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# Memorandum

**To:** Land Conservation and Stewardship Board

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**Date:** July 13, 2016

**Subject**: 2016 Update to the Natural Areas Wildlife Management Guidelines and Potential Land Use Code Changes

**Attachments:**

Attachment July 13, 2016: Wildlife Management Guidelines
Frequently Asked Questions: June 2016
Public Engagement Summary
Prairie Dogs, People, and Plague: Prairie Dog Coalition

**Summary**

Staff is updating the Natural Area Department's 2007 Wildlife Management Guidelines and proposing select changes to Land Use Code (LUC) standards regarding wildlife species. This AIS focuses on the City's management philosophy, direction and regulation with regard to black-tailed prairie dog colony management on both City-owned and managed natural areas and private development sites. The rationale for focusing on prairie dogs is that prairie dog management issues are more difficult and complex than any other wildlife species. Other wildlife species will be addressed in subsequent communications with the public and Council. The AIS summarizes and reflects on past management of black-tailed prairie dog colonies, on-going efforts, recent challenges, current best practices, proposed changes, and public input to date. Following the City Council work session on the prairie dog component of the Guidelines and potential LUC changes, staff will continue to conduct public outreach and return to City Council with final drafts of both documents.

Please note that the Guidelines pertain specifically to management of prairie dogs on City-owned and managed natural areas and not private lands within Fort Collins (although potential private-to-public relocations are contemplated by the Guidelines). The LUC addresses prairie dog management on public and private lands that have entered into a development review process.

## Background/Discussion

This agenda item summary focuses on both the City's approach to black-tailed prairie dog management on City-owned and managed natural areas as described in the 2007 Wildlife Management Guidelines (Guidelines), as well as requirements related to prairie dog management on development sites.

### *Wildlife Management Guidelines*

The Guidelines were administratively adopted by the Natural Areas Director in 2007 after a yearlong public process and Council review. The primary objective articulated in the Guidelines is to promote grassland system health and function.

The Guidelines inform the development and implementation of system-wide and site-specific management strategies that advance ecosystem health, reflect community values, and that are pragmatic and fiscally responsible. In addition to black-tailed prairie dog management, the document outlines strategies that address various other native wildlife species including birds, amphibians, fish, reptiles, and other mammals including beaver. The Guidelines provide direction for control and management of non-native species and address conservation issues surrounding the reintroduction of native species (such as bison, black-footed ferret, and native fish).

The City is a conservation leader on many fronts including the establishment of a conservation herd of genetically important plains bison, the reintroduction of black-footed ferrets to Soapstone Prairie Natural Area and Meadow Springs Ranch, instream flow designations and reintroduction of native fish, and participation in field-testing a new vaccine to manage sylvatic plague. These and other efforts have required extensive planning and development of partnerships with various state and federal agencies and even the successful initiation and sponsorship of legislation at the state level.

### *Regulatory Context*

Wildlife in the State of Colorado are legally the jurisdiction of the state as administered by Colorado Parks and Wildlife. The State designates black-tailed prairie dogs (the species that occurs in Fort Collins) as a "species of concern." However, this designation does not afford

prairie dogs any special protection; a landowner may lethally manage prairie dogs on their property for a wide variety of reasons.

Both the Fort Collins Municipal Code and Land Use Code contain regulations pertaining to the management of prairie dogs on public and private properties throughout the city. Per the Municipal Code, prairie dogs may be poisoned using fumigants or trapped and released in accordance with applicable guidelines from the US Environmental Protection Agency, Colorado Parks and Wildlife, and Humane Society. This applies to properties citywide. The Land Use Code includes additional provisions for sites undergoing development review, including:

- Protection or mitigation of impacts to colonies over 50 acres in size
- Minimization of conflicts between wildlife and development, including prairie dogs
- Removal of prairie dogs on a development site prior to grading or construction activities

***Ecological Value of Prairie Dogs***

Prairie dogs are considered a keystone species in intact shortgrass prairie ecosystems. They support numerous other species as prey, their burrows provide shelter for other animals, and they can positively affect grassland vegetation. In highly fragmented ecosystems, such as the urban natural areas and vacant private land in Fort Collins, prairie dogs continue to play a valuable and important biological role. For example, urban prairie dog burrows provide habitat for reptiles and serve as a prey base for raptors. Moreover, urban prairie dogs are critical to maintaining "meta-populations"; i.e. colonies that are separated by space but able to interact. These dispersed yet biologically connected colonies are critical to sustaining prairie dogs over time in the urban environment, especially with sylvatic plague having such a deadly and detrimental impact to prairie dogs.

While prairie dogs are keystone species in intact prairie ecosystems, it is the observation of Fort Collins's staff as well as other public land managers that prairie dogs in an urban setting can cause degradation of habitat and negatively influence other conservation values. For example, prairie dogs can denude sites of vegetation, contribute to severe wind-drive erosion and fugitive dust, and stimulate non-native plants such as bindweed.

Historically, Colorado may have hosted an estimated 7,000,000 acres of prairie dogs at one time prior to European settlement. A 2006/7 statewide survey conducted by Colorado Parks and Wildlife found approximately 800,000 acres of occupied habitat (an 89% reduction). Similarly, the United States Fish and Wildlife Service in 2009 estimated an approximate 2.1 million acres of occupied habitat in the shortgrass prairie extending from northern Mexico to southern Canada.

The decline of prairie dogs throughout their natural geographic range is a result of three major factors:

1) Widespread poisoning in the early 1900's;

2) native grasslands lost or fragmented due to conversion for agricultural and urban development, and;
3) sylvatic plague.

### *Prairie Dogs and Plague*

Sylvatic plague is a bacterial disease vectored by fleas and introduced into North America in the early 1900's. Many mammalian species such as prairie dogs and black-footed ferrets have little to no immunity. Plague is now one of, if not the most significant factor limiting the expansion and resilience of prairie dog populations as it can decimate colonies with mortality rates exceeding 90%. In the experience of Fort Collins, once a prairie dog colony disappears due to plague, it takes anywhere from four to five years for the colony to become reestablished. Other Front Range communities report that their plague-affected colonies are not recovering as well as those in Fort Collins. That may be because prairie dogs can no longer move from site to site in a highly developed and fragmented urban landscape.

All forms of plague in wildlife are generally referred to as sylvatic plague. Human cases of plague are generally the bubonic form of plague. When people contract the disease, it is often caused by contact with an infected rodent or rodent fleas. Historic plague pandemics have resulted in the death of millions of people but outbreaks are now limited to sub-Saharan Africa and Madagascar (Center for Disease Control 2015). Plague can be a serious illness if left untreated; fortunately, it is treatable with commonly available antibiotics. The chances for human contraction of the plague are extremely low. In 2015, fifteen people within the U.S. were infected with bubonic plague; four of those were located in Colorado. One death occurred in Larimer County; the disease was contracted on private land northwest of Fort Collins. For additional information, please see the attachment "Prairie Dogs, People, and Plague" prepared by the Humane Society of the United States.

## Snapshot of Prairie Dog Management

### *City-Owned and Managed Natural Areas*

Since 2007, much has been learned about prairie dog management on the City's natural areas. Over time, methods have been changed and adapted based on evolving knowledge and on-the-ground results; however, the overarching goal of grassland sustainability and health has remained constant.

The following describes the essentials of the City's prairie dog management on its natural areas. Information that is more detailed is provided as an Attachment to this AIS dated July 13.

- The overriding principle of the Wildlife Guidelines is to manage grasslands from a systems-based approach that values the totality of the system, its biodiversity, integrity, and resilience.

