City of Fort Collins | Natural Areas Department

Wildlife Conservation Guidelines

City of Fort Collins Natural Areas

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Memorandum of Adoption
The Natural Areas Wildlife Conservation Guidelines was administratively adopted by the Natural Areas Department Director on July 11, 2017.

John Stokes, Natural Areas Department Director

7-11-17
Date

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Appendices

Photographic Note: All images were supplied by City of Fort Collins Natural Areas Department staff unless otherwise noted. Additional images were supplied by individual photographers, whom we thank for their generosity and support of the Natural Areas Department.

Cover Photos: Top Left: Green-tailed towhee at Soapstone Prairie Natural Area (Photo by Aran Meyer). Top Right: Elk at Bobcat Ridge Natural Area. Bottom Center: Red fox and kit (Photo by Norm Keally)

Executive Summary

The City of Fort Collins Natural Areas Department manages local and regional natural areas comprising 36,100 acres within Fort Collins and Larimer County. These lands include relatively small, isolated natural areas within the urban setting, a collection of foothills sites just to the west of the City, a series of natural areas along the Poudre River, and four regional natural areas: Gateway, Picnic Rock, Bobcat Ridge, and Soapstone Prairie.

As the natural areas system has grown, so has the complexity of wildlife conservation issues. In turn, the Department seeks out increasingly sophisticated management approaches to address emerging wildlife issues. These Wildlife Conservation Guidelines are intended to guide in the development and implementation of system-wide and site-specific wildlife management and conservation strategies that advance ecosystem health, reflect community values, and that are pragmatic and fiscally responsible.

The Wildlife Conservation Guidelines put forth general management strategies for City-managed natural areas in the urban and rural setting. Specialized topics also are addressed in both settings. The guidelines apply to public lands (natural areas) managed by the Natural Areas Department. They do not apply to private lands, other City of Fort Collins managed lands, or conservation easements held by the Natural Areas Department. Federal and state wildlife law, as well as the Fort Collins Municipal and Land Use Code also supersede them.

These guidelines intend to:

- Provide a framework to guide wildlife conservation decisions on City natural areas within the overarching context of promoting and enhancing ecosystem health and sustainability.
- Maintain consistency in management direction between natural areas while also providing flexibility for site-based decision-making.
- Provide guidance for managing human – wildlife conflicts.
- Inform the management of prairie dogs and prairie dog habitat.
- Implement long-term conservation strategies related to Species of Interest recovery efforts.
- Provide direction for the control of invasive wildlife.
- State future wildlife monitoring and research needs.

Chapter 1: Scope & Purpose

The City of Fort Collins, Colorado, is situated at the base of the Rocky Mountain foothills where the short-grass prairies of the Great Plains rise to meet the shrublands and forests of the Rocky Mountains. By virtue of geography, the area has a naturally diverse ecosystem including features such as short and mixed-grass prairies, wetlands, riparian forests associated with the Cache la Poudre River, and the shrublands and forests of the foothills and beyond. The blend of these ecosystems in this transition area between the plains and the Rocky Mountains support an abundance and diversity of native wildlife enjoyed by the Fort Collins community.

Superimposed on the landforms of the Fort Collins area is the geography of the built environment that grades from a dense urban core to rural and ex-urban development to the north and west (Wellington), with small areas of rural landscape between neighboring communities to the south and east (Loveland and Windsor). The 11,000-year presence of humans on this post-glacial landscape has strongly influenced, and continues to influence, the type, abundance, and diversity of wildlife in of the greater Fort Collins area.

Geographic Scope

Excluding conservation easements, the City's natural area system is comprised of 36,100 acres of conserved land within the city limit and beyond. Natural areas range from small, disconnected parcels within a highly urbanized setting to large contiguous regional natural areas outside city limits that are several thousands of acres or more in size.

Urban and rural settings differ vastly in some aspects that affect wildlife and their habitat. The City owns four regional properties, Bobcat Ridge, Gateway, Picnic Rock, and Soapstone Prairie natural areas. Soapstone Prairie and Bobcat Ridge are considerably larger than most of the urban natural areas (22,498 and 2,605 acres, respectively) and the adjacent lands are primarily ranchlands or publicly owned lands. The size of a natural area is one factor to consider when implementing wildlife management decisions. A second consideration is the degree to which the natural area is connected to other undeveloped parcels or areas managed for wildlife conservation.

This document outlines guidelines for wildlife conservation and management, but not prescriptive policies. Wildlife issues may have different management constraints or opportunities based on the location.

Application of Wildlife Conservation Guidelines

The guidelines are intended to direct management of habitat and wildlife on owned and publicly managed natural areas only. These guidelines <u>do not</u>:

- Serve as policy or management direction for privately owned lands, lands held in conservation easement by the Natural Areas Department, or other City of Fort Collins managed lands.

- Supersede or conflict with current City of Fort Collins Land Use Code or wildlife regulations promulgated by the Fort Collins Municipal Code.

- Supersede or conflict in any way with federal or state law related to wildlife or any policy direction set forth by Colorado Parks and Wildlife (CPW).

- Supersede site management plans that address specific wildlife issues. Instead, these guidelines help inform those management plans.

Natural Areas Department Mission Statement
The Natural Areas Department's mission is to conserve and enhance lands with natural resource, agricultural, and scenic values, while providing meaningful education and appropriate recreation opportunities.

Wildlife Conservation Vision Statement
The City of Fort Collins Natural Areas Department will strive to conserve, restore, and sustain a diversity of native wildlife populations and habitats on City natural areas that are functional within the surrounding environment and compatible with ecological resources.

Principles of Wildlife Conservation on City Natural Areas
The generalized principles listed below provide a framework that guides more specific wildlife management activities:

1. The Natural Areas Department will use the best available science to understand and manage wildlife and their habitats.

2. The Natural Areas Department will consider environmental, economic, and social sustainability principles in managing wildlife and wildlife habitat.

3. The Natural Areas Department will clearly articulate the standards and protocols for managing situations where conflicts arise between wildlife and the public when the situation lies beyond the jurisdiction of the State of Colorado.

4. The Natural Areas Department will establish wildlife management guidelines that proactively reduce human/wildlife conflicts, reflect overall community values, and sustain ecological integrity. The Department will manage wildlife for overall habitat health (including vegetative communities and their associated wildlife) rather than management at a single species level.

5. Natural Areas Department will conduct natural resource surveys as needed to develop conservation strategies. Natural areas with the greatest conservation potential will be the primary focus for proactive wildlife conservation efforts.

6. Staff will report to the Land Conservation Stewardship Board on wildlife management activities annually.

Chapter 2: Regulatory Environment & Framework

Wildlife management occurs within a larger context of local state and federal laws. Colorado Statute 33-1-101(2) states, "wildlife within this state not lawfully acquired and held by private ownership is declared to be the property of the state." Thus, management of wildlife in the State of Colorado is the jurisdiction of the Parks and Wildlife Commission and the Colorado Parks and Wildlife. Furthermore, certain federal laws passed in conjunction with the Endangered Species Act and the Migratory Bird Treaty Act governs management of specific wildlife and their habitat.

The guidelines recommended herein are subordinate not only to state and federal laws, but also to City and County jurisdiction. Specific site management plans guide wildlife management for each natural area; however, this document provides the context that influences how site or area management plans are created. Therefore, this document will frequently serve as the primary set of guidelines for most wildlife management decisions on natural areas.

Existing Policies, Guidelines, and Plans

The Natural Areas Department has managed wildlife occupying City of Fort Collins natural areas through policies, guidelines, and management plans since the its inception in 1992. This document is an updated version of the 2007 Wildlife Management Guidelines. Table 2.1 outlines the natural areas management plans that have site-specific information on wildlife management. Also included in the table is the Natural Areas Master Plan (2014) and other plans and guiding documents that aid in conserving wildlife and wildlife habitat.

Table 2.1 Existing policies, guidelines, and plans in the Natural Areas Department.

Current City Document	Adopted By	Year
Restoration Plan and Vegetation Management Plan (Addendum)	Natural Areas Director	2016
Nature in the City	City Council Adopted	2015
Core Natural Areas Management Plan (8 sites)	Natural Areas Director	2015
2014 Natural Areas Master Plan (*Replaced 2004 Land Conservation and Stewardship Master Plan*)	City Council	2014
Fire Management Plan	Internal Department Reference	2012
Cache la Poudre River Natural Areas Management Plan (*17 sites*)	Natural Areas Director	2011
Agricultural Position Statement	Natural Areas Director	2011
Soapstone Prairie Natural Area Management Plan	Natural Areas Director	2007
Foothills Natural Areas Management Plan (*6 sites*)	Natural Areas Director	2007
Fossil Creek Natural Areas Management Plan (*11 sites, update in 2017*)	Natural Areas Director	2005
Bobcat Ridge Natural Area Management Plan (*Update in 2017*)	Natural Areas Director	2005

Fort Collins City Municipal Code

The Natural Areas Department adheres to City Municipal Code when managing wildlife on City property, whether or not the property is within city limits. Chapter 4 of the City Code, *Animals and Insects*, primarily addresses domestic animals and bees, and is not relevant to wildlife management on City natural areas. However, six sections dealing with poison, trapping, wild birds, and hunting/discharge of a firearm are relevant.

> Section 4-119. Use of poison restricted.
> Prohibits the poisoning of any animal, with the exception of pest rodents, such as mice, rats, and voles with poisons approved for such use by U.S. Environmental Protection Agency. Only State of Colorado licensed persons may perform lethal control on prairie dogs and other burrowing rodents.
>
> Section 4-120. Trapping restricted.
> Restricts trapping of wild animals to live trapping in a manner required by the Humane Society and the Colorado Parks and Wildlife. Exceptions include, rodent snap traps used on private property and emergency trapping (lethal or non-lethal) under the direction of CPW for animals of imminent threat to persons or causing serious damage to property.
>
> Section 4-156. Wild bird refuge created.
> Established Fort Collins as a wild bird sanctuary in 1986; urges all persons to protect wild birds and encourages their propagation and refuge within the City Limits.
>
> Section 4-157. Killing or capturing wild birds restricted.
> Makes it unlawful to kill, injure, or capture any wild bird or injure the nest, eggs, or young of any bird. The Chief of Police and CPW can authorize permits for birds that are a nuisance or health hazard. CPW authorizes permits to capture birds for research purposes.
>
> Sec. 17-101. Discharging of weapons; permit.
> . . .
> (b) The discharge of firearms or weapons by any member of any law enforcement office in the course of such member's law enforcement training exercises or official duty shall not be deemed a violation of Subsection (a) above, and any firing range or training facility operated and maintained by Fort Collins Police Services or the County Sheriff's Office is exempt from the permit requirements specified in Subsection (c) below. The discharge of firearms or weapons in a City natural area, as defined in Section 23-192, by a person in possession of a valid, current, City-issued hunting permit shall not be deemed a violation of Subsection (a) above if the discharge occurs within the area identified and in the manner authorized by the subject permit.
>
> Sec. 23-193. Prohibited acts; permits.
> . . .
> (d) Except as authorized by a permit obtained for such use from the Service Area, it shall be unlawful to:
> - 3 -

. . .
(20) Possess in a natural area any gun, pistol, crossbow, bow and arrow, slingshot or other firearm or weapon whatsoever, including BB guns or pellet or paintball guns, except as permitted by a City-issued or other lawfully issued permit. Discharge of any such firearm or weapon shall be prohibited, except in a natural area as expressly permitted by a City-issued hunting permit.
. .

City of Fort Collins Land Use Code & Buffer Zones (Article 3, Section 3.4.1)

The City of Fort Collins Land Use Code, regulating private land development governs major construction and improvement projects (parking lots, buildings, or other facilities) on natural areas within the city limits. Article 3, Section 3.4.1, of the Land Use Code applies to Natural Habitats and Features. Projects are required to follow standards that preserve or enhance the ecological character, function, and wildlife use of the natural habitat or feature. The Code also requires projects to minimize or adequately mitigate foreseeable impacts of the development.

Buffer zone standards within the Land Use Code provide guidance for not only site development on natural areas, but also management activities (e.g., prairie burning) that could potentially disturb wildlife at a critical time (e.g., denning, nesting). Although trails can be constructed within buffer zones of streams, prairie dog colonies, and wildlife concentration areas, trails are required to be compatible with the ecological character and wildlife use of the habitat, with mitigation measures utilized to minimize foreseeable impacts whenever possible. Below is a list of natural habitats and features with established (regulated) buffer zones.

Natural Habitat or Feature	**Buffer Zone Standard**
Isolated Areas:	
o Irrigation ditches that serve as wildlife corridors	50 feet
o Isolated patches of native grassland or shrubland	50 feet
o Isolated patches of native upland or riparian forest	50 feet
o Woodlots/farmstead windbreaks	25 feet
o Naturalized irrigation ponds	50 feet
o Naturalized storm drainage channels/detention ponds	50 feet
o Lakes or reservoirs	100 feet
o Wetlands < 1/3 acre in size	50 feet
o Wetlands > 1/3 acre in size, without significant use by waterfowl and/or shorebirds	100 feet
o Wetlands > 1/3 acre in size with significant use by waterfowl and/or shorebirds	300 feet
Stream Corridors (buffer distance from the top the bank):	
o Boxelder Creek	100 feet
o Cache la Poudre River in downtown (College to Lincoln Avenue)	200 feet
o Cache la Poudre River outside downtown	300 feet

o Cooper Slough	300 feet
o Dry Creek	100 feet
o Fossil Creek and Tributaries	100 feet
o Spring Creek	100 feet

Special Habitat Features/Resources of Special Concern:

o Bald eagle communal feeding sites	660 feet
o Bald eagle communal roost sites	1,320 feet
o Bald eagle nest sites	2,640 feet
o Winter raptor concentration areas	300 feet
o Great blue heron colonial nest sites	825 feet
o Migratory waterfowl concentration areas	300 feet
o Nesting waterfowl concentration areas	300 feet
o Migratory shorebird concentration areas	300 feet
o Nesting shorebird concentration areas	300 feet
o Migratory songbird concentration areas	300 feet
o Locations of Preble's meadow jumping mouse	300 feet
o Locations of fox, coyote, and badger dens	50 feet
o Locations of rare butterfly species	Site analysis
o Locations of rare, threatened, or endangered plant species	Site analysis
o Locations of geological or paleontological sites of special interest	Site analysis

Larimer County

Any development of a major public improvement on a natural area outside of the city limits requires review by the Larimer County Planning staff including environmental review for possible ecological impacts. The County uses the Wildlife and Plant Communities of State and National Importance database established by the Colorado Natural Heritage Program as the initial indication of the existence of a protected species on a site. All new development projects with potential impacts to state or federally listed wildlife species or habitat are required to consult the Colorado Parks and Wildlife.

Larimer County plans to develop specific standards for habitat and species protection in the future, based on the priorities established in a more detailed habitat mapping project. Four criteria have been selected as the basis for determining habitat priorities: (1) rare vegetation types; (2) areas known to contain rare and threatened species; (3) areas supporting an unusually large number of species; and (4) areas providing habitat for species of importance to the people of Larimer County. These areas include those that are moderately to highly impacted by development, known migration corridors, pronghorn concentration areas, mule deer winter concentration areas, elk severe winter range, duck winter range, bighorn sheep lambing areas, mule deer migration corridors, and elk migration corridors. These standards would apply only to new development, but like the City's buffer standards, may be useful also for guiding wildlife management activities on natural areas outside of the city limits.

State of Colorado

Colorado Parks and Wildlife classifies native terrestrial wildlife in Colorado as big game, small game, waterfowl, furbearers, or non-game. Classifications for fish include either game or non-game species.

The City has the ability to use hunting as a management tool on any natural area in the form of a controlled hunt with a recommendation by CPW and approval by the Natural Areas Director. This could occur for recreation purposes or to address specific management needs such as disease control (e.g., chronic wasting disease in ungulates) or species overabundance (e.g., deer or elk populations over browsing habitat). Any use of hunting for management or recreation will comply with Colorado Parks and Wildlife hunting regulations and City of Fort Collins Municipal Code.

Fishing on any City-owned land also must comply with Colorado Parks and Wildlife fishing regulations. Fishing can be prohibited from a lake or pond owned by the City. Currently, fishing is allowed on 16 City natural areas including areas with ponds, lakes, and access along the Poudre River. Harvesting non-native carp (*Cyprinus carpio*) by bow hunting for either management or recreation is prohibited and would require a special use permit by the Chief of Police and Colorado Parks and Wildlife.

The Natural Areas Department is required to obtain a Colorado Parks and Wildlife permit whenever there is a need to capture or kill any species of wildlife on any of its properties for any purpose, including management or research. By CPW definition, wildlife includes all vertebrates, mollusks, and crayfish. No permit is necessary for the capture or killing of other types of invertebrates, such as insects. A CPW permit is also necessary to destroy a wildlife den, nest, or eggs or if wildlife is harassed.

Federal

Endangered Species Act

The Endangered Species Act provides protection to species in imminent danger of extinction throughout all or a significant portion of its range or those likely to become endangered in the near future. Regulations under the Endangered Species Act prohibit direct physical harm to a listed species, including harassing, wounding, or killing. These regulations also prohibit actions that result in indirect harm by impairing essential functions such as breeding, feeding, or sheltering (denning, roosting, etc.).

City of Fort Collins natural areas currently support two mammals that fall under the Endangered Species Regulations: black-footed ferret and Preble's meadow jumping mouse. Three bird species that may occasionally use the natural areas for migration also fall under Endangered Species Regulations: western snowy plover, least tern, and piping plover. Black-footed ferrets and black-tailed prairie dogs are proactively managed at Soapstone Prairie Natural Area and Meadow Springs Ranch (Utilities owned) to support a site recovery goal of 30 adult female ferrets. Habitat will be actively managed to support endangered species where they occur, if management is deemed to have a positive impact.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act protects all migratory birds and their active nests. The Act prohibits harming a migratory bird or destroying an active nest, including eggs or young. Nest destruction includes activities that cause abandonment of a nest that leads to mortality of eggs or young. However, it does not prohibit destroying an inactive nest. The Migratory Treaty Reform Act of 2004 includes protection of all bird species native to the United States or its territories.

Chapter 3: Protected Wildlife Species Conservation

Located on the boundary between the Rocky Mountains and the Great Plains, Fort Collins has a semi-arid climate with an average precipitation of less than 15 inches. Prior to settlement, the Fort Collins area was characterized by shortgrass prairies with scattered trees and shrubs along watercourses, and sparse ponderosa pine forests in the foothills. Wetlands were primarily confined to the Cache la Poudre River and other stream corridors. A greater variety of habitat types are present today than before European settlement due to land changes from farming and urbanization, including water transportation, reservoir construction, gravel mining, and urban forest plantings.

Located where two major ecological regions merge--the Great Plains and the Rocky Mountains--the Fort Collins area continues to be an important migratory corridor for raptors, songbirds, and butterflies. As wetlands have increased along ditch systems along the Front Range, so has the value of Fort Collins for migratory waterfowl, shorebirds, and other wetland bird species. Riparian forests along the Poudre River and other stream corridors in Colorado are recognized by many as one of the more diverse ecosystems in the United States.

As of September 2015, 358 species of birds have been documented in the Fort Collins area (Table 3.1). The Fort Collins City Limits and Growth Management Area (GMA) encompass approximately 48,000 acres within its geographic range. By comparison, our city's bird species diversity is higher than much larger protected areas within Colorado and elsewhere.

Table 3.1. Comparison of bird diversity in the Fort Collins' region.

Location	# Acres	# Bird Species
Fort Collins City Limits and GMA	~48,000	358
Yellowstone National Park	2.2 million	285
Pawnee National Grassland	193,060	301
Rocky Mountain National Park	265,726	280

The City of Fort Collins has a more than 30-year history of protecting local wildlife. In 1986, City Code established limitations on the possession and feeding of various wildlife species, use of poisons, trapping, and hunting. That same year, Fort Collins became a "Wild Bird Sanctuary." City Code stated, "All persons are urged to protect the wild birds and encourage their propagation and refuge within such sanctuary."

A number of plans and policies followed further providing measures to protect significant natural areas, both on City and privately owned lands. In 1992, the City of Fort Collins adopted the "Natural Areas Policy Plan." As part of this plan, the City identified important wildlife habitat areas, animal species of special concern, and important use areas or concentration sites. The goal of 12 policies established in the plan was to "preserve and protect natural areas within Fort Collins and the Urban Growth Area *[now known as Growth Management Area]* to provide habitat essential to the conservation of plants, animals, and their associated ecosystems..."

Management of natural areas is guided by plans listed in Table 2.1 and Chapter 2, most notably the Natural Areas Master Plan that City Council adopted in 2014.

The City of Fort Collins Natural Areas Department currently manages 45 natural areas within local and community separator areas, totaling approximately 10,600 acres, as well as 4 regional natural areas, totaling over 25,000 acres. A high priority is the conservation and management of important wildlife habitat for groups of species (e.g., raptors, migratory birds, shortgrass prairie species, cavity nesting birds, migratory butterflies, shorebirds, and wetland birds).

With the assistance of the Colorado Natural Heritage Program (CNHP), the Natural Areas Department has compiled a list of native wildlife Species of Interest (Table 3.2) for Fort Collins natural areas (Restoration Plan 2016). This list includes wildlife that are documented or have the potential to occur on natural areas and are:

1) Considered Species of Greatest Conservation Need (SGCN) in the 2015 State Wildlife Action Plan (SWAP) (Colorado Parks and Wildlife, 2015); and/or
2) Species tracked by CNHP.

Species of Greatest Conservation Need include species that are state or federally listed. Some species on this list may warrant further investigation to determine if they occur on natural areas properties and presence/absence surveys could be considered when data gaps exist in areas that are suitable habitat. While a few species occur only rarely and are not in need of any special management action, conservation of most of the Species of Interest can be enhanced through various potential management actions.

