
Develop non-lethal approaches to	High	All threats	Parks Canada Agency	University of Calgary, other researchers	March 2010

restrict colony expansion					
Identify techniques to establish new or manage existing colonies	High	All threats	Parks Canada Agency	University researchers, Canadian zoos	December 2012
Obj. 6: Integrate prairie dog management into larger, unified conservation planning and actions for co-existing prairie species					
Integrate into regional multi-species conservation planning initiatives	Medium	All threats	Parks Canada Agency	Canadian prairie species recovery teams and associated organizations	Ongoing
Spatial analysis to prioritize areas for prairie dog management	High	All Threats	Parks Canada Agency	University of Calgary and other researchers	December 2009
Participate in North American planning initiatives for prairie dogs and co-existing species	Medium	All threats	Parks Canada Agency	Canadian prairie species recovery teams and associated organizations	Ongoing

2.5. Effects on Other Species

Actions flowing from this management plan are not expected to significantly affect other species in a negative manner (Table 4). It is expected that prairie dog colonies within Grasslands National Park will continue to expand or contract as they currently do; regular monitoring will detect any changes. A multi-species action plan for southwest Saskatchewan, currently in development, will make recommendations to address interactions between prairie dogs and other species at risk and their habitats. Management actions may be considered to prevent the expansion or establishment of new colonies in areas where prairie dog activity may be detrimental to other species at risk, such as Greater Sage-grouse. These actions are not expected to have a population level effect on prairie dogs. Management actions may also be taken if prairie dog populations dramatically decline, to ensure the continuation of the functional role that prairie dog colonies play in providing habitat for other species such as Burrowing Owls and black-footed ferrets and to ensure the persistence of prairie dogs in Canada.

Prairie dog colonies located outside of Grasslands National Park (Figure 2) will be maintained within their 2007 boundaries. Therefore, no new effects on other species are anticipated in the area outside of the park.

Insecticidal dusting of prairie dog burrows may be undertaken as part of response to a sylvatic plague outbreak. Working cooperatively with other, potentially affected species' recovery teams and other conservation groups can help mitigate the potential negative effects of prairie dog activities and strengthen environmental benefits.

Table 4. Potential effects of black-tailed prairie dog management actions on co-existing non-target species and natural communities

Species or community	Anticipated effect	Impact of effect	Likelihood of occurrence	Importance of effect
Black-footed Ferrets (Extirpated)	Increase in habitat and prey availability with expansion of prairie dog colonies	Positive	Probable	Moderate
	Increased disease potential with expansion of prairie dog colonies	Negative	Possible	Moderate
Burrowing Owls (Endangered)	Disturbance to nesting owls due to monitoring of prairie dogs	Negative	Possible	Low (measures will be taken to avoid disturbing the owls)
	Increased nesting habitat with expansion of prairie dog colonies	Positive	Probable	Unknown
	Increased disease potential with expansion of prairie dog colonies	Negative	Possible	Unknown (See section 1.9)
Swift foxes (Endangered)	Increased habitat through prairie dog colony expansion	Positive	Possible	Low [Other habitat elements and predation may be greater limiting factors (Moehrenschlager et al. 2004).]
Greater Sage-Grouse (Endangered)	Habitat loss through prairie dog colony expansion	Negative	Possible	Negligible. (Prairie dog expansion will avoid areas of sage grouse habitat)
Mountain Plovers (Endangered)	Increase habitat availability through prairie dog colony expansion	Positive	Possible	Low (No recent nests found in the Grassland National Park region despite the existence of prairie dog colonies.)
Plains bison	Decreased grazing capacity with prairie dog colony expansion	Negative	Possible	Negligible (Very low grazing levels planned for Grasslands National Park.)
Prairie rattlesnakes	Increased prey availability with increases in prairie dogs	Positive	Probable	Unknown
	Increased habitat availability through increases in prairie dog colonies	Positive	Probable	Unknown
Golden Eagles and Ferruginous Hawks (Special Concern)	Increased prey availability with increased prairie dog populations	Positive	Probable	Low

Species or community	Anticipated effect	Impact of effect	Likelihood of occurrence	Importance of effect
Invertebrates	Increased mortality through insecticidal dusting for sylvatic plague control	Negative	Possible	Unknown (Dusting also affects non-target endemic and beneficial invertebrates that provide prey for insectivorous species. See section 1.9.)
Herptiles	Increase habitat availability through prairie dog colony expansion	Positive	Possible	Low (Herptiles in Grasslands National Park do not appear to rely extensively on prairie dog colonies for habitat.)
Rare plants	Habitat loss through prairie dog colony expansion	Negative	Possible	Low (Prairie dog colony expansion can be conducted in a manner that avoids areas with rare plants.)
	Increase habitat availability	Positive	Possible	Low (Rare plants in Grasslands National Park do not appear to rely extensively on prairie dog colonies.)
Late successional native prairie	Decreased biodiversity of endemic or unknown species through prairie dog colony expansion	Negative	Possible	Low (Prairie dog colony expansion can be conducted in a manner that avoids areas with rare plants.)
Sagebrush communities	Reduction of sagebrush habitat	Negative	Probable	Moderate (Sagebrush is an important component of the prairie ecosystem and provides food and shelter for several species at risk including the Greater Sage-Grouse and the Sage Thrasher. Prairie dog colony expansion can be conducted in a manner that avoids destruction of sagebrush.)

2.6. Existing Approaches to Protection

Existing legislation, including the *Canada National Parks Act* and *The Wildlife Act* of Saskatchewan, prevents the unlicensed killing of prairie dogs on national park lands as well as on deeded and on provincial and federal crown lands within Saskatchewan (Government of Saskatchewan 1998; Government of Canada 2000). Under SARA, the prohibitions to protect endangered and threatened species at risk do not apply to special concern species such as the black-tailed prairie dog. However, *The Wildlife Act* of Saskatchewan applies on all deeded and crown land in Saskatchewan. To date, the Province of Saskatchewan has only issued a licence to kill prairie dogs to one private landowner for the control of prairie dog colony expansion on that landowner's deeded and leased lands.

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- G. Crawshaw. Head of Veterinary Services. Toronto Zoo
- Gummer, D. Restoration Ecologist, Parks Canada Agency

Jardine, C. Associate Researcher. Department of Pathobiology, University of Guelph.

List, R. Associate Researcher, Instituto de Ecologia, Universidad Nacional Autonoma de Mexico

Livieri, T. Executive Director, Prairie Wildlife Research

Parks Canada Agency (Grasslands National Park), Government of Canada

4. CONTACTS

The main contacts for questions or concerns regarding this document are the Black-footed Ferret/Black-tailed Prairie Dog Recovery Team co-chairs:

Pat Fargey
Grasslands National Park, Parks Canada Agency
Telephone: 306-298-2166 extension 224
Email: pat.fargey@pc.gc.ca

Joanne Tuckwell
Western and Northern Service Centre, Parks Canada Agency
Telephone: 204-984-2416
Email: joanne.tuckwell@pc.gc.ca