- Within urban natural areas, the Department has been informally managing toward a long-term goal of 10-20% occupation by prairie dogs on land classified as "suitable" habitat (see description of suitable habitat below and in the Attachment dated July 13, 2016).[1] Currently, there are 400 acres of prairie dogs occupying all urban natural areas, or a 26% occupancy rate of suitable habitat, higher than the long-term goal of 10-20%. (Exceeding the threshold does not necessarily trigger lethal or passive management; however, no management effort to encourage expansion is taken.)

- At Soapstone Prairie and Meadow Springs Ranch, the Department has been managing for at least 10% occupancy of suitable habitat or 4,000 acres of prairie dog habitat. The Department has implemented a management strategy to reduce the risk of plague within prairie dog colonies and can do so up to a maximum of about 3,000 acres annually with current technologies and staff capacity (please see the Attachment dated July 13, 2016 for a discussion of insecticide application for plague control and the associated pros and cons). If hoped-for new plague management techniques become available, the number of acres treated could be adjusted upward to be more in alignment with the 10% occupancy goal. As reference, a minimum of 1,500 acres is needed to support the goal of 30 adult female black-footed ferrets.

- Suitable habitat is characterized by lands typically occupied by prairie dogs in an intact prairie setting. Steep areas, land with hydric soils, or habitats other than grasslands are excluded from this characterization. Urban sites undergoing restoration to native prairie vegetation are excluded from suitable habitat calculations. They will be included when they are considered stable enough for prairie dog occupation. Lands within 100 yards of neighborhoods, and lands that host rare plants or unique flora and fauna are excluded from occupation by prairie dogs as an additional management filter.

- Prairie dogs in exclusion zones are managed primarily by lethal methods and occasionally passive methods (such as by fencing). For lethal control, a carbon monoxide gas injected into the burrow is considered the most humane treatment and is now the only method employed by the Natural Areas Department.

- Lethal management has been used effectively by the Department to manage for grassland health as well as to prevent unwanted events, in particular large-scale wind-driven erosion. In the middle 2000's, drought, very high-density prairie dog colonies, associated grazing, and high winds led to extreme soil loss on several urban natural

[1] There is some debate as to the historic occupancy rates of prairie dogs on a landscape scale. Knowles (2002) estimated that range-wide occupation was 2-15%. It should also be considered that site-specific occupancy varies widely (pers. communication Boulder County Parks and Open Space).

areas. The revisions to the Wildlife Management Guidelines were influenced by the community's and staff response to those events.

- The Department rarely utilizes relocation of prairie dogs from one site to another. From a conservation perspective, the City is achieving its overarching objectives of grassland health and species conservation without a need to move prairie dogs. Looking forward, however, staff is recommending some modification to its relocation approach that would facilitate relocation in certain circumstances. Please see attached materials for an extensive review and discussion of relocation.

- The Department inventories and maps all prairie dog colonies on City natural areas on an annual basis. In addition, vegetation conditions are monitored as is the presence/absence of other wildlife, with particular attention to grassland birds endemic to this region.[2]

***Public and Private Development Sites***

Development activities that have the potential to impact natural habitats and features are regulated by Section 3.4.1 of the Land Use Code. In some cases, prairies dog colonies are considered a special feature that warrants protection or mitigation, but provisions for prairie dog management vary depending on the site.

- For colonies over 50 acres in size, the developer must either protect and buffer the colony or, if the colony will be removed, replace the resource value lost to the community through some form of mitigation. Mitigation requirements are determined on a case-by-case basis, and may include the creation of grassland habitat, relocation of prairie dogs, or payment-in-lieu to fund grassland restoration or prairie dog management elsewhere.

- For colonies less than 50 acres in size, no protection or mitigation of impacts to prairie dogs is required. If prairie dogs will be left on-site, and depending on the nature of the project, fencing, underground barriers, or other mechanisms may be required to reduce conflicts between wildlife and the development project.

- Before the commencement of grading or other construction on the development site, any prairie dogs inhabiting the site must be relocated or eradicated by the developer using city-approved methods.

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[2] "As a group, grassland species have shown steeper, more consistent, and more geographically widespread declines than any other behavioral or ecological grouping of North American species," including Neotropical migrants (Knopf 1996*b*). *From the CO Partners in Flight page, Physiographic Region 36 Central Shortgrass Prairie*

- If prairie dogs will be removed from the site, they must be humanely relocated or eradicated using City-approved methods and, in some cases, methods approved by Colorado Division of Parks and Wildlife and/or the Humane Society (see below for additional information on eradication). Fumigation may be used to eradicate prairie dogs, but only by an exterminator or fumigator that is properly licensed by the State of Colorado. Trapping of prairie dogs is permitted, provided that any animals trapped are released or disposed of in the manner required by the Humane Society and the Colorado Division of Parks and Wildlife.

## Recommendations

### *Wildlife Management Guidelines*

Based on the last ten years of experience, as well as guidance provided to the City by a professional wildlife manager's workshop hosted by the Natural Areas Department on March 22, 2016, staff makes the following observations and recommended changes to prairie dog management techniques on City-owned natural areas. The recommendations are further described and supported by additional information in the attached materials. A Frequently Asked Questions document is included as an attachment as well.

1. **Grassland Health:** The City should continue to manage grasslands for ecosystem health in concert with the health and sustainability of all grassland wildlife including prairie dogs. The recommended ecosystem health approach is a long-term objective intended to maintain healthy, native vegetation, support a suite of wildlife, and prevent soil erosion.

2. **Percent Occupation Threshold** – The City should manage for 10-20% prairie dog occupation of suitable habitat in natural areas in order to maintain ecological balance, grassland stability, and species diversity. A desired occupation of 10-20% will guide management actions on urban natural areas as well as Soapstone Prairie Natural Area (SSN) and Meadow Springs Ranch (MSR). This approach is based on findings by Knowles (2002) who estimated historic prairie dog occupancy of grasslands at 2-15%. [3] The initial goal for SSN is to expand to and maintain a minimum of 3,000 acres in order to maintain population levels that support the endangered black-footed ferret. As noted earlier, the Natural Areas Department currently is able to apply sylvatic plague treatments up to a maximum of 3,000 acres at Soapstone Prairie Natural Area (SSN) and Meadow Springs Ranch (MSR). The City will continue to explore options for economically and ecologically effective methods to increase its disease management (such as the plague vaccine currently undergoing trials at

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Knowles, Craig; Proctor, Jonathan; and Forest, Steven, "Black-Tailed Prairie Dog Abundance and Distribution in the Great Plains Based on Historic and Contemporary Information" (2002). Great Plains Research: A Journal of Natural and Social Sciences. Paper 608.

SSN and MSR). Once more effective and less expensive treatment methods are available, the goal will be to expand to at least 10% occupancy (roughly 4,000 acres).

3. **Lethal Control** - The Natural Areas Department stopped using aluminum phosphide for lethal control in 2014. As of 2015, the department instituted a more humane approach utilizing carbon monoxide gas and recommends continuation of this method. Staff recommends continued use of lethal management in certain circumstances as the most practical, cost-effective, and proven method for maintaining colony acreages at or below established thresholds, in particular in the urban setting.

4. **Minimum Acreages** - A 50-acre minimum acreage should not continue to be used as the minimum size for prairie dog colonies. Colonies smaller than 50 acres are viable, have habitat value, and with management can co-exist with other ecological values.

5. **General Relocation Criteria –** Please see the Attachment July 13, 2016 for detailed information.

6. **Relocation to Soapstone Prairie** – Historically, the Department has not relocated prairie dogs from urban natural areas to SSN or MSR. This decision is based on the management philosophy and experience that the SSN and MSR ecosystem exhibits qualities of an intact shortgrass prairie system. With appropriate disease management strategies, colonies have the ability to recover from plague mortality events without supplemental releases. The most effective management efforts focus on disease control, maintaining colony locations to encourage movement between colonies, and using management techniques such as livestock grazing and prescribed fire to encourage colony expansion. This approach has created a prairie dog complex that supports a reintroduced population of black-footed ferrets.