Swift fox at Soapstone Prairie Natural Area

Table 3.2 Wildlife Species of Interest in City of Fort Collins Natural Areas (*See Appendix B for Key to CNHP and State Ranking and Status)

*Documented or potentially occurring on natural areas, *ESA- Endangered Species Act or federal listing status, *State- Colorado listing status

Common Name	*Scientific Name*	Global Rank	State Rank	Documented or Potential*	Tracked by CNHP/CPW?	ESA*	State*
Mammals							
Abert's squirrel	*Sciurus aberti*	G5	S5	Documented	SWAP Tier 2		
Bighorn sheep	*Ovis canadensis*	G4	S4	Documented	SWAP Tier 2		
Bison	*Bison bison*	G4	SX	Documented/ reintroduced	SWAP Tier 2		
Black-footed ferret	*Mustela nigripes*	G1	S1	Documented/ reintroduced	CNHP full/ SWAP Tier 1	E	SE
Black-tailed prairie dog	*Cynomys ludovicianus*	G4	S3	Documented	CNHP partial/ SWAP Tier 2		SC
Dwarf shrew	*Sorex nanus*	G4	S2	Potential	CNHP full/ SWAP Tier 2		
Fringed myotis	*Myotis thysanodes*	G4	S3	Documented	CNHP full/ SWAP Tier 1		
Hoary bat	*Lasiurus cinereus*	G5	S5B	Documented	SWAP Tier 2		
Northern pocket gopher	*Thomomys talpoides agrestis*	G5T3	S3	Potential	CNHP partial		
Olive-backed pocket mouse	*Perognathus fasciatus*	G5	S3	Potential	CNHP full/ SWAP Tier 1		
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	G5T2	S1	Documented (historic)	CNHP full/ SWAP Tier 1	T	ST
River otter	*Lontra canadensis*	G5	S3S4	Documented	SWAP Tier 2		ST
Sagebrush vole	*Lemmiscus curtatus*	G5	S1	Potential	CNHP full/ SWAP Tier 2		
Swift fox	*Vulpex velox*	G3	S3	Documented	CNHP full/ SWAP Tier 2		SC
Townsend's big-eared bat	*Coryhnorhinus townsendii pallescens*	G3T3	S2	Documented	CNHP full/ SWAP Tier 1		SC
Birds							
American bittern	*Botaurus lentiginosus*	G4	S3S4B	Documented	SWAP Tier 2		
American peregrine falcon	*Falco peregrinus anatum*	G4T4	S2B	Documented	CNHP full/ SWAP Tier 2	Delisted	SC
American white pelican	*Pelecanus erythrorhynchos*	G4	S1B	Documented	CNHP full/ SWAP Tier 2		
Bald eagle	*Haliaeetus leucocephalus*	G5	S1B, S3N	Documented	CNHP full/ SWAP Tier 2	Delisted	SC
Barrow's goldeneye	*Bucephala islandica*	G5	S2B	Documented	CNHP full/ SWAP Tier 2		

Common Name	*Scientific Name*	Global Rank	State Rank	Documented or Potential*	Tracked by CNHP/CPW?	ESA*	State*
Black tern	*Chlidonias niger*	G5	S2B	Documented	SWAP Tier 2		
Black-necked stilt	*Himantopus mexicanus*	G5	S3B	Documented	CNHP full		
Bobolink	*Dolichonyx oryzivorus*	G5	S3B	Documented	CNHP watch/ SWAP Tier 2		
Brewer's sparrow	*Spizella breweri*	G5	S4B	Documented	SWAP Tier 2		
Burrowing owl	*Athene cunicularia*	G4	S4B	Documented	CNHP watch/ SWAP Tier 1		ST
Cassin's finch	*Peucaea cassinii*	G5	S5	Documented	SWAP Tier 2		
Cassin's sparrow	*Aimophila cassinii*	G5	S4B	Documented	CNHP watch/ SWAP Tier 2		
Chestnut-collared longspur	*Calcarius ornatus*	G5	S1B	Documented	CNHP full/ SWAP Tier 2		
Ferruginous hawk	*Buteo regalis*	G4	S3B, S4N	Documented	CNHP full/ SWAP Tier 2		SC
Flammulated owl	*Otus flammeolus*	G4	S4	Documented	SWAP Tier 2		
Forester's tern	*Sterna forsteri*	G5	S2B, S4N	Documented	CNHP full		
Golden eagle	*Aquila chrysaetos*	G5	S3S4B, S4N	Documented	SWAP Tier 1		
Grasshopper sparrow	*Ammodramus savannarum*	G5	S3S4B	Documented	SWAP Tier 2		
Greater sandhill crane	*Grus canadensis tabida*	G5T4	S2B, S4N	Potential	CNHP full/ SWAP Tier 1		SC
Lark bunting	*Calamospiza melanocorys*	G5	S4	Documented	SWAP Tier 2		
Lazuli bunting	*Passerina amoena*	G5	S5B	Documented	SWAP Tier 2		
Least tern	*Sterna antillarum*	G4	S1B	Documented	CNHP full/ SWAP Tier 2	E	SE
Lewis's woodpecker	*Melanerpes lewis*	G4	S4	Documented	CNHP full/ SWAP Tier 2		
Loggerhead shrike	*Lanius ludovicianus*	G4	S3S4B	Documented	SWAP Tier 2		
Long-billed curlew	*Numenius americanus*	G5	S2B	Documented	CNHP full/ SWAP Tier 2		SC
McCown's longspur	*Calcarius mccownii*	G4	S2B	Documented	CNHP full/ SWAP Tier 2		
Mountain plover	*Charadrius montanus*	G3	S2B	Documented	CNHP full/ SWAP Tier 1		SC
Northern bobwhite*	*Colinus virginianus*	G5	S4	Documented	SWAP Tier 2		
Northern goshawk	*Accipiter gentilis*	G5	S3B	Documented	CNHP watch/ SWAP Tier 2		
Northern harrier	*Circus cyaneus*	G5	S3B	Documented	SWAP Tier 2		
Northern pygmy owl	*Glaucidium gnoma*	G4G5	S3B	Documented	CNHP watch		
Olive-sided flycatcher	*Contopus cooperi*	G4	S3S4B	Documented	SWAP Tier 2		
Ovenbird	*Seiurus aurocapilla*	G5	S2B	Documented	CNHP full		
Pinyon jay	*Gymnorhinus cyanocephalus*	G5	S5	Documented	SWAP Tier 2		

Common Name	*Scientific Name*	Global Rank	State Rank	Documented or Potential*	Tracked by CNHP/CPW?	ESA*	State*
Piping plover	*Charadrius melodus*	G3	S1B	Documented	CNHP full/ SWAP Tier 2	T	ST
Plains sharp-tailed grouse	*Tympanuchus phasianellus jamesi*	G4T4	S1	Potential reintroduction	CNHP full/SWAP Tier 1		SE
Prairie falcon	*Falco mexicanus*	G5	S4	Documented	CNHP watch/ SWAP Tier 2		
Rufous hummingbird	*Selasphorus rufus*	G5	SNA	Documented	SWAP Tier 2		
Short-eared owl	*Asio flammeus*	G5	S2B	Documented	CNHP full/ SWAP Tier 2		
Snowy egret	*Egretta thula*	G5	S2B	Documented	CNHP full		
Swainson's hawk	*Buteo swainsoni*	G5	S5B	Documented	SWAP Tier 2		
Upland sandpiper	*Bartramia longicauda*	G5	S3B	Documented	SWAP Tier 2		
Veery	*Catharus fuscescens*	G5	S3B	Documented	CNHP watch/ SWAP Tier 2		
Virginia's warbler	*Oreothlypis virginiae*	G5	S5	Documented	SWAP Tier 2		
Western snowy plover	*Charadrius alexandrinus nivosus*	G3T3	SB1	Documented	CNHP full	T	SC
White-faced ibis	*Plegadis chihi*	G5	S2B	Documented	CNHP full/ SWAP Tier 2		
Willet	*Catoptrophorus semipalmatus*	G5	S1B	Documented	CNHP full		
Willow flycatcher	*Empidonax trailii*	G5	S4B	Potential	CNHP watch		
Wilson's pharalope	*Phalaropus tricolor*	G5	S4B, S4N	Documented	CNHP full		
Fish							
Brassy minnow	*Hybognathus hankinsoni*	G5	S3	Documented	CNHP full/ SWAP Tier 1		ST
Common shiner	*Notropis cornutus*	G5	S2	Documented	CNHP full/ SWAP Tier 1		ST
Iowa darter	*Etheostoma exile*	G5	S3	Documented	CNHP full		SC
Northern redbelly dace	*Phoxinus eos*	G5	S1	Documented	CNHP full/ SWAP Tier 1		SE
Orangespotted sunfish	*Lepomis humilis*	G5	S5	Documented	SWAP Tier 1		
Plains topminnow	*Fundulus sciadicus*	G4	S4	Documented	SWAP Tier 1		
Reptiles and Amphibians							
Northern leopard frog	*Lithobates pipiens*	G5	S3	Documented	CNHP full/ SWAP Tier 1		SC
Common garter snake	*Thamnophis sirtalis*	NA	NA	Documented	SWAP Tier 2		SC
Lined snake	*Tropicdoclonion lineatum*	G5	S3	Documented	CNHP watch		
Milksnake	*Lampropeltis triangulum*	G5	S2	Documented	SWAP Tier 2		
Ornate box turtle	*Terrapene ornata*	NA	NA	Documented	NA		

Common Name	*Scientific Name*	Global Rank	State Rank	Documented or Potential*	Tracked by CNHP/CPW?	ESA*	State*
Painted turtle	*Chrysemys picta*	G5	S5	Documented	CNHP partial		
Short-horned lizard	*Phrynosoma hernandesi*	G5	S5	Documented	CNHP watch		
Invertebrates							
Arapahoe snowfly	*Capnia arapahoe*	G1	S1	Potential	CNHP full		
Arogos skipper	*Atrytone arogos*	G3	S2	Documented	CNHP full		
Autumn springfly	*Pictetiella expansa*	G3	S2	Potential	CNHP full		
Backswimmer	*Notonecta unifasciata*	GNR	S1	Documented	CNHP full		
Colorado blue	*Eupholies rita coloradensis*	G3T3	S2	Potential	CNHP full		
Crossline skipper	*Polites origenes*	G5	S3	Documented	CNHP full		
Dusted skipper	*Atrytonopsis hianna*	G4	S2	Potential	CNHP full		
Hairy sallfly	*Alloperla pilosa*	G3	S2	Potential	CNHP full		
Hops blue	*Celastrina humulus*	G2	S2	Documented	CNHP full		
Larimide sallfly	*Suwallia wardi*	G3	S2	Potential	CNHP full		
Lusk's pinemoth	*Coloradia luski*	G4	S1	Potential	CNHP full		
Modest sphinx moth	*Pachysphinx modesta*	G4	S2	Potential	CNHP full		
Morrison's skipper	*Stinga morrisoni*	G4	S3	Potential	CNHP full		
Moss' elfin	*Calliphorys mossii schryveri*	G4T3	S2	Documented	CNHP full		
Mottled dusky wing	*Erynnis martialis*	G3	S2	Potential	CNHP full		
Ottoe's skipper	*Hesperia ottoe*	G3	S2	Documented	CNHP full		
Plains snowfly	*Mesocapnia frisoni*	G5	S1	Potential	CNHP full		
Regal frittilary	*Speyeria idalia*	G3	S1	Documented	CNHP full		
Rhesus skipper	*Polites rhesus*	G4	S2	Documented	CNHP full		
Sandhill fritillary	*Boloria selene sabulocollis*	G5T2	S1	Potential	CNHP full		
Simius roadside skipper	*Amblyscirtes simius*	G4	S3	Potential	CNHP full		
Smoky eyed brown	*Satryodes eurydice fumosa*	G5T3	S1	Documented	CNHP full		
Stevens' torticid moth	*Decodes stevensi*	GNR	S1	Potential	CNHP full		
Two-banded skipper	*Pyrgus ruralis*	G5	S3	Potential	CNHP full		
Two-spotted skipper	*Euphyes bimacula*	G4	S2	Documented	CNHP full		

Chapter 4: Management of Native Wildlife

Native wildlife on natural areas is primarily managed through the protection or restoration of natural habitats, and enhancement of habitat for targeted groups of wildlife. A diversity of habitat is maintained, while protecting key areas that may be limited, or otherwise in need of protection, on the Front Range of Colorado.

Various groups of wildlife are important or of special concern at the local, regional, state, or federal level. These include animals listed as endangered, threatened, or species of concern by the Colorado Parks and Wildlife (CPW) and U.S. Fish and Wildlife Service (USFWS), as well as groups of wildlife that have key concentration or breeding areas in Fort Collins, as identified by the CPW and other local wildlife professionals.

Site management plans for natural areas contain specific goals and strategies for managing various groups of wildlife when sufficient habitat is present or can be restored. Below is a summary of wildlife groups given special consideration in site management plans.

Mammals

Mammalian species common to this region may use city natural areas for the entirety of their life history, or utilize a selected habitat during movement within the normal home range of the species. Management should focus on providing structurally diverse and connected habitat patches at scales appropriate to conserve mammalian species ranging from mice to mountain lions. In areas where habitat is characterized by smaller, fragmented blocks, management efforts for larger mammals focus on maintaining or enhancing movement corridors to achieve habitat connectivity.

Ungulates

Ungulates (elk, mule deer, white-tailed deer, and pronghorn) are the most common large mammals that utilize the natural area system. Spatial needs for these species are generally relatively large and rarely if ever will an ungulate species stay entirely within the boundary of a natural area. Habitat and movement corridors will be conserved as necessary to allow for these species to move onto and across natural areas. Further, the Department will assist CPW when appropriate to achieve regional population goals for these species. In some cases, important habitat areas such as critical wintering areas or winter concentration areas are found within a natural area and management goals will focus on keeping these designated areas free of development and recreation amenities.

Hunting as a management strategy and as a recreational opportunity in the regional natural areas will be determined on a site-by-site, case-by-case basis and will be evaluated based on wildlife population objectives, the maintenance of habitat quality, the maintenance of public safety, and the opportunity to provide a sustainable high-quality experience in nature. Site-specific management plans will address this issue.

Pronghorn at Soapstone Prairie Natural Area (Photo by Jack Glover)

General Strategies for Management of Ungulates on Natural Areas

- ✓ Identify movement corridors connecting habitats and conserve through easement, acquisition, or by structural modification (e.g., culvert placement, fence modification, fence removal).
- ✓ Modify existing fences and design new fences to meet current wildlife friendly designs as needed to allow for passage of elk, deer, and pronghorn.
- ✓ Remove fence that is no longer needed to manage the property.
- ✓ Provide hunting opportunities when necessary to manage population densities and/or for recreation and when hunting can be conducted in a safe and effective manner. Hunting opportunities will be developed in consultation with Colorado Parks and Wildlife.
- ✓ Conserve important habitat areas by limiting or prohibiting public use spatially or temporally.
- ✓ Minimize interactions with domestic dogs by prohibiting dogs from areas of highest conservation value for these species. In other areas, maintain dogs-on-leash regulations.

Large Predators

Mountain lion and black bear routinely use foothills and Poudre River properties respectively for hunting and foraging as part of a larger home range or for movement between habitat patches. Home ranges vary in size depending on available food resources and the sex and age of the animal and range from 10 to 370 square miles and 20-200 square miles for mountain lions and black bear, respectively (CPW). Most natural areas are smaller than typical home ranges of these species and management efforts will focus on maintaining effective movement corridors. Larger regional properties may play a more significant role in the life history of these species. Efforts are made to monitor presence/absence using remote cameras on these properties. Movement corridors or areas with high levels of use will be considered when developing recreation plans.

Black bear at Bobcat Ridge Natural Area (Photo by Norm Keally)

Mesopredators

Mesopredators (medium sized predators such as coyote, bobcat, raccoon, badger, skunk, mink and fox) are commonly found on natural areas. Like large predators, some natural areas may only play a small role in the life history of these animals. Most common management activities focus on den site protection and conserving or enhancing movement corridors. As for all predators, it is important to manage for large-scale habitat mosaics, such as thick-forested areas and large prairies, and small-scale habitat mosaics, such as clumps of grass or shrubs surrounded by bare ground or shorter vegetation for prey species. Larger regional properties may play a more significant role in the life history of these species. Efforts are made to monitor

presence/absence using remote cameras on these properties. Movement corridors or areas with high levels of use will be considered when developing recreation plans.

Bobcat at Bobcat Ridge Natural Area (Photo by Karl Manderbach)

General Strategies for Management of Mammalian Predators on Natural Areas

- ✓ Create large and small scale habitat mosaics to attract both large and small mammals.
- ✓ For urban areas, identify movement corridors connecting habitats and conserve through easement, acquisition, or by structural modification (e.g., culvert placement, fence removal, habitat plantings).
- ✓ For large regional natural areas, avoid creating barriers to restrict movement and habitat use.
- ✓ Utilize camera traps to better understand predator's spatial and temporal use of natural areas.
- ✓ Identify and protect den sites.
- ✓ Minimize interaction with domestic animals by prohibiting dogs off leash. Prohibit dogs in areas of highest conservation value or where a species of conservation concern occurs.
- ✓ Install wildlife-proof trash receptacles.
- ✓ On an as-needed basis, install signs notifying the public of the possible presence of larger predators (bears, mountain lion).

Small Mammals

Small mammals are a numerous and diverse group of species that serve many ecological functions and inhabit all natural area properties. Small mammals serve to enhance soil formation and depth. In some cases, they can be important in propagating plants by storing seeds in caches and in other cases can potentially alter plant composition by preferring one type of grass seed to another. They also serve as an important prey base for larger mammals, reptiles, and raptors. Some species in this group of mammals are secretive making it difficult to understand species richness and relative abundance on natural areas. Inventories of small mammals will be conducted in key habitats, such as grasslands or riparian areas. This data can then be used to inform habitat management for small mammals and protect and enhance areas where Species of Interest are found (e.g., Preble's meadow jumping mouse, olive-backed pocket mouse, northern pocket gopher, dwarf shrew).

General Strategies for Management of Small Mammals on Natural Areas

- ✓ Design and implement small mammal survey methods to determine species richness and relative abundance to inform management decisions.
- ✓ Create habitat goals based on species richness and relative abundance.
- ✓ For urban areas, identify movement corridors connecting habitats and conserve through easement, acquisition, or by structural modification (e.g., culvert placement, fence removal, habitat plantings).
- ✓ Avoid creating barriers to restrict movement and habitat use.
- ✓ Minimize interaction with domestic animals by prohibiting dogs off leash; in areas of highest conservation value or where a species of conservation concern occurs, prohibit dogs.

Bats

Bats are a group of mammals that have received a high degree of interest from conservation scientists due to significant population declines in many species. Habitat loss, pesticide exposure, disease, and direct mortality all cause declines in bat populations. In the U.S., a disease called white-nose syndrome has killed millions of bats in the eastern part of the country and has the potential to make its way to western states. Another factor that contributes to declines are basic life history traits. Many bats give birth once annually, have low birth rates, do not reproduce until one year of age, and are long lived. Given these traits, bats require high adult survival rates to offset low reproduction rates (O'Shea and Bogan, 2003). Additionally, many species of bats will concentrate in large maternity or hibernation colonies, depending on the season, making populations very susceptible to human disturbance and disease. Impacts to these few regionally important locations can contribute to population declines.

Natural areas are commonly used as foraging sites for several species of bats (Appendix D). Three species of bat known to occur on Fort Collins natural areas are considered species of interest by the Natural Areas Department and include fringed myotis, hoary bat, and Townsend's big-eared bat. Efforts to conserve habitat supporting roosts or concentration points for bats on natural areas are important to regional bat conservation efforts. On natural areas, important

maternity or hibernation roost sites that should be protected can include caves, dead trees, rock crevices, and potentially old buildings. Other management actions that benefit bats include minimizing disturbance to known bat concentration areas and maintaining foraging habitat (e.g., water sources).

From 2001-2005 bats were inventoried on natural areas as part of a larger study on urban maternity roost selection of big brown bats in Fort Collins (Neubaum et al., 2007). This provided data showing what species utilize natural areas. The summary of findings also suggests that natural areas adjacent to the Poudre River are valuable bat foraging sites. Additional inventory data would update and add to the data collected from this study. Regional sites were only sampled for a few nights during this study and additional survey nights may detect more species.

Little brown bat showing signs of white nose-syndrome (USFWS photo)

General Strategies for Management of Bats on Natural Areas

- ✓ Inventory bat species on Natural Areas properties to better understand species present and potential habitat management or protection.
- ✓ Identify, and protect cavity forming trees and snags, cliffs, caves, and other locations known to support bat roosts.
- ✓ Maintain buffer distances between active roosts and management activities.
- ✓ Promote research and experimentation to better understand the effectiveness of bat houses and to inform where bat houses are effective and how they should be maintained.
- ✓ Evaluate the use of bat houses installed on natural areas.

Birds

Fort Collins has been committed to bird protection since 1986 when the city was declared a "Wild Bird Sanctuary." Located at the merger of plains and foothills, the Fort Collins landscape offers varied habitat supporting numerous and diverse resident, migrant, and wintering bird species. Some areas, now protected as natural areas, are documented as "birding hot spots" at the state level. It is the goal of the Natural Areas Department to continue to conserve these key habitats to ensure continued biodiversity.

Raptors (Birds of Prey)

Raptors within Fort Collins utilize lakeshores, grasslands, wetlands, riparian forests, and foothills forests for foraging and nest site selection. Northern harriers rely heavily on wetlands, but feed on a variety of prey, including upland rodents. Several raptor species are only in Fort Collins during spring through late summer (breeding season), including ospreys that rely exclusively on open water for fishing and Swainson's hawks who feed on small rodents and invertebrates in large grassland areas. Smaller raptors such as the American kestrel and Cooper's hawk are better adapted to the urban environment and smaller natural areas can support these species.

Raptor nest protection from human disturbance is critical for most species of raptors. As many raptors return to the same nests year after year, it is critical to protect nest sites such as trees that have nests throughout the year. Large mature trees provide perch sites allowing the raptor to scan areas for small rodents, prairie dogs, waterfowl, snakes and other prey as well as the perch to consume the prey. Several of the smaller raptors, including American kestrel and eastern screech owl, are cavity-nesters. Burrowing owls primarily nest in rodent burrows and favor prairie dog burrows in eastern Colorado. On regional natural areas, cliffs are important nest sites for a variety of species, including prairie falcon, red-tailed hawk, golden eagle, and great horned owl.

Wire fencing is hazardous to raptors. Raptors are particularly vulnerable due to their behavior of swooping down on prey within taller grasses that camouflage the fencing. Each year, the Rocky Mountain Raptor Program receives birds, injured by wire fencing, some to the extent that they must be euthanized.

Red-tailed hawk at Kingfisher Point Natural Area (Photo by Norm Keally)

General Strategies for Management of Raptors on Natural Areas

- ✓ Manage natural areas to support a diverse prey base for foraging raptors.
- ✓ Maintain prairie dog colonies in appropriate areas for raptor feeding and burrowing owl nest sites.
- ✓ Maintain recommended buffer distances between active nests and human activity.
- ✓ Retain dead snags for cavity-nesting birds unless snags create a safety hazard.
- ✓ Identify and protect trees and cliffs that support raptor nests (e.g., avoid placing trails on cliff lines).
- ✓ Ensure ongoing availability of nesting and perch trees on grassland sites, waterways, and reservoirs by planting replacement trees where appropriate.
- ✓ Remove wire fencing or replace with wood fencing wherever possible.
- ✓ Retain some wooden posts for raptor perch sites, when removing fences.
- ✓ Permit release of rehabilitated raptors on suitable sites as appropriate.

Waterbirds (waterfowl, shorebirds, wetland obligates)

This group of birds ranks among the favorite watchable wildlife for many citizens of Fort Collins and Larimer County. Similar to raptors, Fort Collins falls within a major migratory and wintering corridor for ducks, shorebirds, and other wetland birds (grouped together here as "Waterbirds"). Certain waterbirds can also indicate functioning wetlands. Indicator species for wetland function include a list of "secretive marsh birds" such as the sora, American bittern, Virginia rail, and green heron. While these species often prefer dense wetland vegetation, such as cattails and bulrush, and may not necessarily indicate an open wetland type (e.g., sedge meadow), they may indicate function in a wetland restoration. A quality wetland will host a variety of waterbirds in addition to secretive marsh birds.

Waterbirds can be found in nearly any habitat containing open water within Fort Collins. However, individual species use varies highly among habitat types. Important features to consider when rating habitat quality include:

1. Acreage, average water depth, and seasonal duration of open water;
2. Shoreline vegetation, aquatic vegetation (percent emergent and submergent) ,and shoreline configuration;
3. Availability of invertebrate and vertebrate food base;
4. Amount and quality of habitat for nesting or cover; and
5. Proximity to human activity.

Although many resident, year-round populations of waterbirds, such as mallard, Canada goose, and red-winged blackbird are very tolerant to human disturbance, most migratory and wintering populations are extremely sensitive to disturbance.

Key production areas for ducks, according to CPW, include most of the gravel ponds, the Poudre River, and wetlands adjacent to the river. During spring migration, ducks and shorebirds frequently use seasonally flooded wetlands supporting a variety of wetland plants, aquatic insects, and other invertebrates. These areas can be particularly rich in food resources and provide carbohydrates (seeds and other plant matter) for migration and invertebrates for the formation of protein necessary for egg production for species that nest locally.

The Fossil Creek Wetlands/Reservoir area is another key wetland area, particularly for migratory species and wintering waterfowl. Over 90 species of waterbirds have been recorded at this complex of wetlands over the last 15 years. This area has been the location of extremely rare sightings in Colorado. The National Audubon Society designated the complex as a statewide Important Bird Area (IBA) in 2001.

Protection of colonial nest sites for waterbirds has been a significant objective for decades. Fort Collins has had several heron rookeries occupied by great blue herons that have been lost due to die-off of cottonwood stands and human disturbance. Herons do not easily occupy a new site in the absence of historic nesting sites. Green herons are rare in Colorado and Fort Collins is one of the few places in the state where the birds are known to nest. The American white pelican, formerly a Colorado Species of Concern, does not nest in the Fort Collins area, but is now

common from spring through early fall. Ponds and lakes provide key habitat for adults during migration and non-breeding individuals throughout the summer.

Siberian elm, Russian olive, and salt cedar are exotic wetland pest trees and tree-size shrubs that threaten the integrity of wetland habitats throughout the Fort Collins area. All are well established along the Poudre River and other stream courses. Management actions to remove exotic trees on natural areas are aggressive and many areas have been improved through these efforts. Purple loosestrife, a perennial flower native to Europe and Asia, has decimated wetlands in the eastern U.S. and began its spread in Colorado wetlands in the 1980's. Fortunately, the City took a very aggressive approach to eradication in the 1990's, preventing the plant from becoming a local problem.