   Although prairie dog relocations to SSN and MSR have not been critical to conservation success, staff is recommending that the 2016 Guidelines establish criteria and thresholds to facilitate relocation of prairie dogs to SSN and MSR. The criteria are based on prairie dog occupancy goals, disease management efforts (and capacity), and recovery goals for black-footed ferrets. Additional information about these and other criteria may be found in the Attachment dated July 13, 2016.

7. **Relocation of prairie dogs between natural areas**– Relocation of prairie dogs between natural areas should remain as a management option. This application may occur under narrow circumstances when there is a need to introduce prairie dogs into a new area (such as a fully restored grassland site), or to resupply a colony in an area where a plague outbreak diminishes populations well below thresholds. The Guidelines set forth a number of factors weighing into a relocation consideration. They include but are not limited to the likely success of the effort, suitability of the receiving site, cost, staff resources, and adjacent land uses.

8. **Relocation of prairie dogs from private lands to natural areas** – In general, staff is not recommending that the City accept prairie dogs from private lands onto City-owned natural areas; however, an exception may be made at SSN and MSR or urban natural areas (see #7 above) if certain criteria are met (see details in the Attachment dated July 13, 2016).

   The recommended approach of limited relocation is generally consistent with other local government open space agencies along the Front Range. As of spring 2016, four of nine agencies utilize relocation. Boulder County Parks and Open Space, City of Boulder Open Space and Mountain Parks, and City & County of Broomfield Open Space use public-to-public relocation as a management tool. Locally, the City & County of Broomfield and Boulder County Parks and Open Space have conducted private-to-public land prairie dog relocation, although its use is very infrequent because there is little suitable habitat.

9. **Recolonization of prairie dog colonies following grassland restoration** – It takes a short-grass prairie restoration project an estimated 10 to 20 years to establish a sufficient root system capable of withstanding drought and some resistance to noxious weed invasions. To that end, prairie dogs should not be permitted to recolonize active restoration sites until they are ready for the stress of grazing. Considerable resources have been invested in restoration areas and occupancy by prairie dogs has the potential to degrade them significantly due to a large seed bank of non-native plants in the urban environment. At this time, it is unknown when it would be appropriate to allow prairie dogs onto restored grasslands. Older restored grasslands (>15 years) currently support other Species of Interest (such as declining grassland birds) that potentially would be lost if prairie dogs were allowed to occupy these sites; therefore, ecological trade-offs should be assessed before allowing prairie dog occupancy. Other Front Range open space managers are developing criteria to assess the readiness of restored grassland sites to accept prairie dogs. The Natural Areas Department will track these efforts and potentially adapt them as it considers how best to manage restored grasslands.

***Land Use Code Changes***

Since the original Land Use Code provisions regarding prairie dog colonies were adopted in 1997, there has been considerable change in the size and characteristics of prairie dog colonies within the Growth Management Area; best practices for fumigation and relocation; and, citywide development patterns. Based on the latest research on the ecosystem value of prairie dog colonies and current best management practices, staff proposes the following changes to the Land Use Code provisions regarding prairie dogs:

1. **Size threshold -** Eliminate the 50-acre threshold for protection and/or mitigation, and instead require consideration of impacts to all prairie dog colonies during the development review process. This is consistent with the proposed updates to the Wildlife Management Guidelines.

2. **Mitigation –** Continue to determine mitigation requirements (on-site improvements, off-site improvements, or payment-in-lieu) on a case-by-case basis for development projects, but for prairie dog colonies of all sizes.

3. **Fumigation (Lethal Control) –** Require the use of carbon monoxide for lethal management on development sites. This method is considered more humane than other fumigants (e.g., aluminum phosphide). This is consistent with the management practice utilized by the Natural Areas Department.

4. **Reporting** – Add a reporting provision to the code that requires consistent documentation of the timing and methods used for prairie dog relocation or eradication.

5. **Species of Interest** – Update the Land Use Code definition for "Sensitive and Specially Valued Species" to reflect the current species of interest list for Fort Collins, as maintained by the Natural Areas Department. Allow for flexibility and/or mitigation of impacts to species of interest, rather than mandating protection in all cases. This is consistent with the Natural Areas Department's wildlife management practices.

**City Financial Impacts**

The proposed Land Use Code changes would not result in any direct financial impacts to the City, though some additional staff time may be necessary to determine mitigation requirements for individual development sites.

Management of prairie dog colonies on City-owned and managed natural areas is funded through the City's "Open Space Yes!" sales tax and Larimer County's "Help Preserve Open Space" sales tax. In addition to staff time (1/3 Wildlife Biologist, with significant input and time from other staff including seasonal field crews, a Botanist, Environmental Planner, Environmental Program Manager, Crew Chief and Department Director), Natural Areas spends an average of $29,000 annually in lethal management in alignment with the objectives of the 2007 guidelines. If the City were to utilize more relocation as management tool, it would generate significant costs ranging from $150 to $400 per animal.

The Department also spends a significant amount annually to conserve land; some of these properties may support existing or future populations of prairie dogs. Natural Areas currently spends between $30,000 and $60,000 annually (roughly $30/acre) on the application of deltamethrin to manage plague impacts on Soapstone Prairie and Meadow Springs Ranch. This includes the cost of deltamethrin, staff time and equipment costs to apply the insecticide, annual mapping to determine colony size and to monitor prairie dog density within conservation zones. Cost estimates for the application of sylvatic plague vaccine are not available at this time, but are expected to be similar to or less than deltamethrin use.

In sum, excluding land purchases, the Natural Areas Department spends an estimated $125,000 to $150,000 a year to manage prairie dogs.

This financial overview does not attempt to measure the financial benefits that may accrue to the community through wildlife watching expenditures by the public. Nor does it attempt to calculate the societal benefits related to the conservation of prairie dogs; for example, the joy of seeing prairie dogs interacting with each other, or the thrill of seeing a raptor hunting in a prairie dog colony. These benefits are difficult to measure, but surely important to the theme of prairie dog conservation.

**Public Outreach**

To date, the department has conducted outreach through a professional workshop as well an open house regarding the relocation effort at Cathy Fromme Prairie and meetings with prairie dog advocates. An additional open house and forum will be held on July 28th prior to an August 30th City Council work session. Invitations will be distributed broadly, including to neighborhoods that adjoin prairie dog colonies. A Land Conservation and Stewardship Board meeting and discussion will occur on July 13. After the August 30th Council work session, additional public outreach will be conducted as the Guidelines are further refined.

# Attachment July 13, 2016

# Wildlife Management Guidelines

The City has demonstrated commitment to the conservation and stewardship of prairie dog habitat on its natural areas since 1992. This commitment has taken many forms and includes:

- acquisition of lands with (or potential) prairie dog habitat
- collaboration with state and federal agencies on innovative prairie dog management techniques, including plague vaccine and fertility controls
- treating up to a maximum of 3,000 acres of prairie dog colonies annually to limit plague
- dialogue with interested citizens
- participation in professional forums related to prairie dog management
- extensive public education and outreach on the value of the prairie dog ecosystem
- efforts to research and implement non-lethal forms of management

The Natural Areas Department (Department) approaches prairie dog management from a system-wide perspective; all 35,000 acres under management by the Department are considered when developing and implementing prairie dog management. Today, under the umbrella of the Wildlife Management Guidelines (Guidelines), the Department manages 4,011 acres of "urban" land and 39,000 acres at Soapstone Prairie Natural Area and Meadow Springs Ranch (owned by Utilities) that are considered biologically suitable for prairie dog habitat.