Trash and other human-made debris in natural areas can potentially affect and injure wildlife, although waterbirds are particularly vulnerable because trash is carried down waterways and accumulates where birds feed, nest, and raise their young. Injury or death of adults and young can result from ingesting or becoming entangled in debris. Fishing line is particularly hazardous to wildlife as they can become entangled in it. Fishing line collection bins have been placed on natural areas to encourage proper disposal of used line.

American white pelican (Photo by Dawn Wilson)

General Strategies for Management of Waterbirds on Natural Areas

- ✓ Where possible, reshape banks of human-made, lakes, and ditches to restore natural contours, create shallow water, and promote the establishment of wetland plants.
- ✓ Manage for variety of wetland plants to support seed and insect production as food sources for waterbirds.
- ✓ Design new trails (or relocate existing trails) with significant waterbird use, outside of wetlands to minimize disturbance to migratory, wintering, and nesting waterbirds.

- ✓ Prohibit visitor and management activity around colonial nesting sites during the nesting season.
- ✓ Control Siberian elm, Russian olive, salt cedar, and common buckthorn in wetland areas used by waterbirds. Continue eradication efforts of all exotic wetland plants.
- ✓ Remove trash and debris from stream courses; keep culverts under roadways and trails free of debris to maintain water flow.

Grassland Birds

Twenty-seven percent (27%) of American grassland birds are on conservation watch lists and are sharply declining. Grassland birds are of high conservation concern and are at risk of extinction without significant action (North American Bird Conservation Initiative, 2016). City natural areas provide highly variable grassland habitat from weedy fields left over from past agricultural uses, to shortgrass prairie mixed with exotic grasses, and large expanses of native shortgrass prairie and native foothills grasslands. In the immediate Fort Collins area, most historic grassland habitats have been converted to urban uses, croplands, or non-native grasses. There are some natural areas along Fossil Creek and the foothills that have grasslands where a more diverse assemblage of native grasses and forbs remains. The further from the center of Fort Collins, the more likely that grassland habitats are composed of a higher diversity of native plants supporting more diverse populations of grassland birds throughout the year. Smaller patches of grassland, as typically found in the more urban areas of the City likely don't support spatially sensitive birds. Soapstone Prairie Natural Area hosts the largest native grassland and most diverse populations of grassland bird species in the City's natural areas system.

Plains and foothills grasslands along the Front Range of Colorado are two of the most severely altered ecosystems in the region due to conversion of lands to agriculture uses (e.g., plowing and unmanaged grazing). These ecosystems are also difficult to restore due to the prevalence of non-native grasses and weeds that have been a part of the landscape for over a 100 years. Remnant native grassland patches occur in areas that have been difficult to plow. Seasonal grazing, periodic fire, and drought are natural processes that sustain native grasslands. These disturbance events create the structure and diversity needed by many grassland birds. Prescribed burns, prescribed grazing, and mechanical treatments can be used to mimic these events. Herbicide and biological treatments are also needed to manage weed infestations.

Grasshopper sparrow (USFWS photo)

General Strategies for Management of Grassland Birds on Natural Areas

- ✓ Use prescribed burns, prescribed grazing, and other tools to mimic the natural disturbance regime needed to maintain a natural diversity of grasses, forbs, and structural diversity.
- ✓ Manage invasive plants through an integrated approach that includes burning, grazing, herbicide application, mowing, and biological controls.
- ✓ Implement management efforts at scales needed to influence grassland bird distribution and abundance.
- ✓ Manage urban prairie dog colonies to provide a balance of habitat for both grassland birds and prairie dogs.
- ✓ Work with Poudre Fire Authority to control wildfire in a manner that minimizes impacts related to fire suppression (e.g., digging firelines, excessive vehicle travel).

Riparian Songbirds

Riparian songbirds include a variety of migrant, nesting, resident, and wintering species drawn to the City's cottonwood and wetland habitats along the Poudre River and other streams in town. Riparian areas support a high diversity of wildlife, particularly in the semi-arid West where water is not abundant. Over 70% of the riparian habitat in the U.S. has been altered; and it is estimated that natural riparian communities now make up less than 3% of the land in Colorado but 80% of bird species depend on this habitat type. Artificial aquatic habitats such as ditches

and gravel ponds also provide conditions for cottonwoods and other riparian vegetation throughout the city.

Important features for riparian songbirds include:

1. Vertical structural diversity in forest habitats including the presence of fruit-bearing shrubs; (2) Patch size and associated edge created by the clumped nature of vegetation (particularly in shrub and forest habitats);
2. Biomass, as well as vegetation richness;
3. Variety of major vegetation types;
4. Proximity to open water; and
5. Amount and quality of habitat for nesting or cover.

Perhaps the most important challenge in enhancing habitat for riparian songbirds is the long-term maintenance of the riparian forest community along the Poudre River. The river's natural flow patterns have been greatly altered by diversions for irrigation, raised armored riverbanks, and upstream reservoirs since the early 1900's. Establishment of native riparian forests is dependent on periodic high flood events that create exposed soil and sediment deposition. Seedlings of cottonwoods and willows will not grow with the low-light conditions of dense established stands. As the cottonwood forest along the Poudre River ages, it will not be replaced without these flood events, or without efforts to plant sapling cottonwoods or lower riverbanks. Opportunities that create the seasonal flooding that allows natural regeneration of the riparian forest will be beneficial for the long-term maintenance of riparian wildlife habitat.

Establishment of exotic trees and shrubs (e.g., Siberian elm, Russian olive, salt cedar, crack willow) along the river and in other riparian areas can also prevent the establishment of native, beneficial plant species. Non-native and invasive species such as Canada thistle, spurge, and smooth brome, can further impact the diversity of the understory riparian plant community.

Floodplain restoration was initiated in 2011, on several areas along the Poudre River with great initial success. McMurry, North Shields Ponds, and Homestead natural areas have had channel banks lowered to permit annual flooding and groundwater recharge as part of the natural hydrologic cycle. Cottonwoods, willows, fruit-bearing shrubs, and native grasses and forbs were planted to recreate native habitat and prevent erosion. These restorations have also resulted in a flush of natural cottonwood and willow regeneration. Birds that prefer mid-story habitat are absent from many areas along the Poudre River, as concluded by breeding bird surveys conducted since 2011, and restored sections of the river are intended to provide habitat for these species in time. More opportunities exist for riparian restoration within the natural areas system and riparian habitat restoration at Kingfisher Point Natural Area will be pursued in 2017.

General Strategies for Management of Riparian Songbirds on Natural Areas

- ✓ Maintain and enhance habitat quality of riparian woodlands along small drainages through restoration of natural hydrology.
- ✓ Continue to selectively protect native trees from beaver damage, while allowing beavers to shape and influence riparian habitat where possible.

- ✓ Repair and prevent bank erosion.
- ✓ Re-contour gravel pond edges and river edges where appropriate to improve hydrologic exchange and natural hydrology.
- ✓ Plant native fruit-bearing shrubs and willows that provide for mid-story riparian bird habitat and support diverse insect communities.
- ✓ Control Siberian elm, Russian olive, salt cedar, common buckthorn, and other noxious weeds in riparian areas.
- ✓ Maintain dead snags and old cottonwoods in riparian areas for cavity-nesting species (e.g., chickadees, house wrens, screech owls) unless they create a human or property safety hazard.
- ✓ Leave some downed wood in place to provide feeding areas and habitat.
- ✓ Minimize disturbance to migratory and nesting songbirds by leaving a buffer area between trails in key riparian areas.
- ✓ Evaluate escarpments on river bends for bank nesting birds such as swallows before river restorations.

Foothills Forest and Shrubland Birds

There are six natural areas that host foothills ponderosa pine forests: four local natural areas (Coyote Ridge, Pineridge, Maxwell, and Reservoir Ridge) and three regional natural areas (Bobcat Ridge, Gateway, and Soapstone Prairie). These sites and two sites on Fossil Creek with high ridges (Cathy Fromme Prairie and Colina Mariposa) also contain foothills shrubland habitat.

Foothills forest and shrubland habitats support a high diversity of species just west of the City. The City's foothills sites are extremely popular birding areas and heavily-used biking and hiking sites. Efforts over the last 10 years to improve the foothills trail system by closing off and revegetating undesignated trails have contributed to reducing the areas of habitat disturbance.

Bobcat Ridge Natural Area in the foothills west of Masonville also hosts a high diversity of foothills birds including species that were recorded in a 2016 survey and are recognized by Partners in Flight (PIF) as species of importance, such as grasshopper sparrow, broad-tailed hummingbird, Virginia's warbler, green-tailed towhee, Lewis's woodpecker, dusky grouse, lazuli bunting, mountain bluebird and plumbeous vireo. A survey was conducted in 2013 at Soapstone Prairie Natural Area and 41 species were detected in the saltbush and mountain mahogany shrubland habitat. Of the species detected there were several species that are included on the Species of Interest list (i.e., lark bunting, Brewer's sparrow, vesper sparrow, Cassin's sparrow, and loggerhead shrike).

Forest and shrubland bird populations can be severely impacted by catastrophic forest fire, such as occurred on Bobcat Ridge in the Bobcat Gulch Fire of 2000. The severe crown fire killed most of the trees, even those in usually protected steep drainages and north-facing slopes. Mature trees that serve as seed sources burned along with seed banks in the soil, leaving no seed source for regeneration, except on the very edges of the fire where mature trees remain. Emergence of early successional weeds, such as cheatgrass, may also have suppressed regeneration. Experimental ponderosa pine restoration is underway at Bobcat Ridge as is the suppression of cheatgrass. Future fire management (prescribed fire) is also included in an overall restoration plan for the site to prevent future catastrophic fires and maintain healthy habitat.

Mountain bluebird at Cathy Fromme Prairie (Photo by Aran Meyer)

General Strategies for Management of Foothills Forest and Shrubland Birds on Natural Areas

- ✓ Design and maintain trail systems to limit development of social trails and minimize fragmentation of foothill shrubland systems. Close and restore undesignated trails that develop.
- ✓ Enhance habitat value and native character of forests through restoration efforts designed to eradicate weeds and maintain the system through periodic natural disturbance.
- ✓ In areas previously impacted by severe fires (e.g., Bobcat Ridge), suppress areas of cheatgrass and explore ways to promote ponderosa pine regeneration.

- ✓ Leave some downed wood in place to provide feeding areas and habitat after wildfires.
- ✓ Enhance habitat value and native character of foothills shrublands by restoring the native grass and forbs component through aggressive weed control or active grassland restoration.

Amphibians and Reptiles

The diversity of Fort Collins' natural areas habitats supports a number of amphibians and reptiles, collectively termed herptiles (Appendix C). Conservation of this group of species is largely accomplished by providing structurally diverse terrestrial and aquatic habitats of sufficient scale and juxtaposition. Specific actions include conservation and management of wetlands and ponds that serve as breeding pools, identification and conservation of dispersal corridors, and ensuring good water quality by maintaining protective vegetative buffers around water bodies when possible. In addition, large regional populations may be found at relatively few locations such as a breeding sites or hibernacula. Impacts to regionally important locations that increase mortality rates can contribute to population declines. Efforts will be made to identify and conserve these important habitat features.

Several important amphibian habitat features have been fenced off in Soapstone Prairie Natural Area, including Spottlewood Creek, Jack's Spring, and Graves Creek, to protect these features from overgrazing. This riparian protection fence protects most of the riparian vegetation and only allows cattle to access the creek in a few limited areas. In addition, grazing in uplands near streams and wetlands has been reduced through shorter pasture rotation of cattle. Another significant threat to these important amphibian habitats is chytrid fungus. This disease has affected hundreds of amphibian species worldwide and can cause massive mortality in some amphibian populations. Chytrid fungus can be moved from pond to pond by amphibians (e.g., bullfrogs) or by human activity. Best management practices will be followed when conducting work in and around wetland areas, in order to prevent further spread of chytrid fungus (see Chapter 8, bullfrog section, for more information on chytrid fungus).

Amphibian call surveys were conducted in 2008 and included a total of 98 points across 34 local natural areas, one certified natural area, and two regional natural areas (Bobcat Ridge and Gateway). Amphibians detected on Bobcat Ridge and Gateway natural areas included western chorus frogs and Woodhouse's toads. On local natural areas western chorus frog and Woodhouse's toad were the most common species recorded and bullfrogs, a non-native species, were recorded at six sites. Northern leopard frogs and northern cricket frogs were both detected during the surveys; however, staff was unable to confirm these detections post-survey. These local and regional natural areas should be resurveyed to determine if species presence and composition has changed.

An amphibian survey was conducted on Soapstone Prairie Natural Area in 2016. Species detected include wood frog (*Lithobates sylvaticus*), Woodhouse's toad, and western chorus frog. Northern leopard frogs have been previously detected at Soapstone Prairie Natural Area and Meadow Springs Ranch and were likely not detected during the recent survey due to timing. Future surveys are needed and should be designed to detect northern leopard frogs. Management actions will be taken to protect and enhance habitat where northern leopard frogs are detected.

Northern leopard frog at Meadow Springs Ranch (Photo by Aran Meyer)

General Strategies for Management of Amphibians and Reptiles on Natural Areas

- ✓ Create habitat mosaics to attract a diverse assemblage of species representing all trophic levels.
- ✓ Identify movement and dispersal corridors connecting habitats and conserve through easement, acquisition, or by structural modification (e.g., culvert placement)
- ✓ Identify and conserve breeding sites and hibernacula.
- ✓ Manage for permanent and temporary water pools within terrestrial environments. Consider providing supplemental water during breeding season.
- ✓ Avoid mowing or use of pesticides near water sources. If mowing cannot be avoided, blades will be set at a height of 8" or greater.
- ✓ When possible, establish a grass buffer (minimum of 100') surrounding water bodies.
- ✓ Identify and protect small pools and ponds that serve as breeding sites.

- ✓ Follow best management practices for chytrid fungus when working in and around wetland areas.
- ✓ Remove trash and debris from stream courses.
- ✓ Close eroded banks from use by anglers or install fishing access steps.
- ✓ Stabilize eroding stream banks with native plantings or seeding.
- ✓ Reshape and re-contour stream banks and pond banks to restore natural conditions that will promote the establishment of wetland plants.
- ✓ Create broad, shallow littoral zones or back waters when ponds are developed or re-contoured.
- ✓ Minimize stocking of introduced predatory fish into natural areas ponds and lakes.
- ✓ Create/maintain fishless ponds and wetlands when possible.
- ✓ Prevent or limit cattle grazing near streams on regional natural areas.

Fish

About half the species of fish on City natural areas are non-native species, primarily introduced to local waters for sport fishing. The majority of the native fish are non-game, small fishes (e.g., darters, minnows, shiners, and topminnows). Of these native fish, species that need clear water and are intolerant of siltation are rare in the Fort Collins area.

Humans have severely altered the distribution of Colorado fishes since the 1800's, from mining, industrial, agricultural, and urbanization activities. Surface waters entering streams that flow through City natural areas are altered from an array of impacts that occur off the site and are not under the control of the Natural Areas Department, including accumulation of nutrients from treated sewage and fertilizers, spilled oil and gas, mud, silt, and pesticides. However, opportunities to enhance habitat for native fishes exist on a few local natural areas. Plains topminnow and northern red-belly dace were reintroduced to Topminnow Natural Area in 2016. An abandoned diversion was removed from the Poudre River near North Shields Ponds Natural Area, allowing movement of fish on the river. A fish passage was also installed to allow fish to move past a diversion near Cottonwood Hollow Natural Area.

On Soapstone Prairie, riparian fences and shorter cattle grazing rotations help to eliminate cattle grazing in key areas, protect stream banks from compaction and overgrazing by cattle, and protect uplands near streams and wetlands. In 2007, a fish survey was conducted in upper Spottlewood Creek and no native fish populations were detected, but water quality data indicated that the creek could support native plains fish. Northern red-belly dace and plains topminnow were reintroduced to upper Spottlewood Creek in 2012. Subsequent surveys were completed at Lone Tree Creek, lower Spottlewood Creek, and Graves Creek. Lone Tree Creek and lower Spottlewood both host native fish populations and no fish were detected at Grave’s Creek.

An important component to maintaining long-term quality native fish (and amphibian) habitat is assuring that there is adequate water available year round. The Department worked with Colorado Water Conservation Board (CWCB) to decree instream-flow rights at Soapstone Prairie Natural Area and Meadow Springs Ranch, which will protect native fish and amphibians that need this habitat. Sites that now have instream flow rights include; Graves Creek, upper Spottlewood Creek and Lone Tree Creek. In addition, CWCB has decreed a natural lake level for Spottlewood Lakes (aka lower Spottlewood).

General Strategies for Management of Native Fishes on Natural Areas

- ✓ Evaluate fish habitat enhancements as appropriate.
- ✓ Remove trash and debris from stream courses.
- ✓ Work with CPW to stock native small fish species, where appropriate.
- ✓ Close eroded banks from use by anglers and/or install fishing steps.
- ✓ Stabilize eroding stream banks with native plantings or seeding.
- ✓ Reshape and re-contour stream banks to restore conditions that will promote the establishment of wetland plants and provide filtration for water quality improvement.
- ✓ Control cattle grazing near streams on regional natural areas.
- ✓ Find ways to protect or manage water in-stream
- ✓ Remove diversion structures or install fish passages when feasible.

Insects and Other Invertebrates

Insects and other small invertebrates, near the bottom of the food chain, comprise the main food source for numerous species of fish and smaller terrestrial birds, as well as ducks and other waterbirds during at least part of the year. Invertebrate populations are often used as key indicator species in the assessment of the general health of wetland and upland communities, but have not been well studied on local natural areas. The Restoration Plan (2016) references indicator species for different habitat types and several species of butterfly; arogos skipper, Ottoe's skipper, crossline skipper, and regal frittilary are listed for assessing habitat health of the foothill and piedmont grassland habitat. As resources allow, efforts to monitor these species may be used to detect areas that may benefit from management actions or in areas where effects of restoration areas can be measured. In addition, there are 25 species of invertebrates identified in the Species of Interest list (Chapter 3) that warrant protection and habitat enhancement if detected on natural areas.

Several invertebrate surveys have been conducted on Soapstone Prairie and Meadow Springs Ranch. Aquatic invertebrate surveys focused on several springs and creeks across the area and several species of note were recorded, including four previously undocumented fly species and

several species that are rare for the region and state. Butterfly surveys were conducted at Soapstone Prairie Natural Area, in 2007 and 2010. Soapstone Prairie provides habitat for a variety of Species of Interest and one of particular importance was found during the surveys, the globally imperiled Colorado blue (*Euphilotes rita coloradensis*).

Several sites support high insect diversity or rare insect populations in local natural areas along the Poudre River, Fossil Creek, and in the foothills. For example, Pineridge Natural Area contains rare foothills and prairie butterflies. According to Dr. Kondratieff at CSU, at least 10 species of insects are found at Pineridge that have not been documented elsewhere in Colorado. At Bobcat Ridge Natural Area, a globally vulnerable subspecies of butterfly, the Moss's elfin, was documented in 2004. Notably, local scientists have concluded that this region is the fourth richest butterfly region in North America (north of Mexico) (Opler, 1994).

Due to their visibility and colors, the public has an interest in maintaining and enhancing butterfly populations. Often, specific types of flowers and flower colors are more attractive to butterflies and most butterflies have specific host plants on which they deposit their eggs. The City also recognizes the important role that insects serve in the ecosystem as pollinators. Native insect pollinators (bees, beetles, butterflies, flies) are considered when determining seed mixes or when plants are ordered for a restoration project. Nature in the City projects also focus on providing habitat for native pollinators throughout the City.

Most insects and other invertebrates are highly sensitive to even small amounts of insecticides. Although the City rarely uses insecticides in natural areas management, they are sometimes used for West Nile virus prevention during outbreaks of human cases. Insecticides are also used for flea control related to plague disease prevention in prairie dog towns, but are applied only to prairie dog burrows.

General Strategies for Management of Insects and Other Invertebrates on Natural Areas

- ✓ Monitor species of interest as resources allow. Identify key larval sites.
- ✓ Include larval host plants in seed mixes for grassland and wetland restoration.
- ✓ Plant larval host plants in grasslands and wetlands.

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Chapter 5: Prairie Dog Management

Introduction

The black-tailed prairie dog is an important and, at times, controversial species. It is impossible to know the exact number of prairie dogs present before European settlement; however, the current population is likely significantly below that of the 1800s (Knowles, 2002). A statewide survey conducted in 2016 for Colorado Parks and Wildlife, found approximately 500,570 acres of occupied habitat (Howlin and Mitchell, 2016). 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 in prairie dog habitat and abundance was the result of widespread poisoning in the early 1900s, conversion of native grasslands for agricultural, urban development, and sylvatic plague. The State of Colorado currently classifies the black-tailed prairie dog as a "species of concern."

The City has pursued 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 prairie dog habitat or potential 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. Most recently, a peer-review workshop was held with various local, state, and private organizations in March 2016 to evaluate the City's approach 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.

Most importantly, the Natural Areas Department recognizes the importance of prairie dog conservation and pursues acquisition of lands that include occupied or suitable prairie dog habitat (see page 40 for a description of suitable habitat). To that end, a total of 6,676 local acres and 25,103 regional acres of natural areas property containing suitable prairie dog habitat has been acquired by the City and its partners.

Prairie dogs are considered an important “keystone” species within intact shortgrass prairie ecosystems. They support numerous other species as prey, their burrows provide shelter for other wildlife, and they can positively modify grassland vegetation. In highly fragmented ecosystems, such as 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 certain wildlife species and serve as a prey base for a variety of predators. Moreover, urban prairie dogs can maintain “meta-populations” (i.e. colonies that are separated by space, but still able to interact). If these dispersed colonies are still biologically connected, they can be critical to sustaining prairie dog colonies over time in the urban environment, especially with sylvatic plague having such a deadly and detrimental impact to prairie dogs.

These Guidelines characterize urban prairie dogs as those prairie dogs in City-owned natural areas in the immediate vicinity of Fort Collins as well as Bobcat Ridge Natural Area. Soapstone Prairie Natural Area and Meadow Springs Ranch are characterized separately and are managed differently than urban prairie dogs. Meadow Springs Ranch is owned and operated by the Utilities Department; however, the Natural Areas Department manages some species on this property, including prairie dogs.

Prairie dog at Coyote Ridge Natural Area (Photo by Norm Keally)

The overall management approach for prairie is influenced by all of the "Principles of Wildlife Conservation" described in Chapter 1. The key intention of the Natural Areas Department is to manage for overall grassland health while also supporting prairie dog conservation. There are, however, unique challenges to managing prairie dogs, especially in an urban setting. Under historic conditions, localized and sustained grazing by prairie dogs occurred next to large areas of undisturbed native vegetation. Slowly moving or expanding prairie dog colonies helped build a mosaic of grassland structure and diverse species composition. Conditions at Soapstone Prairie Natural Area resemble this description.

On the other hand, management of urban prairie dogs is complicated by past and current land use. Unregulated grazing and other agriculture predisposed the land to establishment of non-native vegetation. Invasive non-native vegetation on natural areas is suppressed using a variety of methods; however, the presence of prairie dogs and continuous grazing can provide conditions where non-native plants proliferate. Department staff has observed very low diversity of native vegetation and high dominance by non-native forbs on urban prairie dog colonies. Additionally, prairie dog colonies on smaller fragmented patches of land can exert pressure out to the limited perimeter of parcels that are bounded by roads and other forms of development. This can lead to additional grazing pressure that, in some cases, completely denudes the site of vegetation. Thus, severe wind-driven erosion and fugitive dust is possible. Decreased predator abundance and the reduced ability of the animals to disperse can cause densities to escalate and increase the severity of impact to the land and vegetation (Johnson and Collinge, 2004). In short, urban prairie dog colonies require a high level of management to influence their location and density.

Urban Prairie Dog Management

Population Status of Urban Natural Areas Prairie Dog Colonies

Since annual monitoring began in 2004, occupied acreage on urban natural areas (as distinguished from SSN and MSR) has experienced both system-wide doubling and population crashes from sylvatic plague. Between 2004 and 2009, drought coupled with extensive colony expansion (or high densities in areas where expansion was not possible) resulted in episodes of severe soil erosion at several urban 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.

Wind-erosion of soil from an overgrazed prairie dog colony at Fossil Creek Wetlands Natural Area

In the decade between 2004 and 2015, the total acreage of urban prairie dog colonies reached a level of greater than 1,000 acres before its reduction to 400 acres. The 600-acre reduction of 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. In 2016, urban prairie dog colonies grew to 507 acres.

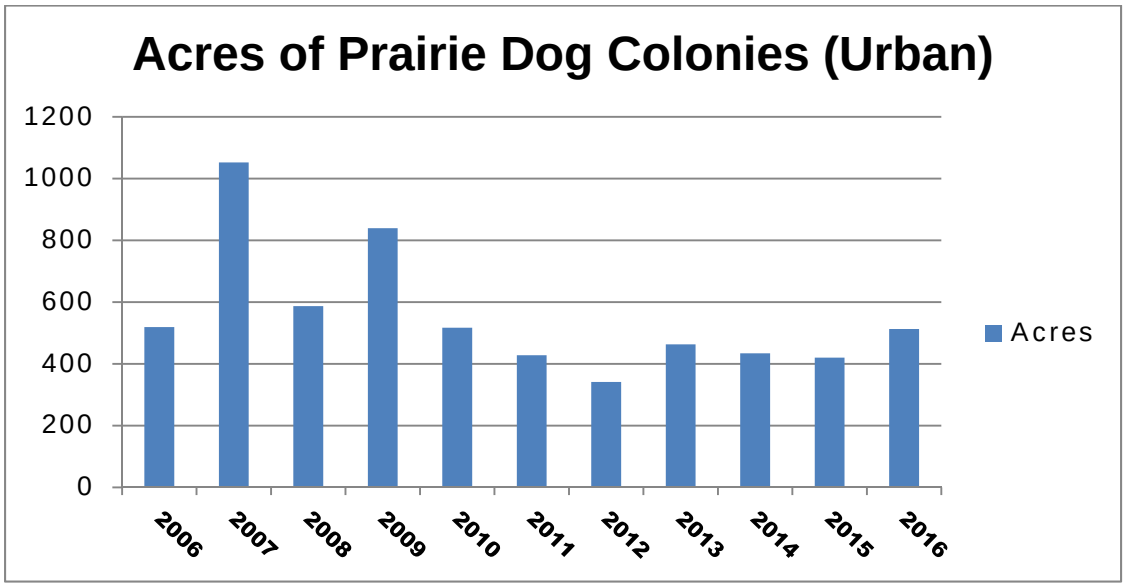


Figure 5.1. Urban Prairie Dog Occupied Areas (2006-2016)

Prairie Dog Management Strategies for Urban Colonies

Description of Suitable Habitat and Management Filters in Urban Natural Areas

Urban prairie dog colonies will be managed as a unit. That is, all urban properties and prairie dog colonies are considered when calculating population size and available habitat. Management decisions will take into account unit-wide population status, as well as a site-by-site analysis accounting for local constraints.

The first step in developing an urban management strategy is to identify the acreage of suitable prairie dog habitat. To determine suitability, various filters are applied. First, slopes exceeding 15%, hydric soils, and habitats other than grasslands are excluded. Second, acres are excluded that host rare or unique flora or fauna or where 300-foot buffers to housing developments are needed. Sites undergoing restoration to native prairie and some highly diverse intact grasslands are also excluded from suitable habitat calculations. Once all of the various exclusions have been applied, the remaining land is characterized as suitable habitat. (Note: Fully restored grasslands ultimately may be available for prairie dog colonies when they are considered stable and resilient enough for prairie dog occupation and if their presence is compatible with other species that occupies these areas. Ten years is generally accepted as the minimum establishment period for grassland restoration.)

Filters for Suitable Habitat in Urban Natural Areas

Filter 1 – Determine Suitable Grassland Habitat

Suitable grassland habitat is defined as areas that:

- ✓ Do not have hydric (wet or saturated) soils.
- ✓ Are dominated by grass or herbaceous plants (excludes forests, shrublands, etc.).
- ✓ Lands with slopes less than 15%.

Filter 2 – Areas that represent active restoration areas, other high-priority conservation targets, and 300 foot buffer to residential developments. These represent areas where prairie dogs will be excluded.

- ✓ Active ecological restoration areas.
- ✓ Areas with rare plants such as *Physaria bellii* (Bell's twinpod).
- ✓ Sites with unique flora or fauna that would be adversely affected by the high-intensity grazing (e.g., Species of Interest).
- ✓ High quality grasslands with substantial native vegetation deserving protection. The definition of high quality grasslands in an ex-urban context such as Soapstone Prairie Natural Area would inherently include prairie dog colonies, however, in the urban context, areas with a high percentage of native plant species are uncommon. These highly diverse grasslands would be vulnerable to invasion by non-native species when bare ground is exposed (due to grazing by prairie dogs).
- ✓ Grassland habitat within 300 feet of residential developments.

Managing for Species Diversity Using Percent Occupied Habitat

These Guidelines recommend a 10 to 20 percent occupation of suitable habitat on urban natural areas. This level of prairie dog occupancy is in line with historic estimates of a 2-15% occupancy rate (Knowles et al., 2002). Setting an occupancy rate allows properties to be managed for multiple values including prairie dog conservation. (Note: Although some of the additional management exclusions in Filter 2 are considered when determining where prairie dog occupancy is appropriate at SSN and MSR, they are not subtracted during suitable habitat calculations.)

Table 5.1 shows percent urban occupancy, unit-wide, at 2016 prairie dog population levels after habitat filters are applied. Lands undergoing grassland restoration represent the largest acreage excluded from prairie dog occupation, with 1,669 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 894 acres. Therefore, the maximum available suitable acreage is 1,450 acres in urban natural areas. The current prairie dog occupation acreage of 507 urban acres represents an occupancy rate of 35%, higher than the long-term intent of 10-20%. Percent occupancy is one of several factors that is taken into account when determining if prairie dog management actions, including lethal control, are needed to reduce the number of prairie dogs in a natural area. No management effort is taken to encourage expansion if this range is exceeded (e.g., relocation of prairie dogs to urban natural areas).

Table 5.1. Percent occupancy of prairie dogs on suitable habitat after filters are applied (2016). All acreage subtractions are cumulative because some areas, where management filters occur, overlap geographically.

Habitat Filters	Urban Acres Remaining After Filter Applied	2016 percent occupancy at 507 acres
Habitats prairie dogs typically do not occupy (>15% slope, non-grassland habitats, hydric soils)	4,013 acres	13%
1,669 acres excluded for grassland restoration	2,344 acres	22%
894 acres removed to conserve rare or unique flora and fauna, and provide a 300 foot buffer to residential neighbors	1,450 acres	35%

SSN and MSR Prairie Dog Management

The Soapstone Prairie Natural Area Management Plan (NAP 2007a) established management objectives and conservation targets intended to guide area 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

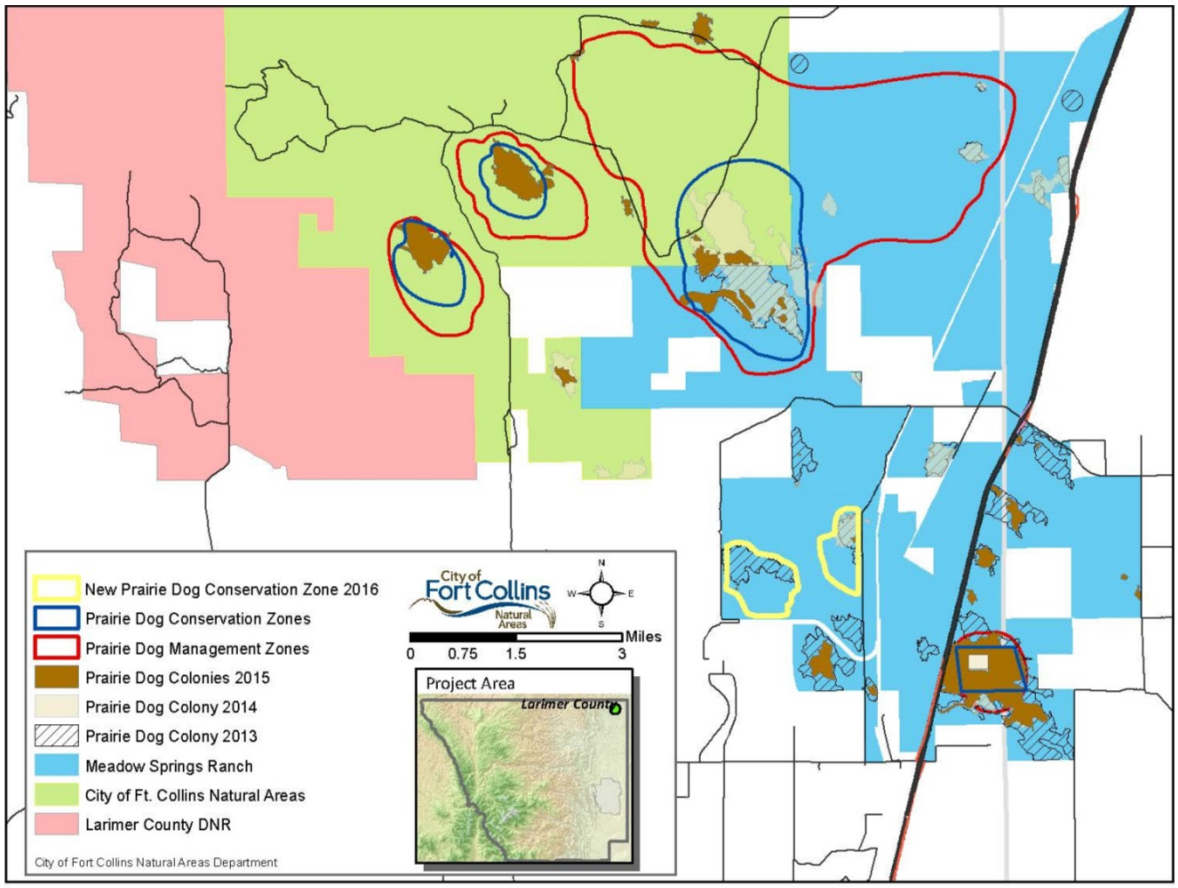
diverse and connected complex of prairie dog colonies as a matrix within un-colonized shortgrass prairie.

A second document (Prairie Dog Community Conservation Plan or PDCCP) was created in 2009 to implement management concepts identified in the Management Plan. The PDCCP guides prairie dog management on SSN and MSR. It 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 black-footed ferrets by the United States Fish and Wildlife Service (USFWS). This plan became the basis for the City's Black-footed Ferret Reintroduction Plan approved by the USFWS and City Council in 2014. The PDCCP is a "living document" that may be modified to reflect 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 et al., 2002), occupied habitat within the SSN and MSR complex is managed to achieve about 10% occupation or 4,000 acres. This occupied acreage base creates a prairie dog complex of sufficient size to support the 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, a series of prairie dog conservation zones were identified 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 in the absence of disease management, sylvatic plague eventually will likely reduce or eliminate the colony. This approach allows the City to maintain an acreage base of occupied habitat to meet long-term objectives 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 intensive and the annual capacity is a maximum of 3,000 acres. As new products like the sylvatic plague vaccine (SPV) are developed, the City's disease management capacity is expected to increase (see Disease Management).



Soapstone Prairie and Meadow Springs Ranch Prairie Dog Colonies

Disease Management

Large plague events within the SSN and 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 sylvatic plague outbreaks.

The best management practice for disease focuses on minimizing the exposure to plague by controlling flea populations in prairie dog colonies. A broad-spectrum insecticide (deltamethrin), used to reduce fleas, may also reduce other beneficial invertebrates, though recent evidence suggest this impact may be short-lived (Dombro, 2016). Application of deltamethrin requires specialized equipment, trained applicators, and is labor intensive.

Deltamethrin is effective at controlling fleas for about 9-10 months and an annual reapplication is required. In addition, when the efficacy of deltamethrin subsides, sylvatic plague can return and may significantly reduce the colony's size. This factor further complicates disease management requiring staff to retreat some colonies twice a year to sustain minimum colony acreage needed for black-footed ferret recovery.

Another complicating factor is the possibility that fleas may develop resistance to deltamethrin after several years of continued use. While resistance to deltamethrin has yet to be observed on SSN and MSR, it remains a concern, as it would present significant management implications. Consequently, only those acres needed to support black-footed ferret reintroduction will be

treated. Based on experience, the annual capacity for disease management using this approach is up to a maximum of 3,000 acres. This figure includes some 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 City is supporting research to field test a new sylvatic plague vaccine (SPV) for prairie dogs in partnership with CPW and the US Geological Survey. The vaccine is delivered via an oral bait that is consumed by prairie dogs. While early results are promising, continued research and improved bait manufacturing production is required to further this method as a reliable tool. As part of the ongoing research, the Department is working with CPW to begin the experimental application of plague vaccine bait on a management scale and is treating approximately 600 acres annually with plans to expand to at least 1,200 acres in 2017. While the use of SPV does not replace the use of deltamethrin, it does add a new management tool and is now part of an integrated pest management strategy to reduce and manage, but not eliminate the impacts of plague.

The direct annual costs of managing sylvatic plague on SSN and MSR currently range from approximately $30,000 to $60,000 (excludes indirect costs). If the maximum management capacity of 3,000 acres within conservation zones is reached, 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 and 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.

Population status

A variety of data is collected on SSN and MSR prairie dog colonies to inform management actions. Since 2006, all colonies have been mapped to determine the distribution and the total occupied acreage in the interest of documenting the rate of change or growth trends for all colonies within and outside of the conservation zones. Since that time, the SSN and MSR complex has ranged from a low of 164 acres following plague events to a high of 3,900 acres. Currently, there are approximately 1,760 acres of prairie dogs at SPN and MSR with 1200 of these acres occurring inside conservation zones (2017). Data, collected during both dry and wet years, 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 cannot be predicted, successful plague management and subsequent growth trends suggest an intermediate growth rate of around 125%. Based on this assumption, colonies within conservation zones could reach 3,000 acres in as few as three 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. Data collection started in 2015 to gain a better understanding of prairie dog density within colonies and will track changes in both density and colony size in future years. Prairie dog density measurements along with black-footed ferret population numbers and locations may help determine optimal prairie dog densities for ferrets.

General Prairie Dog Management for All Areas (Urban, SSN, and MSR)

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 will not be considered and is not recommended on urban natural areas. Further analysis of the 2016 relocation site at Cathy Fromme Prairie will help determine if artificial nest boxes on urban natural areas will be used in the future.

The following recommended general criteria and considerations apply to relocations occurring on any City-owned natural area. SSN and MSR specific criteria are listed after the general criteria.

- CPW will review all proposed relocations. Permits must be received before relocations occur. Colorado Parks and Wildlife (CPW) does allow prairie dog relocation March 1- May 31; however, the burrows are fumigated immediately after relocation activities cease to avoid leaving behind young prairie dogs. In order to avoid unnecessary lethal management, preferred months for relocation are June through September, continuing through December, if weather permits.
- A permit from the City must be obtained and applications must be made at least 45 days in advance of the proposed relocation. It may be a requirement that an approved scientific survival study be conducted by the relocation entity or private landowner. The permit from the City may be applied for ahead of acquiring the CPW permit.
- The receiving site must contain suitable habitat.
- A minimum of 60 prairie dogs is recommended per relocation effort (Robinette et al. 1995). Assembling 60 prairie dogs from different donating sites could be a method of reaching the minimum if individual colonies needing relocation at the same time are small. Supplementing existing colonies with relocated prairie dogs would be rare occurrence but would be considered on a case-by-case basis. For example, if part of a colony succumbs to plague and there is enough room to release prairie dogs while still allowing a buffer to avoid intra-species aggression, less than 60 prairie dogs may be considered. Generally, a minimum of 30 prairie dogs would be requested for colony supplementation, to keep costs to the City low (per prairie dog). Other factors to be considered are the size and growth rate of the existing colony.
- Proximity to adjacent landowners and adjacent land uses will be considered (e.g., farming nearby may not be compatible).
- The receiving site should have a “resting period” of at least 6 months following a plague event before prairie dogs are relocated to the site. The resting period may be extended if conditions warrant. Burrows from donating and receiving sites will be dusted 1-6 months prior to relocation.
- Prior to relocation, all prairie dogs at the sending site must be individually 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 natural burrow entrances have collapsed an auger may be used to open burrow entrances.
- If prairie dogs are relocated from private land, the private landowner or agent must cover the full cost of the relocation. Expenses shall include, but are not limited to, City staff time associated with evaluation of the relocation permit. This expense may be waived if the City is soliciting relocations to augment its prairie dog colonies.
- If prairie dogs are relocated to a natural area from private land, the sending site must be located within the City of Fort Collins Growth Management Area.

SSN and MSR Specific Criteria

Prairie dogs may be accepted in conservation zones if:

- 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 3,000 acres within the next year. Prairie dogs are not accepted outside of conservation zones, as they will be susceptible to plague.
- Intact burrow systems are available within an existing conservation zone.
- Interference with research will not result from the relocation efforts (in particular plague vaccine research).
- It is a suitable time of the year, typically the fall.
- Current environmental and climatic conditions can support the relocation (i.e., no ongoing drought and vegetation is capable of supporting additional animals within a colony).

Relocation Between Natural Areas Guideline

Relocation from one City-owned natural area to another is rarely utilized. From a conservation perspective, the City is achieving its overarching objectives of grassland health and species conservation without a need to supplement existing populations or establish new populations of prairie dogs. Additionally, there is a high cost associated with relocation, currently $150 to $400 per animal, depending on the individual scenario. Although not commonly used, relocation of prairie dogs between natural areas will remain a management option.

Relocation from Private Lands to Natural Areas Guideline

In general, the City has not accepted prairie dogs from private lands onto City-owned natural areas; however, an exception may be made if the previously described relocation criteria are met. Urban natural areas would receive prairie dogs under very rare circumstances as many urban colonies require population control and are incompatible with other conservation goals. The 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 although its application is rare due to suitable habitat constraints. 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.

In 2016, the Fort Collins Prairie Dog Relocation Group and the Prairie Dog Coalition collaborated on a relocation from private properties near Lemay and Vine streets to a receiving site on Cathy Fromme Prairie Natural Area. Over 700 prairie dogs were relocated to 12 acres and 119 artificial nest boxes on Cathy Fromme Prairie. The artificial nest boxes were installed 4 feet deep, are made of plastic, and are connected to the surface by plastic pipe. Further analysis of the success of this relocation will aid in determining if nest boxes will be allowed in the future. If next boxes are abandoned, it may be desirable to remove them. Experimentation with biodegradable materials for artificial nest boxes is encouraged. In addition, approved scientific study of the survival rates of prairie dogs relocated to natural areas properties may be required.

Passive Relocation Guideline

Passive relocation is currently used by some agencies; however, this technique has only been used on natural areas to temporarily exclude prairie dogs from a site due to construction or other temporary impacts (i.e. buried utility installment). Passive relocation typically consists of harassing the burrow until prairie dogs leave and then wire mesh is placed over the burrow entrance to ensure the animals do not re-enter the burrow system. This technique was met with mixed reviews during the 2016 peer-review Prairie Dog Workshop as it can cause intra-species aggression and death when animals are pushed into an already densely occupied habitat. Additionally, unnatural materials are left behind, covering burrow entrances and excluding wildlife that may otherwise use the burrow system.

Trapping and Donation Guideline

When population reduction is necessary and when resources are available, animals will be trapped and donated to either the U.S. Fish and Wildlife Service's National Black-footed Ferret Conservation Center in Carr, Colorado, or to the Rocky Mountain Raptor Program in Fort Collins. Protocols exist for each of the organizations that must be followed if this management tool is applied.

Fumigation Guideline

Fumigation is used to manage prairie dog colony size, shape, density, and distribution on City-managed natural area sites. Fumigation is the only legal method of lethal management that complies with EPA requirements and Fort Collins City Code. Carbon Monoxide is considered the most humane and is the only method of fumigation currently in use.

Prior to lethal control, consideration will be given to (in no order of priority):

- The ecological condition and carrying capacity of the site.
- Population trends for the site and other natural areas.
- Adjacent ecological values (rare or unique plants and wildlife, residential buffers, etc.).
- Adjacent landowners and land uses.
- Funding and staffing considerations.
- Disease concerns if relevant.
- Possible non-lethal alternatives or donation to the Black-footed Ferret Conservation Center or the Rocky Mountain Raptor Program.

- Burrows to be fumigated will be surveyed for burrowing owls and other non-target wildlife.
- Within SSN or MSR – burrows to be fumigated will be surveyed for black-footed ferrets following recommended methodology.

Disease Control Guideline

Prairie dog colonies are monitored regularly and a drastic decrease in population would signal further investigation into the possibility of a plague outbreak. To date, insecticide is not used on urban natural areas as a regular preventative measure in part because the City is exceeding occupation goals. Moreover, there are possible negative effects of using insecticides as a preventative measure over the long term, including potential flea resistance and impacts to native invertebrates. Plague vaccine is under consideration for use on some urban colonies when (and if) it becomes widely available. In the case of suspected plague, the Natural Areas Department will work cooperatively with the Larimer County Department of Health and Environment and the Center for Disease Control. The public will be notified of plague outbreaks and provided information regarding safe practices near prairie dog colonies. Lethal control during or in response to a plague outbreak is not recommended, as it would create a greater risk for flea transmission as remaining fleas search for a new host.

Plague management will continue to be used as primary method for prairie dog conservation on SSN and MSR Properties. Dusting at least annually and continuing to cooperate in Sylvatic Plague Vaccine trials will help reach prairie dog conservation goals on these properties. The capacity for plague management on these properties is about 3,000 acres annually with current technologies and staff. If hoped-for new plague management techniques become available, the number of acres treated could be adjusted upward to be more in alignment with 10% occupancy (4,000 acres).

Barrier Guideline

The City has used a number of techniques to reduce the level of prairie dog movement onto adjacent private property. In the last decade, these have included the installation of solid vinyl barrier fence and shrub plantings. While these methods can deter prairie dog movement, they cannot act as a true barrier to movement into adjacent areas and are not aesthetically pleasing. There are no plans to construct new barriers at this time. Existing barriers will be maintained and local volunteer groups may be recruited to assist in these endeavors. Developments adjacent to City-owned natural areas occupied by prairie dogs will be encouraged to construct and maintain prairie dog barriers on private land.

Recolonization Following Grassland Restoration Guideline

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 the vegetation is prepared for the stress of grazing. Considerable resources are invested in restoration areas and occupancy by prairie dogs has the potential to degrade the areas due to a large seedbank 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

could be lost if prairie dogs were allowed to occupy these sites; therefore, ecological trade-offs are assessed prior to 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. These criteria will be considered for the best management of restored grasslands. Opportunities to collect vegetation data from areas where prairie dogs could colonize restored grasslands will also be valuable (e.g., Fossil Creek Natural Area).

Reproductive Control Guideline

In 2006, an experimental trial with the USDA National Wildlife Research Center on two methods of reproductive controls that have potential for managing prairie dog populations was supported on natural areas. These methods are yet to be approved for use on prairie dogs by the EPA and the USDA, though there is some question as to USDA's continued work on the method (staff communications with the US Department of Agriculture). The first method involves a single injection of a Gonadotropin-releasing hormone (GnRH) registered as GonaCon™. Male and female prairie dogs are trapped prior to the breeding season and injected with the substance that inhibits cholesterol production necessary for sexual hormone formation. Effective contraception is expected to last a minimum of 2 years (prairie dogs may only breed 2 or 3 times during a lifetime). Anticipated cost of each injection is $1.00 plus the staff time necessary to conduct the procedure. In 2010, a study to test the health effects of Gonacon™ on black-tailed prairie dogs showed no negative weight or blood chemistry parameters (Yoder and Miller 2010). It was also noted in this study that there would be no non-target effects with the use of Gonacon™ as it is an injectable (no bait for non-targets to consume). Additionally, there would be no secondary effects associated with this method as Gonacon™ is protein based and is degraded by the digestive system of a predator consuming a vaccinated prairie dog (Yoder and Miller, 2010).