## Description of Suitable Habitat and Management Filters

In order to meet a variety of conservation goals and maintain strong relationships with neighbors, the Department tracks an occupancy rate, i.e. the current occupied acreage divided by the total suitable habitat. Suitable habitat is characterized by lands that typically would be occupied by prairie dogs in a native prairie setting. Steep areas, land with hydric soils, or habitats other than grasslands are excluded.

The Department excludes additional acreage from the suitable category to ensure achievement of multiple conservation and community goals. These additional "management filters" protect lands under grassland restoration, areas with rare or unique flora and fauna, and buffer areas next to housing developments. Of these filters, lands undergoing grassland restoration represent the largest acreage precluding prairie dog occupation, with 1,738 acres in an active restoration status in 2016. Additional filters, which include rare or unique flora and fauna as well as neighborhood buffers, remove another 718 acres. Therefore, the maximum available suitable acreage is 1,555 acres in <u>urban</u> natural areas (as distinguished from SSN and MSR). Thus, the current prairie dog occupation acreage of 400 acres represents an occupancy rate of 26% on urban natural areas.

As noted above, urban sites undergoing native prairie restoration are excluded from suitable habitat calculations. However, fully restored grasslands ultimately may be available for prairie dog colonies when they are considered stable and resilient enough for prairie dog occupation.

| Management Filters | Urban Acres Remaining After Filter Applied | 2015 % occupancy at 400 acres |
|---|---|---|
| Habitats prairie dogs typically do not occupy (>15% slope, non-grassland habitats, hydric soils) | 4,011 acres Biologically suitable acres | 10% |
| 1,738 suitable acres excluded for grassland restoration | 2,273 acres | 18% |
| 718 acres removed to conserve rare or unique flora and fauna, and provide a 100 yard buffer to residential neighbors | 1,555 acres | 26% |

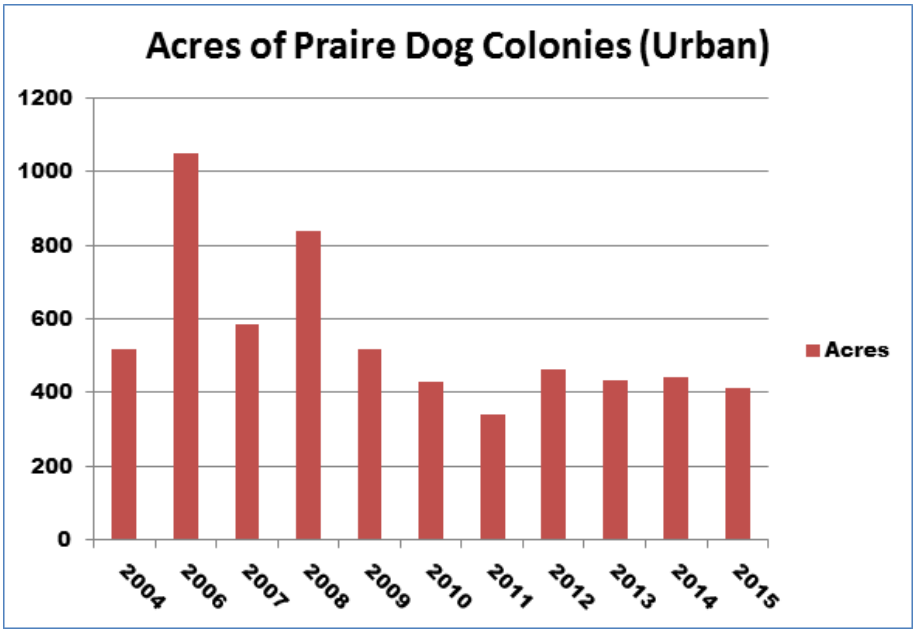
In addition to urban prairie dog colonies, the City's Soapstone Prairie Natural Area (SSN) and Meadow Springs Ranch (MSR) currently support 1,400 acres of occupied prairie dog habitat as of 2015 (see below for more details on SSN and MSR).

## Urban Natural Areas

Since annual monitoring began in 2004, occupied acreage on urban natural areas has experienced both system-wide doubling and population crashes from sylvatic plague. The expansion and contraction of populations coupled with a fragmented urban setting pose significant management challenges. Expansion episodes increase grazing pressure on native vegetation exposing bare soil susceptible to wind erosion. Between 2004 and 2009, drought coupled with extensive colony expansion resulted in episodes of severe soil erosion at several natural areas. Blowing soil from some natural areas created hazardous driving conditions and poor air quality. Neighbors had significant amounts of soil in their homes, garages and yards. Natural Areas staff spent a considerable amount of time cleaning home exteriors and remediating overgrazed and eroding natural areas.

Current Status and Trends

In the decade between 2004 and 2015, the total occupied acreage by prairie dog colonies within urban natural areas reached a level of greater than 1,000 acres (64% of suitable habitat) before reaching a more sustainable level of 400 acres (26% of suitable habitat) at 14 separate locations . The more than 600-acre reduction of occupied prairie dog colonies resulted from extensive plague outbreaks as well as lethal management pursuant to strategies identified in the 2007 Guidelines. Lethal control has been used to establish buffer zones, eliminate grazing on rare plants, and remove animals from sites undergoing grassland restoration. In 2015, the Natural Areas Department conducted lethal control at 14 sites and 203 acres.




Disease Management

Sylvatic plague is an exotic bacterial disease introduced to North America and is commonly transmitted by fleas. It affects prairie dogs and other mammals including ground squirrels, tree squirrels, and rabbits. Prairie dogs have little to no natural immunity and are highly susceptible to this disease. The Department regularly monitors prairie dog colonies and a drastic decrease in population would signal further investigation into the possibility of a plague outbreak. To date, insecticides are not used on urban natural areas as a regular preventative measure because the City is exceeding occupation goals. Moreover, there are negative effects of using insecticides as a preventative measure over the long term, including potential flea resistance and impacts to native invertebrates (see below for more information about a new vaccine as an alternative). Plague vaccine will be considered for use on some urban colonies when (and if) it becomes widely available. The Department will notify the public of plague outbreaks and provide information to the public regarding safe practices near prairie dog colonies. Lethal control during or in response to a plague outbreak is not recommended. Lethal control creates a greater risk for flea transmission as remaining fleas will search for a new host.

## Prairie Dog Management at Soapstone Prairie Natural Area and Meadow Springs Ranch

Introduction

The Soapstone Prairie Natural Area (SSN) Management Plan (NAP 2007*a*) established management objectives and conservation targets intended to guide management decisions. The Plan emphasizes the function and connectivity of the mountains-to-plains ecological

system. In recognition of the keystone role played by black-tailed prairie dogs, the Plan identifies the black-tailed prairie dog community (prairie dogs plus native species commonly associated with large prairie dog complexes) as a priority within the overarching objective of maintaining a diverse, healthy shortgrass prairie. The specific goal with respect to prairie dogs is to create a spatially diverse and connected complex of prairie dog colonies that lie within a matrix of un-colonized shortgrass prairie.

A second document (Prairie Dog Community Conservation Plan or PDCCP) was created to implement management concepts identified in the Management Plan. The PDCCP is used to guide efforts on both SSN and Meadow Springs Ranch and focuses on creating a black-tailed prairie dog complex capable of supporting a self-sustaining population of black-footed ferrets (defined as 30 breeding adult BFF by the USFWS; Black-footed Ferret Programmatic Safe Harbor Agreement 2013). This plan became the basis for the City's Black-footed Ferret Reintroduction Plan approved by the U.S. Fish and Wildlife Service and City Council in 2014. The PDCCP is a "living document" in that management strategies are modified and adapted as needed based on prairie dog response, effectiveness of the management action, and experience.