A second method tested was a drug called Diazacon™ a cholesterol mimic that inhibits cholesterol production and blocks sexual hormone formation. Diazacon™ is administered by feeding treated rolled oats to prairie dogs. This technique would require feedings each year for a two week period, to maintain sterilization. Concerns exist, however, for impacts to non-target species that might consume the available bait. Delivery methods for the bait could be trialed in the field to reduce non-target consumption. Costs for this operation are unknown at this time. If a reproductive control method becomes available, its use will be considered on natural areas.

Education Guideline

The City has a long history of providing the community with educational opportunities about the prairie ecosystem and its wildlife, including prairie dogs. Examples include: a permanent shortgrass prairie exhibit at the Fort Collins Museum of Discovery's Natural Areas Zone (2012); interpretive signs about prairies that have been enjoyed by visitors at several sites; and regular presentations on prairie ecology at community educational programs and activities. Educational opportunities will continue to be provided to the public on the ecology and management of prairie dogs. Topics will include the natural history and importance of prairie dog colonies and urban management issues such as population control, healthy grassland ecosystems, plague, and human interactions. Outreach efforts also will emphasize the comprehensive ecological and community management goals of the City's natural areas as well as other grassland wildlife species found in the natural areas system.

Monitoring, Research, and Experimentation Guideline
The Natural Areas Department will continue to work independently and in partnership with other public and private organizations in prairie dog management, research, and experimentation. As resources permit, an inventory of prairie dog populations will be conducted at least once every other year. Data collected will provide information on the colony location, size, configuration, and trends related to population size and grassland health. Frequency and intensity of monitoring may be adjusted based on need and availability of resources (staff, funding, other priorities, etc.). On-going efforts to monitor prairie dog dependent species and prairie dog associated species will also continue.

Conclusion

The conservation of prairie dogs and the ecosystem they support is best viewed in the long-term and on a large scale. Barring unpredictable plague epizootics or other major natural disturbances, urban prairie dog populations will continue to serve as a meta-population as long as these populations remain biologically connected. In large regional areas, like SSN and MSR, existing populations may exhibit expansion and recession cycles that are more alike to historic conditions and better serve as a keystone species. Plague management will continue to play a vital role in maintaining this population.

More than two decades of effort has considerably advanced the art and science of prairie dog management in urban environments. The management plan and guidelines in this chapter represent a further advancement and refinement of the City's efforts to conserve grassland species, including prairie dogs.

Timeline of Prairie Dog Management in Fort Collins 2008 - 2016

2008

⚠ Plague occurred at Meadow Springs Ranch, Cathy Fromme Prairie Natural Area, and Soapstone Prairie Natural Area .

- Total acreage of City-owned natural areas occupied by prairie dogs: 1,732 (839 urban, 893 SPNA)
- Prairie dog grazing, drought, and windy conditions continued to cause soil erosion at multiple natural areas.
- In an effort to identify non-lethal population control techniques, the USDA National Wildlife Research Center, in cooperation with the City of Fort Collins Natural Areas Program, initiated a study on prairie dog contraceptives at Coyote Ridge Natural Area.
- The *Wildlife Management Guidelines* were finalized to assist staff in developing and implementing system-wide and site-specific wildlife management strategies that support ecosystem health, reflect community values, and are pragmatic and fiscally responsible. The Wildlife Management Guidelines shifted the City wildlife management approach from prairie dog centric to grassland and ecosystem health focused.

- City Council rescinded Resolution 1998-037 acknowledging the Natural Areas Program's desire to manage grasslands more holistically and passed Resolution 2007-019 allowing Natural Areas staff to administratively adopt the Wildlife Management Guidelines.

2009

⚠ Plague occurred at Cathy Fromme Prairie Natural Area.

- Total acreage of City-owned natural areas occupied by prairie dogs: 1,077 (517 urban; 560 SPNA)
- Prairie dog grazing, drought, and windy conditions continued to cause soil erosion at multiple natural areas.
- Plague outbreaks and increased lethal management began to assist in the stabilization of natural areas subjected to severe soil loss.
- Trapping and Relocation projects:

  Site(s): Cathy Fromme Prairie Natural Area to Black-Footed Ferret Recovery Center
  Dates: October 19 – November 3
  Trap: 106 prairie dogs
  Site(s): Fossil Creek Wetlands Natural Area to Black-Footed Ferret Recovery Center
  Dates: November 6 – November 23
  Trap: 181 prairie dogs

2010

⚠ Plague occurred at Cathy Fromme Prairie Natural Area.

- Total acreage of City-owned natural areas occupied by prairie dogs: 1,423 (427 urban; 996 SPNA)

2011

⚠ Plague occurred at Maxwell and Pineridge natural areas.

- Total acreage of City-owned natural areas occupied by prairie dogs: 2,119 (242 urban; 1,877 SPNA)

2012

- Total acreage of City-owned natural areas occupied by prairie dogs: 3,771 (409 urban; 3,362 SPNA)
- Natural Areas Department cooperated with USDA researchers to conduct field tests on a sylvatic plague vaccine intended to reduce the occurrence of plague outbreaks thereby promoting stability in colonies supporting black-footed ferret.
- City of Fort Collins trapped prairie dogs at Fossil Creek Wetlands and Fossil Creek Reservoir natural areas.

Site(s): Fossil Creek Wetlands Natural Area and Fossil Creek Reservoir Natural Area to Black –Footed Ferret Recovery center

Dates: July 30 – August 3, 2012

Trap: 191 prairie dogs (99 from FCW; 92 from FCR)

2013

- Total acreage of City-owned natural areas occupied by prairie dogs: 4,168 (406 urban; 3,762 SPNA)

2014

⚠ Plague occurred at Soapstone Prairie Natural Area.

- Total acreage of City-owned natural areas occupied by prairie dogs: 3,045 (422 urban; 2,623 SPNA)

- City of Fort Collins Natural Areas Department ceased the use of fumitoxin (aluminum phosphide) in favor of carbon monoxide for lethal management actions. Although slightly more expensive, carbon monoxide presents fewer environmental concerns, fewer handling safety issues, and is deemed a more humane mode of action.

2015

⚠ Plague occurrence at Bobcat Ridge Natural Area.

- Total acreage of City-owned natural areas occupied by prairie dogs: 1,800 (400 urban; 1,400 SPNA)

- Fort Collins Prairie Dog Relocation Group requested City Council to direct the City of Fort Collins to identify and permit a relocation site for approximately 40 acres of prairie dogs on private land near the intersection of Lemay and Vine.

2016

⚠ Plague occurrence suspected at Meadow Springs Ranch.

- Total acreage of City-owned natural areas occupied by prairie dogs: 2,269 acres (507 urban; 1,762 SPNA)

- Natural Areas Department hosted a Prairie Dog Workshop attended by local and state agencies, as well as non-profit and consultant organizations.

- Fort Collins Prairie Dog Relocation Group, in cooperation with the Prairie Dog Coalition, trapped and relocated prairie dogs from private land to Cathy Fromme Prairie Natural Area. Over six months, 726 prairie dogs were relocated from private property near Vine and Lemay to ~12 acres at Cathy Fromme Prairie Natural Area. This relocation effort included the installation of 119 artificial nest boxes at Cathy Fromme Prairie Natural Area.

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Chapter 6: Native Wildlife Recovery & Reintroduction

This chapter explores opportunities to advance the wildlife conservation mission of the Natural Areas Department. Because of the size, diversity of habitat, and landscape context of Soapstone Prairie Natural Area, there are opportunities to re-establish extirpated native wildlife to this grassland and shrub ecosystem. Several species have already been reintroduced to Soapstone Prairie Natural Area that are of conservation interest: the black-footed ferret, American bison, and two native fishes; plains topminnow and northern red-belly dace. Although somewhat limited, there are opportunities for wildlife reintroductions on other natural areas as well. For example, two species of native fish were reintroduced to a created wetland at Topminnow Natural Area. There may also be potential for reintroductions of the Preble's meadow jumping mouse at Bobcat Ridge Natural Area, if suitable habitat can be restored and a source population can be found in cooperation with CPW (2015 surveys detected no Preble's on Bobcat Ridge Natural Area). Northern leopard frogs could also be reintroduced where bullfrogs are not found or could be controlled.

The opportunities explored in this chapter are not intended to be prescriptive, instead they describe possibilities that may or may not be pursued by the City. Decisions to pursue these alternatives will be based on many factors, including probability of success, funding, and agency approvals.

Black-footed Ferret

The black-footed ferret (*Mustela nigripes*) is the only ferret species endemic to North America's grassland ecosystems. Historically, the black-footed ferret ranged throughout the Great Plains occupying areas in 12 states and two Canadian provinces (Black Footed Ferret Recovery Plan, 1988). Today, the black-footed ferret is considered the most endangered mammal in North America and has been listed by the U.S. Fish and Wildlife Service as a federally endangered species since March 1967 (Note: The Endangered Species Act of 1973 afforded federal protection status to species that were listed [but not protected] by the U.S. Fish and Wildlife Service). Loss of habitat, widespread prairie dog eradication programs (the ferret's primary food source), and the introduction of sylvatic plague are cited as the primary causes for the ferrets' decline in the 20th century.

In 2014, the first black-footed ferrets were released on SSN and MSR under the black-footed ferret programmatic safe harbor agreement (2013). Subsequent releases were made in 2015 and 2016. To date, 81ferrets have been released on SSN and MSR. Surveys are conducted each year to detect black-footed ferrets and to capture kits for necessary vaccinations. These surveys provide an idea of the number of animals present, but ferrets are difficult to detect. A lactating female, found in 2015, provided evidence of breeding; however, no kits were found. In 2016, three wild borne kits were captured on Meadow Springs Ranch thereby documenting the first confirmed births from the reintroduced population. Additional supplemental releases will likely be needed until a sustainable population is established. Supplemental releases will be coordinated with the USFWS and CPW.

Black-footed ferret at Soapstone Prairie Natural Area (Photo by Kimberly Frazer)

American Bison

The American plains bison (*Bison bison bison*) once dominated the North American grassland landscape. As an ecological force, bison were responsible for creating a mosaic of grassland conditions through the process of grazing, soil disturbance, and subsequent re-growth of vegetation. While historic populations across North America once numbered in the tens of millions, the entire wild population had been reduced to less than 1000 individuals by the late 1800s. Today, genetically "pure" free-roaming populations are estimated at around 6,000 individuals and limited to two protected areas in the United States; the Greater Yellowstone Ecosystem and the Henry Mountains of Utah. Genetically pure (heritage) bison retain genetics that are free from cattle genes. Smaller, publicly managed herds are kept at Wind Cave National Park, Custer State Park (South Dakota), the National Bison Range (Montana), Turner Properties (New Mexico), and several properties operated by the Nature Conservancy across the Midwest.

There are nearly 22,500 acres of Soapstone Prairie Natural Area that are held in direct public ownership with an additional 55,000 acres of other public and private protected lands surrounding this landscape. Yellowstone heritage bison were reintroduced in 2015 to an approximately 1000-acre enclosure located within Soapstone Prairie Natural Area and Red Mountain Open Space. The bison genetics originate from Yellowstone National Park and the animals are free of brucellosis, thanks to research conducted by Colorado State University's

College of Veterinary Medicine and Biomedical Sciences (CSU) and the U.S. Department of Agriculture Animal Plant Health Inspection Service (USDA-APHIS). The herd is managed by CSU. The current plan is to grow the herd to over 50 animals. The enclosure will grow to 2500 acres by 2018.

Bison at Soapstone Prairie Natural Area (Photo by Norm Keally)

Plains Sharp-tailed Grouse

The plains sharp-tailed grouse (*Tympanuchus phasianellus jamesii*) is a native Colorado grassland bird that once nested over much of Colorado's eastern prairie including the area that is now Soapstone Prairie Natural Area. Due to the conversion of grassland to cropland and land development, the grouse has declined to a present population consisting of only a few hundred birds in Douglas County and possibly Weld County. For this reason the bird is listed as endangered by Colorado Parks and Wildlife. Portions of Soapstone Prairie Natural Area may provide suitable reintroduction sites. Discussions have been held with the Colorado Parks and Wildlife regarding the possibility of pursuing a sharp-tailed grouse reintroduction. Although the habitat types and grass heights at Soapstone Prairie Natural Area are slightly outside of plains sharp-tailed grouse requirements, the City will remain open to reintroduction if CPW determines that it is a possibility.

Native Plains Fish

Several species of once common native fish are considered at-risk and are included on the Department's Species of Interest list. Most of these fish are small and vulnerable to larger non-

native fish and are sensitive to pollution and habitat degradation. Plains topminnow and northern red-belly dace were re-introduced to Spottlewood Creek in Soapstone Prairie Natural Area in 2012. Additionally, plains topminnow and northern red-belly dace were reintroduced to Topminnow Natural Area in 2016.

Other fish species on the Species of Interest list include Iowa darter, orangespotted sunfish, brassy minnow, and common shiner. As opportunities arise to create or restore habitat in urban natural areas, staff will carefully consider the feasibility of reintroduction of these six species of fish. Opportunities exist to create habitat during wetland restorations on natural areas and improve habitat by creating fish passages around diversion structures along the Poudre River.

Preble's Meadow Jumping Mouse

Preble's meadow jumping mouse (PMJM) is currently listed as Threatened by the U.S. Fish and Wildlife Service. This mouse depends on dense riparian vegetation and available open water, with abundant upland habitat near-by. One record of a PMJM was documented prior to the original trail construction on the Bobcat Ridge Natural Area (the trail was re-aligned to avoid impact to PMJM habitat). A survey was completed again in 2015 and no PMJM were found. At a minimum, plans remain to continue to assess and improve habitat on Bobcat Ridge. Reintroduction of Preble's may be pursued in the future if it is determined that a reintroduction process may have a high probability of success.

Northern Leopard Frog

Northern leopard frogs are vulnerable to habitat loss, disease, introduced species, pollution, and climate change. They have disappeared from large portions of their historic range and population declines are documented in their current range. Northern leopard frogs have been documented at Soapstone Prairie Natural Area; however, there are few records on all other natural areas. One of the biggest threats to this species is chytrid fungus, a disease that is often spread by non-native bullfrogs. Bullfrogs are less likely to succumb to the disease, therefore spread it readily. Conversely, northern leopard frogs are very sensitive to chytrid fungus and infection is often followed by mortality. Reintroduction in urban natural areas is complicated by the need to control bullfrogs at a reintroduction site. Reintroduction to regional natural areas may afford improved probability of success; however, the population that already exists at Soapstone Prairie Natural Area may populate additional wetlands naturally and without reintroductions. Baseline surveys in targeted habitat would reveal areas that may be appropriate for reintroductions.

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Chapter 7: Wildlife and Human Conflicts

Wildlife within and around Fort Collins is highly valued by Fort Collins' citizens. Wildlife watching contributes to the public's appreciation of nature and adds general aesthetic value in the urban environment. In some cases, however, wildlife can create conflicts with the public when some species inhabiting natural areas move onto adjoining, private property.

Colorado Parks and Wildlife has management and protection jurisdiction over wildlife in the State of Colorado, including those within the City of Fort Collins. With the exception of small rodents, trapping or killing wildlife that conflict with human health, safety, or property requires approval by CPW. In general, Fort Collins residents seek to solve wildlife problems humanely, without killing animals. The Larimer Humane Society provides educational information on their website that assists with reducing conflict with animals on private property.

Although any species of native wildlife could create conflicts at some time for a resident of Fort Collins, the Natural Areas Department has received inquiries or complaints about less than a dozen species (or groups of species) over the last 15 years (Table 7.1). Usually, it is the Department's role to provide information and/or direct the resident to another agency, but not to take management action. Agencies with local offices that provide helpful information on managing problem wildlife include the Colorado Parks and Wildlife, Colorado State University Cooperative Extension, U. S. Department of Agriculture (Animal and Plant Health Inspection Service, Wildlife Services Program), and the Larimer Humane Society. To date, the Natural Areas Department has taken some wildlife management actions beyond providing information to the public, in the management of four native wildlife species.

Black-tailed Prairie Dog

By far, the prairie dog has been the most controversial species to manage, prompting research, policies, restoration, and intensive management actions (see Chapter 5). Prairie dogs primarily become an issue when they move onto neighboring, private property. Concern is not only for the destruction of landscaped areas, but also for the spread of plague, a potentially fatal disease for humans, their pets, and other wildlife species.

Beaver

The beaver is the largest rodent found in North America and has recovered in many areas of the U.S. since it was nearly driven to extinction due to over-trapping for the fur trade. When beavers modify streams by building dams and impounding flows, they do have the potential to flood private property and damage structures. The City's Stormwater Utility is responsible for maintaining flows in drainages throughout Fort Collins and, generally, is responsible for the removal of hazardous beaver dams. If beavers continue to rebuild in the same location, they are either lethally controlled or relocated to more remote areas, following appropriate permitting efforts with CPW.

The North American beaver plays an important and desirable role in the creation and maintenance of diverse pond and wetland habitats as well as riparian vegetation throughout the western U.S. including along the Poudre River. Beaver activities such as the construction of lodges and dams can pose management challenges especially in urban and agricultural

settings. Beaver locations are monitored within natural areas and along the Poudre River. If management challenges arise, in particular with respect to infrastructure or safety, appropriate steps may be taken to reduce or eliminate potential harm (e.g., installing beaver excluders at culverts). Natural Areas will consult as needed with agency partners such as the City's Stormwater and Parks divisions, Colorado Parks and Wildlife, the City of Greeley, and others.

Beavers can transform natural areas by gnawing on larger cottonwoods. In areas of heavy beaver use, larger tree trunks are selectively painted with a sand/paint mix to discourage gnawing. A previous method was to wrap trees with chicken wire, which can be hazardous to other wildlife and requires more maintenance. Although beavers "harvest" cottonwoods and do not always kill trees, they can produce localized changes creating short, stubby cottonwoods rather than mature, tall cottonwoods.

General Strategies for Management of Beaver on Natural Areas

- ✓ Staff will evaluate each beaver dam on a case-by-case basis to determine the potential for flooding, impacts to property if flooding occurs, and any impacts to public safety. Control devices will not be installed if public safety is an issue or if damage to private property will occur. In these cases, dams will be removed and beaver removed from the area if necessary. Note: this guideline applies to management of beavers only on City-managed natural areas.

Canada Geese

Canada geese are year-round residents of Fort Collins, but numbers of geese increase substantially during winter when the City and other urban areas along the Front Range become popular winter refuges for migrant geese. Fort Collins is attractive to migrant geese because of the ample supply of food and water and refuge from hunting. Canada geese droppings can be a problem as well as overgrazing and damage to golf courses and turf grass on parks and private open space areas. When geese are feeding in larger numbers on a natural area, they are usually in large fields and not where people travel.

Canada geese can be a problem on newly planted restoration areas by feeding on upland or wetland plants. One method to discourage geese is to install temporary wire fencing to prevent geese from pulling up new wetland seedlings during the first growing season. Coyote statues have also been installed to frighten geese away from fresh plantings. While these passive techniques likely deter geese for short periods of time, they have not completely prevented the undoing of some of these plantings. The most successful technique has been the use of wetland mats or sod instead of wetland plugs. The mats come in 3-foot by 9-foot sections and can be rolled out and staked down in shallow water. These mats take root quickly and are resistant to geese pulling them out of the ground. Experimentation with new methods of goose damage control on restoration sites will be continued.

Other Species

Several other native wildlife species may cause conflicts with neighboring residents. Although not treated in detail here, Table 7.1 describes management considerations for deer, raccoon, skunk, coyote, garter snakes, and prairie rattlesnakes when human conflict arises in relation to natural areas management.

Table 7.1. Potential Problems Posed by Native Wildlife Species in Urban Natural Areas

Species	Potential Problems	Local Conflict Level	Management Action
Black-tailed prairie dog (Cynomys ludovicianus)	Private property damage. May carry plague infected fleas that may be picked up by humans, pets, and other wildlife.	High	Population management (see Chapter 5).
Beaver (Castor canadensis)	Flooding structures or private property. Flooding structures on natural areas. Cutting of large cottonwoods. Can carry tularemia, but rarely transmitted to humans.	Moderate	The City of Fort Collins Stormwater Utility removes dams with potential to flood structures or private property and occasionally relocates beavers. Native trees are selectively painted (sand/paint mix) to prevent gnawing and preserve large trees for wildlife.
Canada goose (Branta canadensis)	Droppings are unsightly and unsanitary. Can be aggressive towards children and pets. Overcrowding can cause avian diseases (e.g., botulism, avian cholera, and duck plague). Droppings add nutrients to lakes and ponds contributing to algae build up; algae die off depleting water oxygen supply with resulting fish kills and other aquatic organisms.	Moderate	Problems are rare regarding geese on natural areas. A variety of methods are used to protect newly planted wetland seedlings from being destroyed by geese.
Deer (Odocoileus spp.)	Damage to ornamental and garden plants. Host for ticks and associated tick-borne diseases, which can be transmitted to humans (see Chapter 10).	Low	Problems are rare regarding deer on natural areas; no management action is planned at this time.
Raccoon (Procyon lotor)	Damage to gardens and crops. Denning in residential or commercial buildings. Transmit rabies and other diseases to humans, pets, and other wildlife.	Low	Problems are rare regarding raccoons on natural areas; no management action is planned at this time.
Striped skunk (Mephitis mephitis)	Denning in residential or commercial buildings. Strong odor. Can transmit rabies and other diseases to humans, pets, and other wildlife.	Low	Problems are rare regarding skunks on natural areas; no management action is planned at this time.
Coyote (Canis latrans)	Prey on domestic cats or small dogs. Transmit rabies and other diseases to humans, pets, and other wildlife.	Low	Natural Areas Rangers post signs on select areas where coyotes may be denning in early spring, and may be more aggressive. May need to control at Soapstone Prairie Natural Area if found to be impacting swift fox population.
Non-venomous snakes	Fear of being bitten.	Low	Problems are rare regarding non-venomous snakes on natural areas; no management action is planned at this time.
Prairie rattlesnake (Crotalus viridis)	Could cause death to child or pet if bitten.	Low	Informational signs are posted seasonally in areas where rattlesnakes are commonly seen. Rangers may relocate snakes from trail areas.

Chapter 8: Non-Native Wildlife Species Management

Non-native species are those plant or animal species that were not present to this region at the time of European settlement. Due to aggressive habits and lack of natural predators, many non-native wildlife species become abundant and have the ability to out-compete native species. This negative interaction impacts native species through competition for food, displacement from areas of suitable habitat, increased disease, or increased predation rates.

Many non-native species are found within Fort Collins natural areas. In many cases, non-native species are common and efforts to remove them from a natural area may be of limited value due to ease of in-migration from the surrounding landscape. However, if removal is necessary due to concern related to public safety or environmental impact, the Natural Areas Department will work with the Colorado Parks and Wildlife (CPW), Larimer Humane Society Animal Control officers (Animal Control), and other groups as needed to safely and humanely remove the animal(s).

A second option to limit non-native species is to modify existing habitat conditions. If this approach is feasible, habitat modification through management or restoration practices can be implemented. However, given most invasive non-native species are considered "generalists" as habitat users this option will have limited potential.

A summary of certain non-native species along with management options are provided below. Specific management guidelines are suggested only when management action could result in a desired outcome.

Bullfrogs (*Rana catesbeianna****)***
North American bullfrogs are native to eastern U.S.; from Nova Scotia to central Florida and west to into the Great Plains Region. Introduction to the Front Range and Colorado Rockies dates to the early 1900's.

North American bullfrogs live in or near warm, still, shallow waters found in lakes, ponds, rivers, or wetlands and prey upon snakes, worms, insects, crustaceans, frogs, tadpoles, and aquatic eggs of fish, frogs, insects, or salamanders. Predation on other frog species is a major impact and is in part a contributing factor to population declines of some species. Bullfrogs are also carriers of chytrid fungus, a non-native disease that can have major effects on less tolerant native species, such as northern leopard frogs.