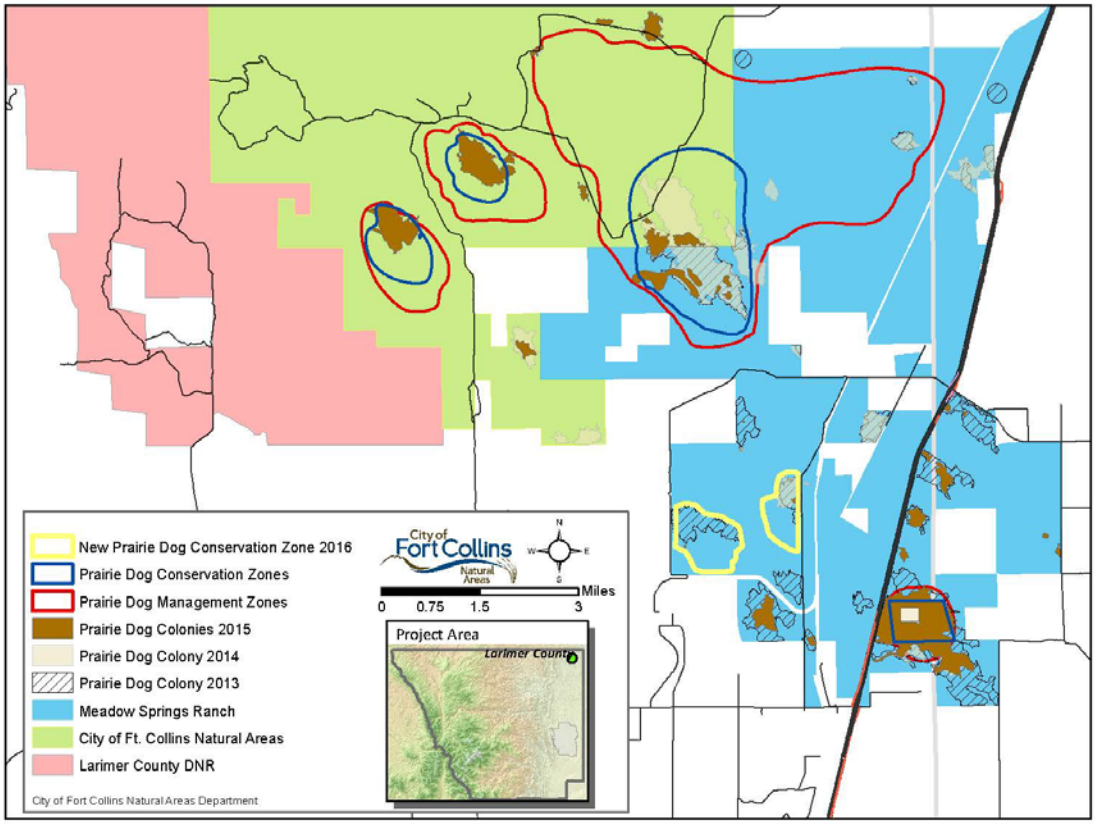
Based on an estimate that prairie dogs historically inhabited approximately 2-15% of prairie ecosystems (Knowles, 2002) , the occupied habitat goal within the SSN/MSR complex is at least 10% or 4,000 acres.[1] The 10% goal creates a prairie dog complex of sufficient size to support black-footed ferret recovery goal (1,500 acres; Black-footed Ferret Programmatic Safe Harbor Agreement 2013).

To manage prairie dogs within this relatively large landscape, Natural Areas created a series of prairie dog conservation zones used to designate areas where prairie dog colonies are managed for expansion and where conflicts with other conservation priorities and neighboring landowners are minimized. The location of the conservation zones ensure dispersal distances are appropriate and movement between colonies by prairie dogs and other species such as black-footed ferrets can occur. Prairie dogs can establish outside of the conservation zones, but disease management is not likely to occur and sylvatic plague is likely to eventually reduce colony size. This approach allows the City to maintain an acreage base of occupied habitat for long-term goals and recognizes an additional acreage base will expand and contract outside of the conservation zones.

Current best management practices for the control of sylvatic plague include the annual application of deltamethrin, a broad-spectrum insecticide. The application of this product is labor extensive and Natural Areas annual capacity is up to a maximum of 3,000 acres. As new products such as sylvatic plague vaccine are developed, Natural Areas disease management capacity is expected to increase (see Disease Management).

[1] Please note that the Department treats up to 3,000 acres for disease management. Beyond this level of treatment, prairie dogs are at risk from plague. See below for more information on disease management.

Soapstone Prairie and Meadow Springs Ranch Prairie Dog Colonies




Disease Management

Large plague events within the SSN/MSR complex at times have dramatically reduced the abundance and distribution of prairie dogs. In fact, a major limiting factor for colony expansion and ferret survival is the occurrence of an epizootic sylvatic plague outbreak.

The best management practice for prairie dog disease management focuses on minimizing the exposure to plague by controlling fleas with deltamethrin. Deltamethrin is considered a broad-spectrum insecticide meaning that while effective at reducing fleas, it may also reduce other invertebrates that many grassland species depend on for food sources. Application of this product requires specialized equipment and is labor intensive to apply.

Deltamethrin is effective at controlling fleas for about 9-10 months and an annual reapplication is required. Sylvatic plague can greatly reduce colonies when efficacy of deltamethrin has subsided. This further complicates disease management and Natural Areas treats some colonies twice each year to support black-footed ferret recovery. These re-treatments reduce the number of "new" acres that can be treated in any one year.

Another complicating factor is the concern that fleas may develop resistance to deltamethrin after several years of continued use. While the Department does not have any data to suggest deltamethrin resistant fleas occur on SSN/MSR, it is a concern. Nevertheless,

deltamethrin is the most effective insecticide for controlling fleas within prairie dog colonies. In response, to ecological and potential future resistance concerns the Department will treat only those acres needed to support black-footed ferret reintroduction. Based on experience, the Natural Area Department's annual capacity for disease management using this approach is up to a maximum of 3000 acres. (Please note this figure includes equipment and personnel supplied by Colorado Parks and Wildlife (CPW) as part of their research partnership with the City.)

Given the potential constraints posed by continued use of deltamethrin, the Department is helping to support research to field test a new sylvatic plague vaccine (SPV) for prairie dogs in partnership with CPW and the US Geologic Survey. The vaccine is an oral vaccine distributed via bait consumed by the prairie dogs. While early results are promising, continued research and bait manufacturing technology development is needed to build upon this successful research collaboration. As part of the ongoing research, Natural Areas is working with CPW to begin the experimental application of plague vaccine on a management scale and to date has treated up to approximately 600 acres annually with plans to expand to at least 1000 acres in 2016. While the use of SPV does not replace the use of deltamethrin, it does introduce a new management tool that the City and CPW are exploring. The ultimate goal is the development of an integrated pest management strategy to reduce and manage, but not entirely eliminate plague impacts.