Bullfrog control is difficult so complete removal is unlikely in any natural area. Staff will continue to promote harvest opportunities on natural areas following rules and regulations set by the Colorado Parks and Wildlife. Additionally, best practices for reducing spread of chytrid fungus should be used by natural areas staff and reflected by natural area regulations. Most often, humans spread chytrid fungus by moving amphibians or tadpoles from one location to another, by collection and release as pets or fishing bait. Aquarium water can also be contaminated and the disease can be spread if it is dumped into the environment. Natural Areas regulations state that no wildlife can be removed from, or animals released into, a natural area except fish as permitted. If bullfrogs are harvested, they should not be released back into the

environment once they are captured. Staff should clean equipment between work sites (e.g., boots, nets) if work is conducted in multiple wetlands where chytrid fungus may occur. Staff will encourage research on bullfrog management and reduction techniques and stay aware of emerging management techniques and best management practices for chytrid fungus.

General Strategies for Management of Bullfrogs on Natural Areas

- ✓ In consultation with CPW, the Department will determine and implement, when appropriate, management options available to control bullfrog populations.
- ✓ Avoid the spread of chytrid fungus using best management practices.

Carp (*Cyprinus carpio****)***
Carp are large bottom-feeding fish found throughout the United States. This species occurs naturally in Asia and Europe, but was introduced to many North American locations during the early 1800s.

Carp displace emergent and submergent vegetation through feeding and to some extent spawning activities. Their diet consists of mollusks, insects, worms, crustaceans, algae, aquatic plants (dead or living), and seeds. During foraging activities, carp suck in and expel water, mud, and debris. This activity results in the uprooting of aquatic plants, the release of nutrients, and an increase in suspended sediments that increase water turbidity and limit light penetration (thus, limiting aquatic plant growth).

The removal or control of carp is difficult but can occur with the use of aquatic pesticides (rotenone). However, use of these pesticides removes all fish, both native and non-native within the system. As such, promotion of harvest opportunities on natural areas will continue, following rules and regulations set by the Colorado Parks and Wildlife. Further, staff will consult with CPW if management opportunities are available or if any pesticide use or fishery management technique to remove or reduce carp is desired.

General Strategies for Management of Carp on Natural Areas

- ✓ In consultation with CPW, determine and implement, when appropriate, management options available to reduce carp populations.

***Mosquito fish* (*Gambusia* spp.*)*.**
Mosquito fish refers to either the western or eastern species of *Gambusia*. This guppy-like fish is one to two inches in length, silver to gray in color, and resembles the common minnow. It is very adaptable, tolerant of a wide range of water qualities, and its expansion is only limited by severe climates.
As its name suggests, this fish has been widely released to help in the control of mosquitoes. Females of the species have been reported to eat several hundred mosquito larvae per day. However, research suggests that *Gambusia* is no more effective at controlling mosquitoes than many other native predators. Furthermore, mosquito fish have been shown to have negative

ecological impacts where they are introduced. This species is highly predaceous on native fish larva and readily out-competes native species of minnow for available forage or harassing those competitors until death. The decline of up to 20 species of native minnows has been linked to the introduction of mosquito fish outside of its native range.

Mosquito fish are difficult to eliminate once established, so the best way to reduce their effects is to control their further spread. Staff will not permit the release of mosquito fish into any waters found within a natural area. A permit is required for the release of fish or wildlife onto City natural areas.

Feral / Free Ranging Dogs and Cats

Domestic dogs can also have a significant impact on the surrounding wildlife. A study conducted on Boulder County Open Space trails examined wildlife activity on trails with dogs (off leash) as compared to trails where dogs were prohibited (Lenth et al., 2006). The presence of off-leash dogs correlated with altered patterns of habitat utilization by several wildlife species where activity was significantly lower in proximity to trails. The effect extended out to 100 m for mule deer and 50 m for several rodents species." The impact dogs have on wildlife will be minimized through regulations and enforcement of leash laws.

Feral and free roaming cats prey upon birds, rodents, and small mammals. Urbanization and the related increased presence of free roaming cats has a tremendous influence on survival of small birds and mammals. A recent scientific study estimates that free-ranging domestic cats kill an estimated 1.3–4.0 billion birds and 6.3–22.3 billion mammals annually (Loss et al., 2013). If feral or free ranging dogs or cats are seen on a natural area, staff will contact Animal Control officers to capture and remove the animal. If it is suspected that the animal is an escaped pet, Ranger staff may post flyers to alert owners.

Chapter references

Lenth B., Brennan, M., and Knight, R.L. 2006. City of Boulder Open Space and Mountain Parks. Colorado, USA.

Loss, R. L., T. Will, and P.P. Marra. 2013. The impact of free-ranging domestic cats on wildlife of the United States. Nature Communications. 4:1396

Chapter 9: Management and Control of Wildlife Diseases

Wildlife disease is an important component of wildlife management. Wildlife diseases are often only noticed when the disease can be transferred to humans, pets, or livestock. Wildlife management must also consider the impacts to wildlife populations and efforts to conserve them. The Natural Areas Department will continue to cooperate with disease research agencies and participate in forums to learn more about how management actions can help promote the health of wildlife in our natural areas.

Currently, the Natural Areas Department's role in wildlife disease management is to provide the public and visitors notification about the presence of a disease and any public health risk the disease may pose. Detailed information regarding diseases that cause public health risk is available through the website for the National Center for Disease Control (CDC) (Appendix A). Natural areas may be valuable for conducting research on disease, such as the plague vaccine trials currently taking place at Soapstone Prairie Natural Area.

This chapter provides general information about seven diseases that are found in the Fort Collins area and defines the management role of the Natural Areas Department related to diseases found in the City's natural areas.

Plague

Plague is a widespread disease affecting many rodent species in western North America and around the world. The word sylvatic is used to describe plague affecting animals. When humans get plague it is usually in the form of bubonic plague. It is believed that plague was introduced to North America in the early 1900s through rat-infested ships. The flea carrying plague is commonly carried by rock squirrels, prairie dogs, wood rats, and other species of ground squirrels and chipmunks. Other animals in the plague cycle include tree squirrels, swift fox, wild rabbits, and domestic pets.

Plague is caused by a bacterium (*Yersinia pestis*) transferred by flea bites or through direct contact with an infected animal (including transmission to humans). The most common form of plague is bubonic, where symptoms include swollen lymph glands (buboes). Other forms of plague are septicemic (when the blood stream is infected) and pneumonic (when the lungs are infected). In the cases of bubonic and septicemic plague, the disease cannot be transmitted from human to human; however, pneumonic plague can be transmitted through breathing infected respiratory droplets from an infected person or animal. In humans, symptoms may be seen 2 – 6 days after exposure and include sudden fever and chills, severe headache, muscle aches, nausea, vomiting, and a general feeling of illness. If detected early, antibiotics can be effective; otherwise, life-threatening complications may follow. A doctor should be consulted as soon as symptoms appear.

Plague has had a significant impact on wildlife populations, especially prairie dogs, in Fort Collins natural areas. Since 1997, plague has been recorded in prairie dog populations in the foothills, Fossil Creek drainage, and SSN and MSR. Sites include Coyote Ridge, Pineridge, Maxwell, Cathy Fromme Prairie, Colina Mariposa, Bobcat Ridge, and Soapstone Prairie natural

areas and Meadow Springs Ranch. While in most cases the prairie dog populations were significantly impacted or even eliminated, colonies generally re-established within several years.

Plague in our Natural Areas

The City of Fort Collins does not regularly control for fleas to prevent plague on local natural areas. Individual precautions for natural area visitors and staff are always encouraged. These include minimizing direct human contact with animals and their burrows/nests/dens; not feeding or enticing rodents; using insecticide on clothing, arms, and legs when hiking or camping; keeping pets restrained from roaming (on-leash); and using insecticide powders or shampoos on pets every few days while in possible plague areas.

General Strategies for Management of Plague on Natural Areas

- ✓ Prairie dog populations on natural areas will be monitored on a routine basis. A drastic decrease in a population will indicate the need to investigate further.
- ✓ Appropriate protective equipment and procedures (such as dusting burrows) will be used during relocations to protect staff and volunteers from potential exposure.
- ✓ Dead animals should be reported to the Natural Areas Department and, if deemed appropriate, they will be tested by the Center for Disease Control.

In the case of a plague epizootic in one of the natural areas:

- ✓ The Natural Areas Department will notify and work cooperatively with the Larimer County Department of Health and Environment.
- ✓ Appropriate signage will be posted at the natural area warning the visitor of the presence of plague and necessary precautions.
- ✓ Public notification will be made via local media contacts.
- ✓ Permitted group activities in affected areas may temporarily cease.
- ✓ Dusting of prairie dog burrows with insecticide to kill the host fleas may be done to reduce the spread of the disease.
- ✓ Natural area or trail closures may be necessary.

Tick-borne disease

While there are eight diseases transmitted by ticks in the United States, four might occur in Colorado and the other four are unlikely to be found in this region. The four potential tick-borne diseases are Colorado Tick Fever, Rocky Mountain Spotted Fever, Relapsing Fever, and Tularemia. Tularemia is the only tick-borne disease that has been documented on the natural areas.

Tularemia

Tularemia is a disease caused by the bacteria *Francisella tularensis*, and affects both humans and wildlife. Like plague, it can be transferred through direct contact with an infected animal or through the bite of an infected insect, primarily deerflies and ticks.

Persons at highest risk are those handling infected animals, particularly hunters. Less common means of spreading the disease include drinking contaminated water, inhaling contaminated dust or soil, or through the bite of a wild animal, cat, or dog that has been in contact with an infected animal. Most human cases of tularemia are a result of dressing or skinning infected rabbits; hence, it is commonly referred to as "rabbit fever." It is not spread from human to human.

Symptoms usually occur in 2 – 10 days after exposure. Tularemia may be first recognized by the presence of an ulcer-type of lesion at the insect bite site and enlarged, swollen, painful glands near the bite. A sore throat, intestinal pain, vomiting, and diarrhea may result from ingesting the organism in water or meat. Inhaling the organism may produce a fever and pneumonia. This disease can be treated with antibiotics and a doctor should be consulted as soon as symptoms appear.

Tularemia in our Natural Areas

Individual precautions are encouraged for natural area visitors and staff. Preventive measures include wearing protective clothing, searching for and removing ticks, and wearing insect repellant containing DEET. Gloves must always be worn when handling sick or dead animals. Children should not handle sick or dead animals, especially rabbits.

Tularemia has been a rare occurrence in Fort Collins. When present, it is usually detected in local beaver populations. In the spring of 2002, tularemia was found in a dead weasel at CSU's Environmental Learning Center and in a dead prairie dog at Soapstone Prairie in 2015. Public notification took place in conjunction with the Larimer County Department of Health and Environment through press releases and sign postings at surrounding natural areas.

General Strategies for Management of Tularemia on Natural Areas

- ✓ Dead animals should be reported to the Natural Areas Department and, if deemed appropriate, they will be tested by the Center for Disease Control.

In case of a tularemia epizootic in or near by one of the natural areas:

- ✓ The Natural Areas Department shall notify and work cooperatively with the Larimer County Department of Health and Environment.
- ✓ Public notification will be made via local media contacts and appropriate signage posted on the natural area.
- ✓ Permitted group activities in affected areas may temporarily cease.
- ✓ Natural Area or trail closures may be necessary.
- ✓ Soil and water samples may be tested for the presence of the causative bacterium.

Rabies

Rabies is a viral disease transmitted through the bite of an infected animal. It has existed in this country since the 1700s. In Colorado, rabies mostly affects bats and rarely affects other wild and domestic animals. Rodents in Colorado have not been infected with rabies. Animals most commonly infected are bats, raccoons, skunks, foxes, and coyotes, and to a much lesser extent domestic cats and dogs.

The rabies virus causes a disease of the brain called encephalopathy (a disease altering brain function or structure) and eventually death. Symptoms in humans include fever, headache, and general malaise. As the disease progresses symptoms become more specific and may include insomnia, anxiety, confusion, slight or partial paralysis, excitation, hallucinations, agitation, hyper-salivation, difficulty swallowing, and hydrophobia (fear of water), eventually leading to death. Once symptoms appear, it is too late for treatment; however, a post exposure vaccine is extremely effective. One should seek medical attention immediately after possible exposure to the rabies virus and definitely if bitten by a wild or domestic animal.

Rabies in our Natural Areas

In recent years, skunks have surpassed bats, as the most common carrier of rabies in northern Colorado. In 2012, a rabies epizootic in skunks was detected in Larimer and Weld counties. To help prevent the spread of rabies certain precautions to be practiced include, keeping domestic cat, dog, and ferret vaccinations current, and teaching children never to handle unfamiliar or wild animals.

General Strategies for Management of Rabies on Natural Areas

- ✓ Animals displaying unusual behavior or dead animals should be reported to the Natural Areas Department and if deemed appropriate, they will be tested by the Center for Disease Control.
- ✓ The Natural Areas Department will work cooperatively with the Larimer County Department of Health and Environment should there be any indicators of a rabies epizootic.

Distemper

Canine distemper is a viral disease causing illness in domestic dogs and wild carnivores such as raccoons, coyotes, skunks, foxes, and mink. It is different from, but related to, the human measles virus. Feline distemper is an entirely different virus. The signs of distemper in wildlife are often confused with rabies and include mucous secretions around the eyes and nose, coughing, paralysis, open sores, and twitching, shaking, or other abnormal behaviors. The virus is transmitted through infected animal's secretions and excretions, especially respiratory excretions. Food and water can become contaminated by airborne secretions. Distemper cannot be transmitted to humans.

Distemper in our Natural Areas:

The occurrence of distemper in domestic animals has been greatly reduced by vaccination programs. Another precaution to protect dogs is to keep them on leash and not allow them to investigate or eat dead wildlife. Distemper seems to be cyclical in nature and at times has had a significant impact on local raccoon populations. In years with increased deaths due to distemper, signs have been posted and dead animals have been collected and cremated to help reduce the spread of the disease to the remaining populations.

General Strategies for Management of Distemper on Natural Areas

- ✓ Animals displaying unusual behavior or dead animals should be reported to the Natural Areas Department and, if deemed appropriate, they will be tested by the Center for Disease Control.

- ✓ Signs will be posted in natural areas during times of increased incidence of distemper in wild animals.

Chronic Wasting Disease (CWD)

CWD was first found in captive mule deer in Colorado in the 1960s. It is a form of spongiform encephalopathy; a neurological disease that affects the brain of infected animals. CWD affects members of the Cervidae family (deer, white-tailed deer, elk, and moose). It is in the same family of diseases that causes "mad cow disease."

Transmissible spongiform encephalopathy is caused by a prion, which is an infectious, abnormally structured protein that causes abnormal protein cell production in the brain. This then leads to rapidly progressive brain damage which is always fatal. An emaciated animal with a lack of coordination or other abnormal behaviors are signs that an animal may have chronic wasting disease. This disease is not yet known to be transmitted to humans; however, precautions should be taken when handling deer, elk, or moose carcasses.

Colorado Parks and Wildlife is the agency spearheading the effort to prevent the spread of chronic wasting disease beyond historically infected areas. They are also working to reduce its prevalence within infected geographic areas by removing infected deer and elk from diseased herds, enforcing illegal feeding regulations and transport laws from infected areas or into the state, and continuing research in conjunction with other agencies.

<u>Chronic Wasting Disease in Natural Areas</u>

Chronic wasting disease can be found in Larimer County and maybe present on City natural areas inhabited by deer. In the spring of 2002, two deer testing positive for CWD were found along the Poudre River. The Colorado Division of Wildlife was given a permit to test and euthanize deer in natural areas along the river. The Department will cooperate with CPW in assessing feasibility of CWD management options on natural areas as needed.

General Strategies for Management of Chronic Wasting Disease on Natural Areas

- ✓ Monitor deer and elk populations for any symptoms of chronic wasting disease in conjunction with Colorado Parks and Wildlife.
- ✓ Work cooperatively with Colorado Parks and Wildlife in assessing CWD management options on natural areas as needed.

Chapter 10: Habitat Protection and Enhancement

Ecosystem Management and Adaptive Management

Wildlife habitat on natural areas is typically managed by the holistic approach of ecosystem management, although specific habitat management strategies are listed in these Guidelines. Ecosystem management includes evaluating the effects of wildlife use on habitats as well as the effects of management techniques (e.g., prescribed fire and grazing) in both urban and regional natural areas. Adaptive management is used as a framework to continually improve habitat management techniques. It is an on-going iterative process by which management actions are evaluated and "adaptations" made to better ensure resource objectives are met. Thus, adaptive management fosters effective decision making, efficient resource allocation, and provides a framework for achieving resource objectives. To that end, the Natural Areas Department has routinely experimented with habitat management actions to improve a number of habitat parameters.

Ecological Disturbance

Ecological disturbance is an important component of habitat management and may be due to natural environmental influences or the result of management action. Natural disturbances can create conditions that are favorable for native wildlife species but these disturbances may not occur at the same rate they did historically, due to habitat alteration or loss of species (e.g. loss of Bison as important grassland grazers). Prescribed disturbances, such as fire, grazing or flooding, are used for ecosystem management purposes. The application of prescribed fire or grazing at the appropriate scale, can create a mosaic of conditions that will support a variety of species. Restoration of riparian habitats along the Poudre River, provides disturbance through flooding and also provides habitat for a variety of native wildlife. The 2015 Restoration Plan provides further details on ecological disturbance goals in relation to wildlife habitat management.

Wildlife Friendly Fencing

Proper construction or alteration of fencing will allow a variety of wildlife species safe passage. Fence design plays a major role in maintaining wildlife travel corridors and poor fence design that lacks consideration of wildlife can fragment habitat, sever access to or from breeding grounds, and in extreme cases cause death via entanglement. Accepted design for wildlife friendly fencing can be found in guidelines prepared by Colorado Parks and Wildlife (Hanophy, 2009).

The majority of fencing on urban natural areas consists of a single rail or buck-and-rail style that allows passage for wildlife of all kinds. Future fencing designs will continue to allow for wildlife movement.

Habitat Protection Strategies for Fences

- ✓ Continue to construct and alter fencing to allow a variety of wildlife species safe passage.
- ✓ Unnecessary fence will continue to be removed.

Stock Tank Escape Ladders

Stock tank escape ladders are designed to provide escape for avian and terrestrial wildlife from stock watering tanks. For years ranchers have used wood planks set across the tank to allow for birds and mammals to climb out of the water. However, as water levels decrease so do the efficacy of the wood planks. A newly developed design that uses expanded metal secured to the side of the tank, allows for wildlife to escape at all levels of water. Stock tank ladders were installed after acquiring Soapstone Prairie at all permanent stock tank locations and continue to be maintained. More information regarding this new design can be found by contacting the Bird Conservancy of the Rockies or the Colorado Parks and Wildlife.

Stock tank escape ladder, installed winter 2006, at Soapstone Prairie Natural Area.

Habitat Protection Strategy for Stock Tanks

- ✓ Continue to install and maintain stock tank escape ladders for the protection of avian and terrestrial wildlife.

Trees affected by Beaver Herbivory

In 2004, a program to manage beaver and non-native tree species along the Poudre River was initiated. Rather than the traditional method of wrapping desired trees in chicken wire (which needs to be replaced periodically to avoid tree strangulation), a mixture of sand and latex paint was applied to the base of cottonwood and various other native riparian tree species. The grit provided by the sand in this mixture deters beaver from felling native trees as a source of food and lodge material. Although the beaver prefer the softer wood of the cottonwood, ample supply of non-native crack willow (*Salix fragilis*) provide both sustenance and building materials. Generally, native trees that are six inches or greater are protected; however, other characteristics are taken into account when deciding which trees to protect.

The sand-paint mixture can be applied either by way of pneumatic paint sprayer or by brush. The paint color is carefully chosen to mimic the natural color of the target species (in this case native cottonwood) and applied to a height roughly of 4 feet. This method has been very successful at reducing beaver herbivory and is generally more aesthetically pleasing than chicken wire.

Habitat Protection Strategy for Beaver Herbivory

- ✓ Continue to selectively protect native trees along major waterways from beaver herbivory.

Foreground; cottonwood treated with sand/latex paint mixture.

Raptor Poles, Osprey Platforms

Osprey platforms have long been used to provide a safe nesting site for osprey around man-made and natural ponds. In recent years, ospreys have used artificial nesting platforms at Riverbend Ponds and Cottonwood Hollow natural areas. Nesting platforms consist of a single pole 40-60 feet tall with a circular platform fixed atop, and perpendicular to the pole.

Osprey platform at River Bend Ponds Natural Area (Photo by Bruce Barber)

Turtle Trees
Strategically placed dead tree limbs provide excellent perching habitat for turtles in natural area ponds. Trees of sufficient bole size to both anchor in the pond silt and breach the water surface provide desirable sunning locations for turtles. Turtle tree habitat improvements have been installed at the following Natural Areas: Riverbend Ponds, Redwing Marsh, North Shields Ponds, and Kingfisher Point.

Standing "Non-hazard" Dead Trees
Standing dead trees that pose no hazard to visitors or structures are typically allowed to stand and serve as habitat for wildlife (vertebrates and invertebrates). These trees can also serve as important nest and roost sites for a variety of birds, bats, and other wildlife.

Habitat Protection Strategy for Dead Trees

- ✓ Continue to allow standing, non-hazard dead trees to stand when possible. Exceptions are made for safety or other hazards.

Nature in the City
Nature in the City (NIC) is the next evolution of urban conservation in Fort Collins. Housed in Natural Areas, the program seeks to increase people's access to nature while enhancing habitat and connectivity for wildlife. To achieve this, Nature in the City promotes innovative partnerships, policies, and projects on public and private lands across the community. From citizen science monitoring with CSU and the Wildlife Conservation Society, to capital projects that empower residents to create and protect healthy habitat in their neighborhood, NIC's work helps to better understand urban natural spaces, the wildlife that use them, and the ways the broader community can contribute to local conservation. In complement to efforts on the ground, NIC staff in Planning Services shape land use code, long range management plans, and incoming development proposals to better support high-quality habitat and landscape diversity. Together, this mix of research and regulation, policy and practice yields small-scale improvements that add up to increased habitat connectivity and access to nature in urban areas. These connections benefit a variety of wildlife, particularly smaller species that can move between habitat by flight, such as birds, bats, and insects.

Nature in the City Strategy

- ✓ Nature in the City (NIC) envisions an accessible, connected open space network. The network will support residents living within a ten-minute walk to nature; conservation and enhancement of high quality natural spaces; and, diverse landscapes that support healthy environments for people and wildlife.

Chapter references

Hanophy, W. 2009. Fencing with wildlife in mind. Colorado Parks and Wildlife, Denver, Colorado, USA.

Chapter 11: Wildlife Inventory and Monitoring

Habitat management, assessment, and wildlife population inventory and monitoring are important tools that direct and enable managers to enhance the conservation values of our natural areas. Every natural area from the smallest to the largest has some capability to contribute to the conservation of native wildlife. The type of habitat, its size, juxtaposition, and connectivity to other habitats, as well as how the property is managed determines what type of wildlife will occupy the area. As such, wildlife management goals for natural areas are based on an assessment of existing and potential habitat conditions, current and potential species richness and diversity, and species of management interest. Consequently, a monitoring program for any given wildlife management objective may involve collecting information on the wildlife itself or a variety of habitat components.

Inventory and Monitoring Wildlife

Monitoring species richness and relative abundance, both components of species diversity, provides information necessary for managers to critically evaluate habitat management efforts and actions taken to minimize wildlife disturbance (trail placement, seasonal closures, etc.). Inventory and monitoring can provide baseline data that may be used to create management goals. Additionally, monitoring data can serve as a metric for evaluating the progress of management goals. Also, since natural areas range in size from less than 10 acres to over 20,000 acres and range from shortgrass prairie to riparian forests to mid-elevation pine forests, no one inventory or monitoring technique will be suitable for all properties, habitat types, and wildlife species.

A second factor to consider is that while all natural area properties play important roles in the life histories of some wildlife species, many areas are too small and/or isolated to strongly influence local population size. Conversely, large properties may have an influence on local population size and, in some cases, direct estimates of abundance are appropriate for monitoring of some wildlife species.

Population indices are techniques that measure abundance relative to an identified standard or to another property. These techniques typically measure species density and/or the number of different species relative to a standardized unit of effort such as time searched or miles walked. Generally, sampling protocol is developed to minimize variability caused by seasonal weather and weather events, observer bias, and habitat conditions. These techniques are relatively easy and inexpensive to conduct but results are only comparable when they are gathered employing the exact same technique. These techniques are based only on the number of animals observed and cannot account for, or measure, what is not observed. Relative abundance estimates or indices are the most common category of data collected for inventory and monitoring on natural areas.