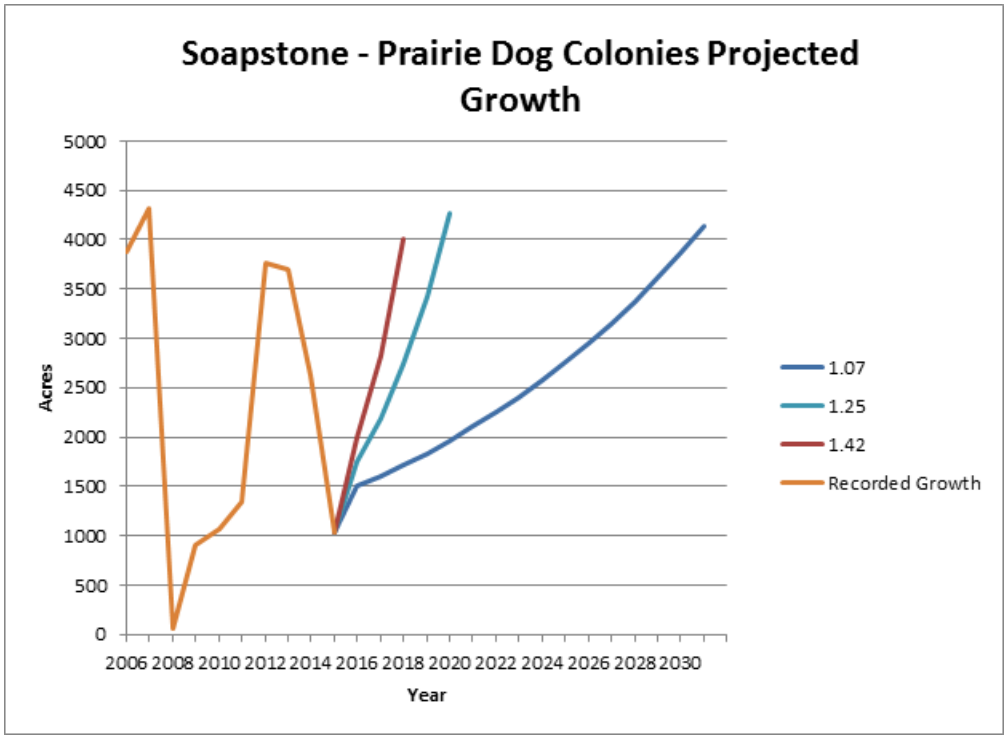
The direct costs of managing sylvatic plague on SSN and MSR range from approximately $30,000 to $60,000 (excludes indirect costs). If Natural Areas reaches its maximum management capacity of 3,000 acres within conservation zones, direct costs will be approximately $90,000 for plague management using BMPs currently available, i.e. deltamethrin.

If new tools such as sylvatic plague vaccine allow for additional disease management capacity, the managed acreage base may be able to expand. It is also possible that total costs for disease management will decrease in the future as vaccine and bait costs are reduced as production becomes more efficient and cost effective. Increasing production of vaccine and bait for experimental use in Colorado are the focus of current CPW research and development projects.

Data

To inform management actions, a variety of data is collected on SSN and MSR prairie dog colonies. Since 2006, all colonies are mapped to determine the total acreage and to document the rate of change or growth trends for all colonies within and outside of the conservation zones. The complex size has ranged from 164 acres to 3,900 acres. Approximately 1,060 acres of prairie dogs currently occur within established conservation zones and 450 acres are located outside of the zones. Data reveal that colonies within conservation zones that have had minimal exposure to sylvatic plague experience a spatial growth rate on average of approximately 142% annually. When colonies regularly reduced by plague are included, the growth rate drops to 107%. While future growth rates are unknown, given the success of

plague management and the related growth trends, an intermediate growth rate of around 125% is expected. Under this assumption, the colonies within conservation zones could reach 3,000 acres in as few as four years or by 2020. It is important to note that the growth rate described above is based on the change in colony size or footprint and may not reflect a concurrent change in population size. Natural Areas initiated data collection in 2015 to better understand prairie dog density within colonies and will be able to track changes in both density and colony size in future years.




## *Relocation Opportunities and Recommendations*

Under certain circumstances (see below), the City may decide to augment prairie dog populations. Given the high quality of the grassland at SSN and MSR and the difficulty in restoring impacted soils within this landscape, use of excavation techniques, artificial burrows or other soil disturbance techniques are not recommended.

The following recommended general criteria and considerations apply to relocations occurring on any City-owned natural area. Soapstone and Meadow Springs specific criteria follow.

- CPW will review all proposed relocations. Permits must be received before relocations occur.
- A permit from the City must be obtained and must be applied for at least 45 days in advance of the proposed relocation.

- The receiving site must contain suitable habitat.
- A minimum of 60 prairie dogs is recommended per relocation effort (adopted from Boulder County Parks and Open Space).
- Proximity to adjacent landowners and adjacent land uses (e.g., farming nearby may not be compatible).
- There shall be a resting period of at least 12-18 months after a plague event at the receiving site. Burrows from donating and receiving sites will be dusted 1-6 months prior to relocation.
- Prairie dogs to be relocated will also be individually dusted or treated for fleas.
- The availability of existing natural burrows is preferred; creating burrows is undesirable on natural areas due to the amount of unnatural materials left behind (e.g., plastic pipe) and surface disturbance.
- If the prairie dogs are coming from private land, the private sector must cover the full cost of relocation. Costs shall include City staff time and expenses such as expenses associated with approval of the relocation plan. This expense may be waived if the City is soliciting relocations to augment its prairie dog colonies.

Soapstone and Meadow Springs Criteria

1. Prairie dog colonies occupied by black-footed ferrets:
    a. If an event occurs (i.e. sylvatic plague) that reduces the prairie dog population to a level that will endanger the survival of black-footed ferrets (less than 1,500 acres) relocated animals may be accepted.

Colonies within conservation zones; prairie dogs may be accepted if:

1. Occupied acres within conservation zones are less than 3,000 acres (disease management capacity) and projected growth rates indicate the occupied acres will not exceed 3000 acres within the next year;
2. Intact burrow systems are available within an existing conservation zone; (given the high quality of the grassland at SSN and MSR and the difficulty in restoring impacted soils within this landscape, use of excavation techniques, artificial burrows or other soil disturbance techniques are not recommended);
3. Interference with research will not result from the relocation efforts (in particular plague vaccine research);
4. It is a suitable time of the year, typically the fall.
5. Current environmental and climate conditions can support the relocation (no ongoing drought and vegetation is capable of supporting a colony)

## Recommendations from Professional Wildlife Manager's Workshop:

A professional wildlife manager's workshop was hosted by the Natural Areas Department on March 22, 2016. The purpose of the workshop was to solicit input on the City of Fort Collins

Natural Areas Department's prairie dog management practices, and share related best practices and lessons learned in order to help the Department determine if and how to update guidelines in the 10-Year Wildlife Management Plan. Attendees included City Staff, Colorado Parks and Wildlife, eight (8) Front Range open space agencies, Arizona Fish and Game, and the Prairie Dog Coalition (Humane Society of the United States) based out of Boulder, CO. The Prairie Dog Coalition (PDC) provided a list of recommendations and background information. Responses to the key PDC recommendations are provided in a separate attachment.

In General, the Panel agreed that:

1. Managing for healthy grasslands rather than a single-species approach (prairie dogs) is the best management approach. The Panel further acknowledged that prairie dogs are one among many components of healthy grasslands.
2. Management and conservation of prairie dog colonies at Soapstone Prairie Natural Area was of the highest conservation importance.
3. The existing guidelines provide a framework that is not highly prescriptive, and allows flexibility to adapt decision making depending on the particular social and ecological context of a prairie dog colony.
4. The department's application and use of carbon monoxide is the most humane method of lethal control.
5. The zoning approach intended to reduce the concentration of prairie dogs toward the edges of a colony is ineffective and can be costly to implement.
6. Relocation of colonies from one property to another has marginal success rates and is expensive to implement. (Please note that the Prairie Dog Coalition believes that its relocation success rates are much higher than reported in the literature or by other agencies. Please see the FAQ attachment for more details.)
7. Transparency and providing opportunities for public engagement is critical to the complex and difficult task of managing colonies in an urban context.

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Prairie Dog Frequently Asked Questions

June 2016

**Question: With the changes to the Natural Areas' Wildlife Management Guidelines, will it be possible to move prairie dogs from private lands to Soapstone Prairie Natural Area and Meadow Springs Ranch?**

Response: Yes, under certain conditions. If there are less than 3,000 acres of prairie dogs in designated conservation zones at SSN/MSR then it may be possible to accept prairie dogs from private properties located within the City's GMA and/or from colonies from City owned properties (please see attachment dated July 13, 2016 for more details). There must be existing suitable burrows at SSN/MSR; and, the private sector must be fully responsible for the costs of the relocation if the prairie dogs are coming from privately owned lands.

**Question: Natural Areas does not recommend relocating prairie dogs to SSN/MSR when the total acreage is at or above 3,000 acres. Why is this?**

Response: Natural Areas is committed to treating up to 3,000 acres of prairie dog burrows for plague prevention. Beyond that acreage, the dedication of the Department's resources would be unreasonable and come at the expense of other conservation priorities.

**Question: Natural Areas has not relocated prairie dogs from urban natural areas to SSN/MSR instead of using lethal management or passive relocation techniques. Why is this?**

Response: Natural Areas is able to achieve important conservation objectives at SSN/MSR without the introduction of prairie dogs. Relocating prairie dogs would come at the expense of at the expense of core operations, such as trail construction, facilities maintenance, law enforcement, etc.

**Question: Why doesn't Natural Areas use passive relocation techniques rather than lethal management on its urban natural areas?**

Response: Natural Areas has used barrier fencing to limit the movement of prairie dogs into undesirable locations. Natural Areas has also required the use of passive relocation techniques to remove prairie dogs from areas of short-term impacts related to utility installations. However, these techniques can be time consuming, costly, and may not achieve long-term management objectives. Furthermore, passive relocation can have the undesired impact of creating high densities of prairie dogs, which can cause resource damage.

**Question: Will the City consider donating prairie dogs to the black-footed ferret recovery facility located in Carr, CO?**

Response: Yes, although this is a costly strategy (due to the necessity to live trap) and should be considered on a case-by-case basis.

**Question: What are the issues associated with allowing prairie dogs on fully restored urban grasslands?**

Response: Currently the City has 1,738 acres in the urban area undergoing grassland restoration. These areas were disturbed by a variety of factors mainly related to agricultural activities. As these areas become firmly restored to native grasslands with deep root systems, healthy soils, and good ground cover (a process based on staff's observations that can take one or two decades) it may be possible for the sites to host prairie dog colonies. As areas are occupied, it is expected that grassland health will decline given the viable non-native seed bank in the soils, which can persist for many decades.

**Question: How much does it cost to move prairie dogs?**

Response: Based on the City's experience and personnel communications with other agencies and private contractors, costs range from $150 to $400 per prairie dog. It is difficult to calculate a per-acre cost because prairie dog densities can vary so much from site to site. Urban prairie dog colonies may have densities of many dozens of animal per acre, while at Soapstone densities may average less than a dozen per acre. Aside from taxpayer financed relocations, non-profit or volunteer groups can provide low cost, to no cost, relocation services. For example, the relocation currently underway from private land to Cathy Fromme Prairie has been conducted with no cash investment by the City and the contribution of modest amounts of staff time.

**Question: How much does it cost to use lethal management?**

Response: In 2015, the Natural Areas Department spent $28,891 on lethal control. The estimated cost per acre is approximately $142.

**Question: How much does it cost to apply disease treatment?**

Response: It costs approximately $30 dollars per acre to apply an insecticide to control fleas that carry sylvatic plague. The City only applies insecticide at Soapstone Prairie Natural Area and Meadow Springs Ranch, given the density of occupation at these locations the per-acre cost is roughly $5-6 per prairie dog

**Question: How many prairie dogs survive the relocation in the first few months?**

Response: There is limited scientific research on this question. Some literature posits a survival rate of 20 to 40%. Anecdotal information from other agencies and private contractors support this range. There are, however, anecdotal reports from the Prairie Dog Coalition of survival rates of 80% or greater.

**Question: What is the minimum number of prairie dogs needed for a relocation effort?**

Response: Fort Collins' staff currently is recommending a minimum of 60 prairie dogs (Robinette et al. 1995), although greater numbers may increase relocation success. A target release of 4-7 prairie dogs per available burrow will be followed (Shier 2006). (Adopted from Boulder County Parks and Open Space.)

**Question: Are prairie dogs endangered?**

Response: There are five species of prairie dogs in the United States. The Mexican and Utah prairie dog are listed by the Federal government as endangered and threatened, respectively. The other three, Gunnison's, White-tailed and Black-tailed are all rare and declining (USFWS 2000; Hoogland 1985). The

Black-tailed prairie dog was nearly extinct in 1961 with only 364,000 acres occupied out of the historical 100 million acres (USFWS 2009, News Release). The Black-tailed prairie dog was listed as a candidate species under the Endangered Species Act in 2000, and removed from candidacy in 2004. The USFWS found scientific evidence to support another petition for listing in 2007, but denied it in 2009. Although currently not listed as threatened or endangered, the USFWS actively monitors the status of Black-tailed prairie dogs across their range, and Colorado and other states currently monitor report and actively manage the status of this species in an attempt to keep them from being listed as threatened or endangered.

# PUBLIC ENGAGEMENT SUMMARY

PROJECT TITLE: Natural Areas Wildlife Management Guidelines and Prairie Dog Land Use Code Updates

OVERALL PUBLIC ENGAGEMENT LEVEL: Inform and Consult

KEY STAKEHOLDERS: Developers and development consultants, neighborhood groups, private property owners, public land managers, Natural Area visitors and recreation groups, wildlife groups, Colorado Parks and Wildlife, educational groups who use natural areas, natural area neighbors, fellow land conservation agencies, habitat interests, hunters and hunting groups, Boards and Commissions, City Council and leadership, general public.

BOTTOM LINE QUESTION: How should wildlife in natural areas be managed for the next ten years? How should the Land Use Code regulate the management of prairie dogs on public and private development sites?

TIMELINE: March- December 2016

Phase 1: Natural Areas Policy Review, Land Use Code Review & Relocation Project Public Engagement

Timeframe: Spring 2016

Tools and Techniques:

- Prairie Dog Management Review Workshop (to understand best practices from experts), March 2016
- Prairie Dog Relocation Project outreach for private land to Cathy Fromme Prairie project included:
    - Prairie Dog Coalition outreach to two neighboring HOAs (164 residents) with mailed input form (10 responses; 5 opposed, 4 in favor, 1 no response). Prairie Dog Coalition/ City followed up by submitting a response to Fox Hills HOA concerns.
    - Prairie Dog Coalition outreach to CPW, County Commissioners, Larimer County Health Department, US Geological Survey
    - Mailing invitation to neighbors within $^{1/8}$ mile of Cathy Fromme Prairie Natural Area
    - Open House: April 19 at Registry Ridge Clubhouse (attended by 70 people; 53 response forms submitted) plus an online information and email link for those that can't attend open house (total of 165 comments; 29 concerned, 5 no objection, 131 support)
    - Trailhead kiosk flyer
    - Social media posts
    - Press release
    - Natural Areas and citywide website

- Online event calendars
- Email to City Council, leadership, LCSB, NAD staff
- Prairie Dog Coalition and New Belgium shared with their networks

Planning and Zoning Board Work Session- May 6, 2016

- The Board reviewed a range of options and staff recommendations for potential Land Use Code changes and provided direction.

Comments have been received on both the proposed code changes and Wildlife Guidelines from the Prairie Dog Coalition of the Humane Society of the United States. A response was sent addressing the recommendations.

Phase 2: Draft Wildlife Management Guidelines and Prairie Dog Code Update Public Engagement

Timeframe: Summer 2016 (July and August)

Key Messages: What is your feedback on the proposed Wildlife Management Guidelines and Land Use Code Updates?