Population estimates generally are conducted by trained staff and have strict sampling assumptions that must be met. These techniques measure both the animals observed and estimate the animals not observed during the sampling period. Examples include using distance sampling techniques and mark recapture techniques. Since actual population estimates are made, data are comparable to any technique that produces population estimates. Population estimates

will rarely be used and likely to be applicable only to regional properties and some clusters of natural areas such as the foothills region.

Prior to the start of any monitoring program, efforts will be made to determine if an existing protocol is in use by other conservation groups. Examples include Colorado Parks Wildlife monitoring efforts, Partners in Flight monitoring, Christmas bird counts, and the North American Amphibian Monitoring Protocol. If so, protocol will be followed thereby allowing for data collected on a natural area to be compared to existing data sets collected over several years and within a larger landscape. When established protocols are absent, consultation with other agencies or conservation organizations will be made and a protocol developed based on species, habitat type, and type of estimate desired (indices vs. direct estimate). Likewise, the City will consider information from existing biological inventories available at the regional scale (by partner agencies such as the Colorado Parks and Wildlife) to augment our understanding of local populations and prevent unnecessary monitoring projects.

Most inventory and monitoring protocol are based on visual and/or auditory survey techniques. However, certain wildlife species are difficult to detect using these types of surveys. Examples include animals that are nocturnal, species widely distributed in low densities (large predators), or secretive species. Disturbance of wildlife may also need to be minimized during certain times of the year (e.g., denning and nesting). Monitoring techniques will be tailored to the situation and based on consultation with other conservation professionals and groups. Examples of techniques to help increase observations include remote cameras, mist nets, acoustic detectors, scent posts, track plates, fur snags, trapping, and radio telemetry.

Inventory and Monitoring Wildlife Habitat and Wildlife Influences

It is often useful to collect data on potential wildlife habitat or on the influence wildlife has on the environment (e.g., overgrazing). Designing a program for either objective must be very specific to the focal species or issue. Implementing such a program will be highly dependent on available budget, staffing, and other resources. Similarly, assessment of ecosystem health is essential for managing sustainable habitat. Thus, efforts will be made to monitor soil stability, hydrologic function, biotic integrity, and other ecosystem components to ensure the long-term health of habitats within Fort Collins natural areas. Implementation of this monitoring will be dependent upon specific information needs and will vary in intensity both in terms of cost and scientific rigor. The list below details an example of monitoring intensity from least to most intensive:

1. Incidental observation by members of the public and field staff.
2. Rapid assessment techniques intended to gather limited data, including presence/absence surveys.
3. Short-term monitoring efforts designed to assess ecosystem health or restoration success.
4. Long-term monitoring efforts designed to assess ecosystem health or restoration success.
5. Implementation of statistically rigorous science experiment or observational study.

Indicator Species Monitoring

The Restoration Plan (2016 update) lists indicator species for each habitat type found on natural areas (Table 11.1). These species will be monitored in order to measure habitat restoration success. Surveys that are already conducted include bird surveys that detect indicators of grassland and riparian habitat quality, which are included in the table. This list is a culmination of expertise from Colorado Natural Heritage Program (CNHP), The Bird Conservancy of the Rockies, and the Natural Areas Department. Recommended indicator species for several plant communities are available in the CNHP Ecological System Descriptions and Viability Guidelines for Colorado (2005) and were adopted by the Natural Areas Department.

For restoration monitoring purposes, indicator species are those that are responsive to management actions and would signal change in habitat condition. Additionally, indicator species exhibit habitat requirements that are representative of other wildlife within that habitat type. Likewise, indicator species can be used to measure restoration success only if that species has the potential to be present on a restoration site and has a preference for the desired conditions. Urban habitats may not have the ability to host some indicator species, therefore the urban grasslands and Soapstone Prairie Natural Area grasslands are divided in the list below.

Table 11.1. Wildlife Indicator Species by habitat type and restoration zone (restoration zones are depicted in the 2015 Restoration Plan)

Wildlife Species or Group	**Urban Grasslands** Zone 2	**Foothill & Piedmont Grassland** Zone 3	**Ponderosa Pine** Zones 3,4	**Wetlands** Zones 1,2,3,5	**Riparian** Zones 1,2,3,4,5	**Soapstone Shortgrass Prairie** Zone 5
Vesper sparrow	X					
Lark sparrow	X					
Brewer's sparrow	X					
Cassin's sparrow	X					
Grasshopper sparrow	X					
Pygmy nuthatch			X			
Lewis's woodpecker			X		X	
Plumbeous vireo			X			
Long-billed curlew						X
Mountain plover						X
McCown's longspur						X
Short-eared owl						X
Ferruginous hawk						X
Prairie falcon						X
Golden eagle						X
Burrowing owl						X
Sora				X		
American bittern				X		
Virginia rail				X		
Green heron				X		
Gray Catbird					X	
Brown thrasher					X	
Yellow-breasted chat					X	

Yellow-billed cuckoo					X	
Eastern screech owl					X	
Arogos skipper		X				
Ottoe's skipper		X				
Crossline skipper		X				
Regal fritillary		X				X
Native prairie fish					X	
Short-horned lizard						X
Northern leopard frog				X	X	
Native prairie amphibians				X	X	
Preble's meadow jumping mouse					X	
Native small mammals	X					
Swift fox						X
Black-footed ferret						X
Pronghorn						X
Black-tailed prairie dog complexes						X

Wildlife Monitoring Prioritization

It is beyond available resources to monitor and inventory all wildlife native to Fort Collins and the region. Species of Interest, indicator species, or information needed to guide wildlife management actions could all be targets for monitoring. Some indicator species will be targeted for monitoring to gather information about restoration areas or potential restoration areas. Often, when organizations plan restoration projects, there are insufficient resources to conduct extensive monitoring to determine if objectives were met. Monitoring restoration areas before and after restoration action is an important component of adaptive management and will become increasingly important in the next decade.

Species of Interest may warrant further investigation to determine if they occur on natural area properties and presence/absence surveys may be considered when data gaps exist in areas that are believed to be suitable habitat. Suites of species that are lacking data include small mammals (rodents, shrews, moles) and bats. These animals are very secretive, but a better understanding of species present in specific locations could direct habitat management or protection. Furthermore, several small mammals and native bats are considered Species of Interest by the Department. These are just a few examples of species that monitoring will be expanded for in the near future. A new data collection method for incidental sightings of Species of Interest using I-pads, has also recently been developed. The data collection software allows staff to enter geo-referenced incidental sightings of Species of Interest or other species that are deemed important. This will allow species occurrences to be tracked in a centralized database and will assist in making management decisions related to these species.

Occasionally, a species may rise to the top of the priority list due to the need to better understand management options for that species. The potential for overgrazing and over-browsing by elk at Bobcat Ridge Natural Area is an example of a recent priority information need. Additional information is needed to determine if the herd is becoming resident rather than migratory and if resource damage is occurring due to the higher population present year round. The monitoring objective is to develop a baseline ahead of potential vegetation impacts. Mule deer and

pronghorn are also species that have the potential to increase under the right conditions and monitoring programs are in place at Soapstone Prairie Natural Area to guide management decisions. While priorities are likely to change over next decade, Table 11.2 lists current wildlife monitoring projects.

Table 11.2. Current Wildlife Monitoring

Species or Survey	Background and Purpose of Wildlife Surveys
Soapstone Prairie Grassland and Shrubland Birds	Grassland and Shrubland breeding bird surveys are conducted periodically on Soapstone Prairie. These surveys track Species of Interest and conservation targets for the natural area. Additionally, these surveys track the health of the grasslands and shrublands by detecting indicator species for these habitats.
Soapstone Prairie Pronghorn and Mule Deer	Surveys were initiated upon acquiring the property. A baseline count of pronghorn and mule deer was established to understand disturbance to these species that may be caused by recreation. Counts continue to be conducted periodically to monitor changes caused by recreation or other causes.
Soapstone Prairie Swift Fox	Swift fox are detected during night-time black-footed ferret spotlight surveys annually. Swift fox are also detected using remote cameras. This is a Species of Interest for the Department and a conservation target for Soapstone Prairie.
Soapstone Prairie Black-footed ferrets	Black-footed ferrets were released onto Soapstone Prairie and Meadow Springs Ranch beginning in 2014. Night-time spotlight surveys are conducted, at least annually, and any kits found are captured for vaccination. Ferrets are monitored in partnership with USFWS and CPW. Black-footed ferrets are listed as federally endangered.
Soapstone Prairie Northern Leopard Frogs	Northern leopard frogs are a Species of Interest for the Department and occur in two locations on Soapstone Prairie and Meadow Springs Ranch. To date, only presence/absence visual and auditory surveys have been conducted. Potential exists for a relative abundance study for this species on these properties. Understanding occurrence and relative abundance of this species will aid in management decisions regarding habitat protection and improvement.
Prairie Dogs	Prairie dogs are monitored annually on all natural areas where they occur. Urban prairie dog colonies are mapped annually to record the colony footprint and determine if any management actions are needed. On Soapstone Prairie and Meadow Springs Ranch, burrow density surveys and surface counts are also conducted in addition to mapping colonies to better understand quality habitat for black-footed ferrets.
Breeding Bird Survey (Foothills and Riparian)	Breeding bird surveys are currently conducted on foothills and Poudre River properties (alternating; two years Poudre River and two years foothills natural areas). The purpose of these surveys is to monitor riparian and grassland health and restoration success. Indicator species and Species of Interest are detected during these surveys.
Preble's Meadow Jumping Mouse	Preble's meadow jumping mouse surveys are scheduled for 2017 on Bobcat Ridge Natural Area. Detection of Preble's meadow jumping mouse in riparian areas could direct management actions to improve and protect habitat. Preble's meadow jumping mouse is listed as federally threatened.

Ponderosa Pine Indicator Species	Foothills breeding bird surveys include ponderosa pine habitats to detect ponderosa pine forest indicator species and establish a baseline in these areas. Bobcat Ridge ponderosa pine habitats were surveyed in 2016 as part of a larger breeding bird survey on the site. Gateway Natural Area ponderosa pine habitat has not yet been surveyed for indicator species. Ponderosa pine habitat will continue to be surveyed for indicator species as needed. This data may indicate if habitat improvement is needed on these sites; however, habitat quality may be heavily influenced by surrounding properties.
Bats	Some limited surveying for bats has been conducted on natural areas in the past (2001-2005). Surveys are currently scheduled for 2017 on regional properties and Kingfisher Point Natural Area. More information will be collected to understand species present, particularly Species of Interest, and habitat protection or management needed.
Raptor Monitoring	Raptor nests are monitored annually on natural areas. Raptors are indicators of environmental health as they are apex predators and a change in nest success of raptors could indicate a problem at a lower trophic level.
Native Amphibians	An acoustic amphibian survey was conducted in 2008 on 34 local natural areas. Currently, amphibian surveys are conducted on an as-needed basis in order to monitor a site before and after a wetland or riparian restoration project. There is potential to conduct another more extensive survey on local natural areas to detect occurrence of northern leopard frogs (listed as special concern in Colorado) or establish a baseline for other native amphibians.
Butterfly Indicator Species and Species of Interest	Initial surveys on foothills properties and Bobcat Ridge would aid in understanding species present and to establish a baseline of indicator species and species of interest. As restoration occurs, subsequent surveys can be conducted to detect success. Surveys would be beneficial anywhere Species of Interest can occur and could result in habitat protection and enhancement in areas where these species are detected.
Native Small Mammals	Initial monitoring on various stages of grassland restoration to understand species present and relative abundance is scheduled for 2017. Little information about small mammals present on natural areas grasslands is available and this important suite of species has the potential to direct management actions. Surveys may also detect Species of Interest.
Secretive Marsh Birds	Monitor secretive marsh birds (sora, American bittern, Virginia rail, and green heron) as needed to monitor restoration success and wetland function. These species typically represent one type of wetland habitat (cattail and bulrush) so it is understood that their presence should be accompanied by a suite of other water birds.
Native Prairie Fish	Native prairie fish can be used as an indicator of wetland, river, and riparian health. It is recommended that surveys be conducted, as needed, for specific projects or occurrence data. Fish species may be reintroduced to sites that are suitable but where native prairie fish are not currently present.
Native Reptiles	Currently no surveys are planned for snakes or lizards on natural areas properties. There is potential to document several Species of Interest if formal surveys are conducted, but currently these species are documented opportunistically using the Species of Interest data collection software. Of particular interest are locations for short-horned lizards.
Incidental Records of Species of Interest	Incidental sightings of wildlife Species of Interest on natural areas properties can be recorded using the new data collection software on I-pads. Occurrence data that is stored in a central location will aid in tracking species locations and habitat use and in making management decisions for habitat protection and improvement. Unusual species sightings or other species deemed important can also be recorded using this software.

Research

Many natural areas provide unique research opportunities especially to local university students and faculty. The use of natural area properties for research directly related to the Department's wildlife conservation information needs will be encouraged. Natural areas serve many purposes that include wildlife conservation and public participation in activities such as nature viewing and wildlife observation. In many cases, wildlife inventory and monitoring efforts can be combined with public participation and provide an opportunity for the public to gather wildlife related information. Natural Areas will, through outreach and education, encourage members of the public to participate in monitoring efforts.

General Strategies for Wildlife Conservation Research on Natural Areas

- ✓ Encourage the use of natural area properties for research directly related to the Department's wildlife conservation information needs.
- ✓ Encourage members of the public to participate in monitoring efforts through outreach and education.

Research: Wildlife Movement Patterns and Corridor Protection

The City of Fort Collins and surrounding areas have an extensive network of natural areas. In several cases, natural areas properties are directly adjacent to one another. However, properties are not frequently in direct contact with another natural area and at times may be isolated by urban development.

General Strategies for Future Research Related to Wildlife Movement & Corridor Protection

- ✓ Participate as a partner in the Colorado Parks and Wildlife's Front Range radio telemetry studies on mountain lion movement.
- ✓ Partner with agencies and academic researchers to gather data on important movement areas.
- ✓ Identify high use movement areas through telemetry, remote cameras, or other techniques. Develop conservation plans to conserve important connections.
- ✓ Identify potential movement barriers and identify possible solutions (additional land conservation, habitat modification, employ wildlife passage techniques such as drift fence/culverts).

Conclusion

Monitoring wildlife, their habitat and their influences can be extremely valuable for making sound management decisions. Extensive inventory or research, however, is not the primary objective of the Natural Areas Department and typically is beyond available resources. The high

costs and time required to gain useful information on any species prohibits monitoring numerous species and habitats. Therefore, monitoring will be prioritized, when possible in situations when it is likely to have an impact on management decisions.

Appendix A: Responding to Wildlife Emergencies (and other Wildlife Contacts)

For dead animals

Road Kill is most often observed in or near paved and dirt roads and the animal appears to have died from a traumatic event.

- Move the animal off of the road if possible, using a shovel or stick…Do not handle the animal with your bare hands**!**
- Moving the animal away from traffic will potentially reduce possible injury to wildlife scavengers

Suspious Circumstance are most often associated with trauma caused from an unnatural event, like malicious human behavior e.g., abuse or poaching.

- Do not handle the animal**!**
- Document observations and photograph if possible

Who to Contact:

- Colorado Parks and Wildlife 970-472-4300
- **After Hours** Contact: Colorado State Patrol 888-477-4328
- **If in Natural Area also** Contact a Natural Areas Ranger 970-416-2147

For Injured Animals

Injured Animals will display signs of trama associated with conflict from humans or other animals and is not always easy to determine.

- Do not attempt to approach or handle the animal**!**
- If you feel threatened or in danger call **911**
- Document observations and location

Who to Contact:

- Larimer Humane Society 970-226-3647
- **If in Natural Area also** Contact a Natural Areas Ranger 970-416-2147
- **After Hours** Contact: Colorado State Patrol 888-477-4328
- If raptor then contact Rocky Mountain Raptor Program 970-484-5889

Potential Disease

Animal often does not appear to be injured, however displays behavior that is not consistant with the species or out of character (e.g., wandering aimlessly and exposing itself to dangers it would normally avoid).

- Do Not Attempt to Approach or Handle the Animal.
- If You Feel Threatened or In Danger call **911.**
- Document Observations and Location.

Who to Contact:

- Larimer County Department of Health and Enivronment 970-498-7000

- **If in a Natural Area <u>also</u>** contact a Natural Areas Ranger 970-416-2147
- Colorado Parks and Wildlife 970-472-4300

Information on potential diseases to humans

- Center for Disease Control (CDC) phone 800-232-4636
  - Website: http://www.cdc.gov.
  - Web link regarding insect borne diseases: http://www.cdc.gov/ncidod/diseases/insects/diseases.htm

Appendix B: Key to Wildlife Species of Interest in City of Fort Collins Natural Areas

Colorado Natural Heritage Program (CNHP) Ranking (not a legal designation)	
Level	**Description**
G/S-1	Critically imperiled globally/state because of rarity (5 or few occurrences in the world/state; or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction.
G/S-2	Imperiled globally/state because of rarity (6-20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range.
G/S-3	Vulnerable through its range or found locally in a restricted range (21-100 occurrences).
G/S-4	Apparently secure globally/state, though it might be quite rare in parts of its range, especially at the periphery.
G/S-5	Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
GNR	Not yet ranked globally.
G#T#	Trinomial rank (T) is used for subspecies ranked on the same criteria as G1-G5.
S#B	Refers to the breeding season imperilment of elements that are not permanent residents.
S#N	Refers to the non-breeding season imperilment of elements that are not permanent residents. Where no consistent location can be discerned for migrants or non-breeding populations, a rank of SZN is used.
SZ	Migrant whose occurrences are too irregular, transitory, and/or dispersed to be reliably identified, mapped, and protected.
Notes: # represents rank (1-5). Where two numbers appear in a state or global rank (e.g., S2S3), the actual rank of the element falls between the two numbers.	

State/Federal Status (legal designation)	
Level	**Description**
SE	State Endangered--those species or subspecies of native wildlife whose prospects for survival or recruitment within Colorado are in jeopardy, as determined by the Colorado Parks and Wildlife (CPW).
ST	State Threatened--those species or subspecies of native wildlife which, as determined by the CPW, are not in immediate jeopardy of extinction but are vulnerable because they exist in such small numbers, are so extremely restricted in their range, or are experiencing such low recruitment or survival that they may become extinct.

SC	State Special Concern--species or subspecies of native wildlife which have been removed from the State threatened or endangered list within the last 5 years; are proposed for Federal listing (or are Federal listed "candidate species") and are not already State listed; have experienced, based on available data, a downward trend in numbers or distribution lasting at least 5 years which may lead to a threatened or endangered status; or are otherwise determined to be vulnerable in Colorado, as determined by the CPW.
E	Federal Listed Endangered--defined by the U.S. Fish and Wildlife Service as a species, subspecies, or variety in danger of extinction throughout all or a significant portion of its range.
T	Federal Listed Threatened--defined as a species, subspecies, or variety likely to become endangered in the foreseeable future throughout all or a significant portion of its range.

Colorado Parks and Wildlife (CPW) State Wildlife Action Plan (SWAP) listed or Colorado Natural Heritage Program (CNHP) tracking	
Level	**Description**
SWAP Tier 1	SWAP species are Species of Greatest Conservation Need as determined by CPW. Tier 1 species are a higher relative priority for conservation efforts than are Tier 2 species. Tier 1 species are of highest conservation priority in the state of Colorado.
SWAP Tier 2	SWAP Tier 2 species are species in which conservation is important in stalling population trends but the urgency for these species is considered less than for Tier 1 Species. See the CPW State Wildlife Action Plan for more detailed information on Tier1 and Tier 2 Species.
CNHP Full Tracked	For a species to be fully tracked it has the following ranks: (G1, G2, G3, G4 and G5) with the state rank combo of S1 or S2.
CNHP watchlist	CNHP maintains information on these species so that if a declining trend becomes apparent, watchlisted species can be changed back to tracked species in the database.
CNHP Partial Tracked	Partial tracking is used for more common plant communities in Colorado. Animals and plants are not typically partially tracked by CNHP.

Appendix C: Amphibians and Reptiles of Larimer County

Amphibians and Reptiles of Larimer County		
Amphibians		
Common Name	**Scientific Name**	**Reference**
Tiger salamander	*Ambystoma tigrinum*	H
Western toad	*Bufo boreas*	H
Great Plains toad	*Bufo cognatus*	*
Woodhouse's toad	*Bufo woodhousii*	H
Western chorus frog	*Pseudacris triseriata*	H
Bullfrog	*Rana catesbeiana*	RJW1
Northern leopard frog	*Rana pipiens*	H
Wood frog	*Rana sylvatica*	H
Plains spadefoot	*Spea bombifrons*	H
Turtles		
Common Name	**Scientific Name**	**Reference**
Spiny softshell	*Apalone spinifera*	*
Snapping turtle	*Chelydra serpentina*	H
Painted turtle	*Chrysemys picta*	H
Ornate box turtle	*Terrapene ornata*	*
Lizards		
Common Name	**Scientific Name**	**Reference**
Six-lined racerunner	*Cnemidophorus sexlineatus*	H
Many-lined skink	*Eumeces multivirgatus*	H
Lesser earless lizard	*Holbrookia maculata*	H
Short-horned lizard	*Phrynosoma hernandesi*	H
Prairie lizard / Plateau lizard	*Sceloporus undulatus*	H

Snakes		
Common Name	**Scientific Name**	**Reference**
Racer	*Coluber constrictor*	H
Western rattlesnake	*Crotalus viridis*	H
Western hognose snake	*Heterodon nasicus*	H
Milk snake	*Lampropeltis triangulum*	H
Smooth green snake	*Liochlorophis vernalis*	*
Northern water snake	*Nerodia sipedon*	H
Gopher snake	*Pituophis catenifer*	H
Plains blackhead snake	*Tantilla nigriceps*	H
Western terrestrial garter snake	*Thamnophis elegans*	H
Plains garter snake	*Thamnophis radix*	H
Common garter snake	*Thamnophis sirtalis*	H
Lined snake	*Tropidoclonoin lineatum*	*

* Indicates that, while the species has not been documented for the county, it may occur there (Reichard et al. 1996).

\# Indicates that, while at least one of the subspecies has not been documented for the county, two possible subspecies of the same species may occur in the county.

H Hammerson, G. A. 1986. Amphibians and Reptiles in Colorado. Colorado Division of Wildlife, Publ. No. DOW-M-1-3-86 131 pp.

RJW1 Wiese, R. J. 1990. Survey of the bullfrog along the Front Range and in eastern Colorado, 1989. Unpubl. rept., Colorado Division of Wildlife, Denver.

Appendix D: Bats Occurring on Fort Collins Natural Areas

Bats known to occur in the Fort Collins area. Information on conservation status and ecology on Fort Collins bats is from *Bats of the Rocky Mountain West* (Adams, 2003) unless otherwise noted.