Tools and Techniques:

July 13- Land Conservation and Stewardship Board presentation
Summary of proposed changes, also published online with comment form

Thursday, July 28- Open House and Forum Panel

- 5-8 pm Wildlife Management Guidelines Open House (Columbine room)
  - Posters with overview of policy changes/issues
  - Cookies, non-alcoholic drinks
  - Comment forms
  - Conversation with planners
- 6-7 pm Prairie Dog Management Forum (Canyon West room)
  - Participants- wildlife manager- CPW, prairie dog advocate, Lindsey Sterling-Krank , NAD Aran Meyer or Rick Bachand, development/chamber representative, Rebecca Everette-Planning Dept, professional facilitator- Laura Sneeringer, CDR Associates
  - Short presentation describing current situation, issues, proposed changes overview- NAD/Planning
  - 5 min per panelist to describe their perspective
  - Question time-with preset FAQs, index cards selected from audience or flip chart question generation.
- 7-8 p.m. open house continues

To advertise proposals, open house and online comment opportunity:

- Press release
- Website coverage, electronic calendars

- Online comment form and related information
- Social media posts
- Trailhead flyers
- Enewsletters from both Planning (weekly Development Review) and Natural Areas (monthly Enews)
- Mailing to neighbors within 1/8 mile of natural areas with prairie dog colonies
- Email blast to selected stakeholders (NAD and Planning email lists)
- Email to anyone who commented on relocation project

August 30-Work session with City Council

Phase 3: Final Wildlife Management Guidelines and Land Use Code Update
Timeframe: Fall/Winter 2016

Key Messages: Share final document and policies with the community.

Tools and Techniques:

- Email people who attended open house or were otherwise involved in previous phases
- Natural Areas & Planning websites
- Natural Areas & Planing enewsletters
- Planning & Zoning Board Hearing to review and recommend code changes to Council
- Land Conservation and Stewardship Board meeting for final review and possible recommendation to Council
- City Council Regular Meeting to consider adoption of Land Use Code changes

PRAIRIE DOG
COALITION

THE HUMANE SOCIETY
OF THE UNITED STATES

**2525 Arapahoe #E4-527. Boulder, CO 80302. (720) 938-0788. prairiedogcoalition.org**

# PRAIRIE DOGS, PEOPLE AND PLAGUE

**The Prairie Dog Coalition prepared this report with the cooperation of the Colorado Department of Public Health and the Environment.**

The following is a fact sheet complied by the Prairie Dog Coalition is intended to offer the facts relating to prairie dogs and plague.

Prairie dogs are only one of many rodent species that are susceptible to plague. Seventy-six species of mammals have been shown to carry fleas infected with plague. Plague is a disease caused by bacterium that is transmitted by infected fleas and maintained in the environment in a flea-rodent cycle. Plague is found in rodents and their associated fleas throughout the Western U.S.. Prairie dogs are not silent, long-term reservoirs of plague; instead over 95% of prairie dogs will die within 78 hours of infection with plague. Because of this, prairie dogs can be an indicator species for the presence of plague circulating in other rodent species in an area. The loss of a prairie dog colony over the course of a few weeks, in absence of human control, strongly indicates the presence of plague. If you see an active prairie dog colony, plague probably is not present in that colony.

Plague is transmitted to people through fleabites or direct contact with bodily fluids of infected animals, but it is primarily a disease of wild rodents. Numerous species of rodents have been involved in Colorado's human cases particularly rock squirrels and wood rats because they often live in or near people's homes.

The Centers for Disease Control and Prevention states that, "The number of human plague infections is low when compared to diseases caused by other agents, yet plague invokes an intense, irrational fear, disproportionate to its transmission potential in the post-antibiotic/vaccination era." Fears of humans contracting plague from prairie dogs are often exaggerated and sometimes even used as an excuse for extermination. According to the Colorado Department of Public Health and Environment statistics, of the 51 plague cases in Colorado since 1957, only 7 cases, one a fatality, were directly linked to prairie dogs. In four other cases prairie dogs and other rodents species were found infected in the area. Of those 7 cases two were related to people skinning prairie dogs, two were the result of family pets bringing home fleas after being allowed to roam freely in prairie dog colonies and three were people infected from working, playing or hiking in infected colonies.

The Colorado Department of Health states, "If precautions are taken, the probability of an individual contracting plague, even in an active plague area, is quite low." Eric Stone, wildlife biologist for The US Fish & Wildlife Service at Rocky Mountain Arsenal National Wildlife Refuge confirms, "Contracting the Plague is very unlikely even if a person is walking through or living near a prairie dog colony. The fleas that carry plague stay in, and around the burrows, so as long as a person or their pets are not coming in contact with the fleas, it is unlikely that they will contract plague."

The most common means of human infection is from being exposed to rodent fleas in areas where rodents are dying from plague. Pet cats and dogs have also been implicated in human cases by bringing home infected fleas or in the case of cats contracting plague by catching and eating infected animals or by being bitten by infected fleas. Even though the risk of human infection is low, people working in or near prairie dog colonies should be familiar with the symptoms of plague. Please visit http://www.cdc.gov/ncidod/dvbid/plague/index.htm to learn more. Plague is easily treatable with antibiotics and readily curable in humans if diagnosed and treated early.

Plague was accidentally introduced to North America from Asia around 1900, and has devastated western wildlife populations. All four species of prairie dogs in the U.S. are extremely susceptible to plague.

Because the prairie dog ecosystem has been destabilized by massive plague die-offs, other wildlife that rely on prairie dogs for food and shelter, like the black-footed ferret, burrowing owl, ferruginous hawk, and mountain plover, are also in trouble now. Researchers are working to develop a vaccine against this nonnative disease.

RECOMMENDED CONTROL AND PREVENTION

- **Large-scale rodent extermination, such as poisoning entire prairie dog colonies, is not recommended by the Colorado Department of Public Health and the Environment as an effective means of plague control.**
- Dusting rodent burrows with insecticide powder to kill fleas is effective in controlling plague in relatively small areas that have high human use such as a colony bordering a park, open space or subdivision. In these cases, a 100-foot buffer zone of burrows can be treated with insecticide dust and the areas posted to advise people and pets to stay out of the colony.
- Avoid contact with all sick and dead rodents and rabbits. Report any die offs involving multiple rodents (as opposed to a single dead animal) or the sudden disappearance of a prairie dog colony to local or state health departments.
- Keep cats and dogs out of prairie dog colonies; this will continue to decrease the low number of human cases of the plague linked to prairie dogs. Pets that live or visit rural areas should be treated for fleas according to your veterinarian's recommendations.
- Do not feed or entice any rodent or rabbit species into your yard, back porch, or patio.
- Eliminate rodent habitat, such as piles of lumber, broken cement, trash and weeds around your home or cabin.
- While hiking, treat pants, socks, shoe tops, arms and legs with insect repellants.
- Remember the incubation period of 2-6 days and consult a physician if sudden unexplained illness occurs within that period after activities in the outdoors.

The Prairie Dog Coalition prepared this report with the cooperation of the Colorado Department of Public Health and the Environment.

For more information or a list of sources, contact The Prairie Dog Coalition at (720) 938-0788 or visit www.cdc.gov/ncidod/dvbid/plague, or call the CDC public response hotline at (888) 246-2675 (English), (888) 246-2857 (Espanol), or (866) 874-2646 (TTY), The Colorado Department of Public Health and the Environment can be reached at (303) 692-2700 or the CO HELP (health education line for the public) toll free hotline, (877) 462-2911, for plague information inquires or visit http://www.cdphe.state.co.us/dc/Zoonosis/plague/plaguehom.html

**Photo by Sandy Nervig**