Common Name	Conservation Status	Ecology
Western long-eared myotis (*Myotis evotis*)	Threat low for the eastern slope of Colorado	*This species picks insects off leaves and bark in dense vegetation. Roosts sites vary and are usually in rocky areas but also include hollow trees, loose bark, caves, mines, and abandoned buildings. Evidence of breeding in Colorado and likely migrates south in the winter.*
Little brown myotis (*Myotis lucifugus*)	Threat low on the eastern slope of Colorado but medium in western Colorado	*Uses a wide variety of day roosts and hibernates in caves and mines. Migration occurs between roost sites with high fidelity. Known to reproduce in Colorado but numbers have declined. Will also use bat houses.*
Fringed myotis (*Myotis thysanodes*)	Threat medium in central Colorado but high in western Colorado	*Very dependent on old growth forest conditions with cavity forming trees and snags for roosting at a density of 8 large snags per acre (Keinath, 2004). Maternity and hibernation sites can also include caves, mines, and buildings. Species is known to breed in Colorado. Maternity colonies are susceptible to human disturbance. Feeds just above the forest canopy.*
Long-legged myotis (*Myotis volans*)	Threat low for Colorado	*This species roosts in trees, rock crevices, stream bank crevices, and buildings. It feeds over and through forest canopies (ponderosa pine) and hibernates in caves and mines.*
Western small-footed myotis (*Myotis ciliolabrum*)	Threat low in eastern Colorado but medium in western Colorado	*This species roosts in rock crevices and beneath or between boulders. Associated with ponderosa pine/ Douglas-fir forests and along riparian/ grassland habitats*
Hoary bat (*Lasiurus*	Threat medium for the	*Solitary roosts in foliage of tree,*

cinereus)	Rocky Mountain range	*often 10-16 feet above ground at the edge of clearings. Reproductive females are rare during the summer in Colorado.*
Silver-haired bat (*Lasionycteris noctivagans*)	Threat medium for the Rocky Mountain range	*Solitary day roosts are under loose bark or in woodpecker holes, but it is not known to overwinter in Colorado. Maternity colonies are found in hollow trees. Woodland ponds and streams are important foraging habitat.*
Big brown bat (*Eptesicus fuscus*)	Threat low for the Rocky Mountain range	*Summer maternity colonies and male roost sites are found in buildings, barns, and bridges. The species hibernates in buildings, caves, mines, and rock crevices during winter months. Will also use bat houses.*
Townsend's big-eared bat (*Corynorhinus townsendii*)	Threat high for the Rocky Mountain range	*Summer maternity colonies are usually found in caves, mines, or buildings. They can hibernate alone or in small groups in the winter near cave entrances. Individuals show hibernation site fidelity. Uses mature forests for foraging and will not use early stage stands (Gruver and Keinath, 2006)*
Eastern red bat (*Lasiurus borealis*)	Threat medium for the Rocky Mountain range	*Rare in Colorado as its range is mostly the eastern U.S. In Colorado, it is found in riparian and urban woodlands and roosts on foliage during the day.*

Appendix E: Wildlife and Prairie Dog Management Public Engagement Results, August 10, 2016

This document includes an overview of the Open House and Forum that was held July 28, responses to questions posed there, as well as a list of online comments received through August 10.

More information is available at:

- Wildlife Management Guidelines proposed updates: www.fcgov.com/naturalareas
- Proposed Land Use Code updates: www.fcgov.com/planning

Open House and Forum Purpose and Format

The open house and forum's goal was to get input on proposed updates to policies and share the City of Fort Collins' philosophy for wildlife protection and management, with an emphasis on prairie dog management.

Poster stations (pdf) provided an overview of proposed changes to both the Natural Areas Wildlife Management Guidelines that impact public lands and the Land Use Code that regulates development on both public and private lands (Land Use Code posters pdf). A panel discussion provided information on prairie dog management (see below). The evening allowed time for participants to ask questions and share ideas with planners, as well as to provide feedback via comment forms. Participants were encouraged to submit additional comments at fcgov.com/naturalareas . While feedback is appreciated any time, comments received by August 10 are included here.

Prairie Dog Forum

The panelists included:

- John Stokes, City of Fort Collins Natural Areas Department
- Rebecca Everette, City of Fort Collins Planning Services
- Tina Jackson, Colorado Parks and Wildlife (CPW)
- Lindsey Sterling Krank, Prairie Dog Coalition of the Humane Society of the U.S.(PDC)

In their opening remarks, the panelists highlighted the following information:

CPW:

- Colorado is one of only 11 states with black-tailed prairie dogs. There is a significant range-wide effort to conserve them including CPW's goal to conserve 255,000 acres within the state. The state's plans are outlined in its 2003 Grassland Management Plan. The last survey that was done in 2006-2007 documented 814,000 acres of prairie dog colonies, which is well above the management plan goal. A new 2016 survey is underway.
- Researchers at CPW are working to develop a sylvatic plague vaccine.

- CPW is working with the US Fish and Wildlife Service and USDA National Resources Conservation Service (NRCS) to provide land owner incentives as part of black-footed ferret conservation efforts.

Prairie Dog Coalition:

- The Prairie Dog Coalition's mission is to help conserve prairie dogs as they have been in significant decline. The Coalition's main goal is to focus on prairie dogs with the largest conservation value such as larger, often rural, areas with contiguous colonies and associated species (Soapstone Prairie Natural Area is an example).They attempt to address potential conflicts with prairie dogs by developing non-lethal solutions such as working with adjacent land owners to prevent migration within buffers, redirecting prairie dogs, etc. The Prairie Dog Coalition has recently worked with the City of Fort Collins Natural Areas Department on a project to relocate prairie dogs from a private site in east Fort Collins to Cathy Fromme Prairie Natural Area.

City of Fort Collins Natural Areas Department:

- The Natural Areas Department's management approach includes conservation in the following contexts:
    - A regional context at the Soapstone Prairie Natural Area and Meadow Springs Ranch (property managed jointly with the Fort Collins Utility Department). The intent at Soapstone Prairie is to have 3,000-4,000 acres of prairie dogs (currently approximately 1,600 acres). Prairie dog colonies are being treated for plague in collaboration with CPW. The department's capacity to treat colonies for plague is about 3,000 acres a year.
    - Urban natural area sites host about 400 acres occupied by prairie dogs. These areas are more constrained, posing significant management challenges. For a historical perspective, in the mid-2000's drought caused a lot of problems when prairie dog grazing denuded the land creating areas prone to wind erosion and dust storms.
- The Natural Areas Wildlife Management Guidelines initially were adopted in 2007 and are now in the process of being updated. One significant change being proposed is that the city, under certain circumstances, could accept relocation of prairie dogs to Soapstone Prairie Natural Area.

Fort Collins Planning Services:

- The City is proposing updated land use code requirements related to prairie dog management on properties coming through the development review process. Two potential changes are to 1) eliminate the requirement that a private property must have at least a 50 acres or larger colony for additional protections and mitigation and 2)further restrict lethal management methods for development sites to carbon monoxide only (considered the most humane method and consistent with Natural Areas Department practice).

Forum questions and verbal responses

From your perspective, what is the most significant challenge in Fort Collins related to prairie dog management? 1) loss of habitat, especially in constrained urban areas where there are high densities of prairie dogs, 2) plague, which is a significant range-wide issue and may not be as relevant in smaller urban areas, and 3) interface between land with prairie dog colonies and other property owners.

How do you define suitable habitat? What are your goals for occupied acres?
Suitable habitat is grassland that would have traditionally supported prairie dogs excluding upland sites with rare plants, shrublands, wetland areas and grassland restoration areas. City of Fort Collins Natural Areas Department's intent is a 10-20% occupation of suitable habitat in natural areas.

Are the population numbers for all states set by USFWS a starting point? Is there any guarantee that these numbers will insure long term survival of species?
Colorado Parks and Wildlife's goal is 255,000 acres of prairie dogs statewide. The 2006 statewide survey found 814,000 acres of occupied colonies. In the 2016 survey, CPW will implement updated survey methods that should yield a more accurate count. CPW is also working on a sylvatic plague vaccine for prairie dogs and offers land owner incentives to maintain prairie dog colonies.

Describe the difference between CPW and the city's jurisdiction. States have management authority of wildlife species except for species that migrate over state lines or are threatened or endangered under the Endangered Species Act. Prairie dogs are managed by the state as a non-game, general species. Cities cannot be less restrictive, but can be more restrictive, than the state. Prairie dogs can be controlled on private lands by land owners. Those interested in relocation must go through a CPW permit process.

What are the proposed changes to Fort Collins' relocation policy? Could Soapstone Prairie be a relocation site? The Natural Areas Department got away from relocation in the 2000's because conservation goals were being met without relocation, prairie dogs were causing damage in urban natural areas, and relocation is an expensive, complicated process that requires a lot of labor and expertise. The Natural Areas Department is now proposing to consider prairie dog relocation at Soapstone Prairie under specific conditions. The Department's intent is to sustain 3,000 acres of active prairie dog colonies. Relocation of prairie dogs to Soapstone could occur if the population needed to be supplemented, and if required conditions were met including the presence of existing unoccupied burrows, and financing of all costs by private property owners or proponents.

How do you determine if a site is good for relocation? If/how does relocation impact prairie dog social structures? If you give prairie dogs food, shelter and their family structure, they won't leave an area. Replicating the layout of the colony is important to relocation success. Behavioral observations should be collected beforehand to understand family structures so that they can be recreated at the receiving site. Existing burrows are helpful on receiving relocation sites if used sooner rather than later because the tunnels can collapse with time. Existing burrows can make it more difficult to replicate the same burrow and family structure layout as the donating site. In order to prevent plague, it is often required that the take site and receiving site are both dusted with insecticide.

What are typical success rates for relocation? There is a lot of debate about success rates. The Prairie Dog Coalition does not collect data to measure its success rates.

How does a private property owner get started with relocation? The Natural Areas Department can provide advice on contractors that can relocate prairie dogs. The most significant challenge is finding a place to put them. Private property owners will have to get a permit from the state and follow the state protocols, which are listed on the CPW website. The Prairie Dog Coalition has a website with more information.

How much does relocation cost? What is the cost to developers or other private property owners? The Prairie Dog Coalition shared that relocation costs vary and a rough estimate is $100/ prairie dog. City of Fort Collins estimates $150 to $400 per prairie dog. For development properties, other mitigations could include on-site mitigation or payment into a bank that funds off-site mitigation. Mitigation costs have not been determined. Fumigation is typically under $10/burrow. The Prairie Dog Coalition and CPW have been working on an incentive program involving a habitat quantification tool to assess conservation net gain so property owners can purchase conservation credits.

How is the relocation of the Lemay Ave prairie dogs going?
The Prairie Dog Coalition reports that all but one nest box is being used which is a good sign. The PDC doesn't track success rates.

What is the future of prairie dogs at Cathy Fromme Prairie Natural Area? If the prairie dogs cross Taft Hill Rd, would you allow them to recolonize?
Natural Areas is seeing good population and relocation success. Staff will continue to watch and monitor the colonies. There are areas east of Taft Hill Road that host rare plants, quality grasslands and ecological restoration sites where prairie dogs will not be allowed. At this time there is only a small amount of available habitat east of Taft Hill Road on Cathy Fromme Prairie Natural Area.

Please provide more detail on the plague vaccine that is being developed. Could you describe the relationship between high density of prairie dogs and increase in plague cases? Plague is a disease transmitted by fleas onto prairie dogs and other species. Plague typically emerges in the summer. Flea density plays a role in the spread of plague; when there are higher numbers of fleas, plague tends to spread more rapidly. The more dense the burrows of the prairie dog colony are, the more rapid the spread of fleas carrying plague. Plague can kill an entire prairie dog colony. At the same time, plague may be present without effecting populations at all. CPW currently kills fleas by dusting colonies. It costs approximately $30/acre and lasts about 9 months. Research on a sylvatic plague vaccine is underway. The vaccine doesn't kill the fleas; it protects (inoculates) the prairie dogs. It is being tested at Soapstone Prairie and there have been positive results. CPW is currently ramping up production of the vaccine bait, with a goal of being able to treat 10,000 acres per year. Focus areas will be black-footed ferret conservation sites and Gunnison prairie dog sites in southern and western Colorado.

What is the prairie dog's experience when fumigation is used? Carbon monoxide is considered the most humane fumigant and is recommended as the only allowable lethal control for development sites in the update to the Land Use Code. Carbon monoxide is the only lethal control method used by the Natural Areas Department. Other fumigants are allowed on private property not undergoing development review.

What prairie dog education is currently available? The Prairie Dog Coalition has a goal of reaching 1,000 students per year using a wide range of strategies from puppet shows to presentations on college campuses. The Prairie Dog Relocation Group also is working on an educational video. CPW has an education section that does a lot to teach the public about grasslands, including a video. They've been doing a lot of education with private land owners related to black-footed ferret conservation and prairie dogs on their properties. The City of Fort Collins Natural Areas Department provided over 300 educational activities last year to 18,000 people, many of which focused on the shortgrass prairie ecosystem.

Are there opportunities to include Watchable Wildlife Areas as an educational tool? Fort Collins' City Council adopted a Nature in the City Strategic Plan which coordinates with multiple city departments. There are several natural areas around town that provide prairie dog viewing such as The Coterie Natural Area.

Additional Forum Questions

Due to time limitations, not all questions were addressed at the Forum. These additional questions were submitted on post-it notes.

Question/ Comment	Response
Please explain how the current relocation project was approved? By one person, by a committee, by the City Council? Why was there not a vote by the citizens near this site offered?	The relocation to Cathy Fromme Prairie Natural Area was approved by the City of Fort Collins Natural Areas Department and Colorado Parks and Wildlife after a public engagement process that included mailings to neighbors and Home Owner Associations within 1/8 mile of the natural area, a trailhead flyer, social media posts, a press release, an article in Natural Areas Enewsletter, posts on the Natural Areas Department webpage, listing on electronic event calendars, emails to City Council, City leadership, Land Conservation and Stewardship Board, and requests for feedback were mailed to Larimer County Commissioners, Larimer County Health Department, and US Geological Survey. An open house was held on April 19 and attended by 70 people. Comments were accepted at the Open House and online; 165 comments were received; 29 concerned, 5 no objections and 131 in support.
I recently read in the Coloradoan that policy toward the prairie dogs has changed from "management" (i.e. killing) to relocation. Please comment on the changes.	In the update to the Guidelines that is being proposed, lethal control will still be used, especially in urban natural areas where prairie dogs are near exclusion zones that host rare flora or fauna, are near residential developments or are in active grassland restorations. The Natural Areas Department's intent is to sustain approximately 10%-20% occupation of suitable habitat. Please note that occupation is only partly influenced by the City, independent factors such as climate and disease play a major role. In certain locations, occupation may be below or above these percentages. Only carbon monoxide is used for lethal management as it is the most humane method.

Question/ Comment	Response
So, if Soapstone Prairie Natural Area has 3,000 or less occupied acres of prairie dogs, other prairie dogs could be augmented or relocated into SSN?	In the update to the Guidelines that is being proposed, Soapstone Prairie Natural Area could be a relocation site under certain conditions.
City of Ft Collins has an active prairie dog program, but does Larimer County? Is anyone here from County Government?	No representatives from Larimer County were present to respond as the Forum was hosted by City of Fort Collins.
Are the intentions of the City and Larimer County to grow the number of acres of prairie dog colonies?	No representatives from Larimer County were present to respond as the Forum was hosted by City of Fort Collins. As noted above, the Natural Areas Department's intent is to sustain approximately 10%-20% occupation in suitable habitat. The City's ability to sustain these percentages depends on some factors outside of, or only partially, within its control (for example climate and disease).
What defines a "suitable habitat" for relocation near housing areas?	The City of Fort Collins Natural Areas Department requires a 300 foot buffer from residential areas.
Should there be another drought, what is the plan to protect the prairie grasses from over consumption by the prairie dog colonies? (Such as 2007 -2009 - has photos of Cathy Fromme)	The City of Fort Collins Natural Areas Department's intent to manage for a 10%-20% prairie dog occupation urban natural areas was set based on experience from the mid-2000's and accounts for drought conditions.
Will prairie dogs be added to the city's list of species of special concern?	The list is yet to be determined, future public outreach will include the opportunity to provide input on the species of concern list.

Question/ Comment	Response
Mitigation for developers is set at $900/acre of disturbed prairie dogs. Will that cost stay the same?	In one recent example, a value of $900/acre was required for mitigation of the loss of a prairie dog colony on a development site. However, mitigation requirements for various natural resources are determined on a case-by-case basis and depend on the value of the resource or habitat that is lost. The City of Fort Collins has not yet determined whether a set cost would be applied for the loss of prairie dog colonies, what the appropriate amount would be, and if other mitigation options may be allowable (e.g., relocation instead of eradication, on-site habitat enhancements for other species, etc.). The mitigation strategy will be finalized throughout this process, with ongoing opportunities for community input.
Could developers be forgiven paying mitigation if they agree to relocate?	The City is currently exploring this as a mitigation option for developers that could be used instead of other forms of mitigation (e.g., payment-in-lieu for habitat loss). Staff is supportive of this option as an alternative form of mitigation for the loss of prairie dog colonies assuming relocation sites can be found.
What other incentives could you give developers to use non- lethal means of controlling prairie dogs?	Options could include requiring contributions into a "bank" that funds prairie dog relocation or grassland restoration or allowing relocation in place of mitigation requirements. In some cases, prairie dogs may be able to persist on a portion of a development site that remains undeveloped, which may be encouraged by the City in some situations. In addition, the Prairie Dog Coalition is working on a habitat quantification tool to assess habitat value, if the tool were implemented in Fort Collins then conservation credits could be purchased, which could be another option for developers.
How many acres of prairie dogs are living on private lands in the city?	The Natural Areas Department has used aerial photography to determine that there are approximately 300 acres of prairie dogs on private lands within the City's Growth Management Area.

Question/ Comment	Response
Is Fort Collins doing anything to limit how much development is happening in the city?	In recent years, there has been significant population growth in communities all along the Front Range, including in Fort Collins - this is something that nearly every nearby community is dealing with. Growth and development in Fort Collins can be directly tied to the quality of jobs and quality of life within our community. The community's comprehensive plan, City Plan, provides guidance for how and where development should occur, and seeks to balance the values and priorities of our community with the private property rights of landowners. In addition, the City has established a fixed Growth Management Area to limit outward growth toward other communities. While the City cannot infringe upon the inherent rights of property owners to develop and increase the value of their properties, the City does have extensive regulations that restrict the type and character of the development that occurs. Community residents are strongly encouraged to participate at all stages of the development review process, as well as in long-range planning efforts, such as future updates to City Plan.
Are prairie dog den holes dangerous to livestock? Is there any conclusive data?	The Forum panel is not aware of resources to answer this question.
The City of Ft Collins kills the prairie dogs on their land by the dam off of Frontage Road of I25 and 392. Why do they do that?	This spot may be managed by North Poudre Irrigation Company (private land owner), or it may be Fossil Creek Reservoir Natural Area- we are not sure from the description. In the natural area, prairie dogs are lethally managed to maintain the current occupation rate and prevent erosion and overgrazing.

Written Comment Forms

A paper comment form was available at the Open House that asked:

- Please share your thoughts on the proposed Natural Areas Wildlife Management Guidelines
- Please share your thoughts on the proposed Land Use Code changes
- Any other comments?
- Are you a Larimer County resident? (circle one) Yes No
- How did you hear about this project?
- If you would like to stay involved as the guidelines and code are developed, please share your email address. We will only contact you about this project.

City of Fort Collins responses to the comments are below (comments are in bold, responses follow).

If you continue to allow the killing, make it the last choice. Have people relocate first and have regulations in place for public notices to give opportunity for rescue. We vote every year to fund our public land and we should be able to fund land for the prairie dogs.

This question applies to both operations by Natural Areas on public properties as well as development regulations applied to private lands:

Natural Areas is recommending relocation options as well as continued use of lethal control. Details regarding the proposed revisions to the Wildlife Management Guidelines are at fcgov.com/naturalareas.

Planning Services is recommending a number of changes to the Land Use Code that would require additional consideration and mitigation for prairie dog colonies that are impacted by development projects. If approved, these requirements may make relocation more attractive for some property owners and developers. However, it is important to recognize that relocating prairie dogs is significantly more costly and time consuming than eradication for a property owner or developer.

All proposed development projects, regardless of whether the contain prairie dog colonies, are required to post a notification sign on the property for the duration of the development review process. Additional information about these projects can be found at any time online at www.fcgov.com/developmentreview, or by contacting the Planning Services office directly.

It might be advantageous to develop a program which allows people to volunteer doing hands on conservation work in order to accomplish more without significantly increasing costs. I understand that there is a colony in town being relocated by volunteers. More of this grassroots type of involvement in conservation could go a long way.

Volunteers play an important role in wildlife relocations. Relocations also require the leadership of an experienced, professional wildlife management organization.

A recommendation: Look into cooperative management plans with private landowners. By collaborating and working with private landowners we have more power to persuade non-lethal management.

There are private landowners in Larimer County who have entered into agreements and incentive programs with federal agencies to conserve areas for the conservation of the black-footed ferret recovery. This typically involves protections of the ferret's habitat including prairie dog towns.

Biggest concern for developers is cost, so how will the city address this if non-lethal is more expensive compared to lethal control? One way to do this is for the city to offer some form of assistance. This has been done around the country, specifically with farmers and wildlife species. I cannot recall the name of the program, but I know it has had success as the farmer is essentially being rewarded for promoting healthy habitats and wildlife coexistence.

As noted above, the Natural Resource Conservation Service (NRCS) administers several federal programs that promote grassland-related conservation. The Natural Areas Department is not recommending that the City fund private conservation efforts for prairie dogs.

Fumigation is cheaper which is what causes this huge controversy in control and management. It's cheaper because application is quicker and more convenient than relocation costs. What if we raise the price of fumigation because not only is it painful for the animal, but potentially can be damaging to the environment (other wildlife could consume). This is a cost in itself although it's not presented by money. Like I mentioned earlier, offering a reward system/credit system for beneficial and healthy practices for the environment. (Also toxins could persist in environment causing more, indirect damage, risks to humans as well.)

The City of Fort Collins does not regulate cost of fumigants or cost of services in the private sector for lethal control. For two years now, the Natural Areas Department has used pressurized carbon monoxide gas that is the most humane and environmentally benign method for lethal management of prairie dogs. The City's Planning Services staff is proposing that developers be required to use carbon monoxide treatment methods rather than other fumigants. Planning Services is also proposing increased requirements for protection and/or mitigation for the loss of prairie dog colonies, which may make relocation more attractive for some property owners and developers.

Building a grasslands nature center and require schools to take a field trip there at certain age (kids are a great population to educate as they are excited and eager to learn – they are our future after all).

The Natural Areas Department has conducted a variety of prairie dog and grassland conservation education and outreach for more than 20 years. In 2015, over 300 educational activities reached 18,000 people. The City cannot require local school districts to incorporate mandatory field trips/etc.

Doing this could create revenue for grasslands management – with a focus on prairie dogs due to ecological importance. Education is huge; there are a lot of misunderstandings and confusion around the subject of prairie dogs.

The Natural Areas Department is the largest environmental education provider in Larimer County with a team of three full-time employees, three seasonal employees, and 1,800 volunteers. In 2015, over 300 educational activities reached 18,000 people. It has been our policy since our program's early days to provide free, high quality educational programming to local school districts and the community.

Soapstone already has black-footed ferrets, which are one of the most endangered mammals in North America, so there is already so much investment in a species that is a prairie dog obligate carnivore. Considering a wide array of tactics to support the grassland ecosystem that is of such conservation value at SSN is necessary. Restoring grasslands is a great endeavor that Ft. Collins is undertaking, but guidelines to determine when a restored grassland can be habitat for native species, such as btpd should be established. It says that it is unknown when btpd will be ok on restored grasslands. What's the point of doing habitat restoration if it is not to support CO native species?

Grassland restorations are conducted within the urban core of Fort Collins, not Soapstone Prairie. Urban natural areas often have widespread non-native plants, developed borders, and other stressors that make maintaining native prairie challenging within the city. The City's efforts to restore grasslands are making substantial progress: to date there are 1,700 acres of disturbed grasslands and former farmlands on their way to becoming native. These areas already support a myriad of native species, including declining bird species. Nevertheless, it will take time for these areas to mature to a point at which they are sufficiently stable to support heavy grazing by prairie dogs. At this time the City does not have specific criteria to determine when, or if, prairie dogs should be reintroduced to restored grasslands. Key decision factors include: presence/absence of other species of concern/interest; boundary conditions; climatic conditions; and, ecological objectives for all natural areas managed by the City.

If there is an educational program for the public to teach them the importance and need of prairie dogs, what/where is it advertised? What about utilizing say Public Radio?

For over 20 years the Natural Areas Department has provided educational material, field trips, and other efforts for both adults and children alike. Similarly, the Natural Areas Department has hosted professional field trips and workshops that focused on best practices in managing urban prairie dog towns. With limited budgets, public radio advertising/sponsorship is only used to promote large events and special occasions.

Very pleased that the City is opening up space to receive prairie dog relocations and changing LUC in consideration of prairie dogs. Would like to see more done to encourage and incentivize developers to relocate other than exterminate.

The City could encourage developers to relocate prairie dogs through regulatory incentives. For example, reducing or eliminating requirements for mitigation of the loss of a prairie dog colony in exchange for relocating the colony instead. The City can also provide information about relocation opportunities to developers who are interested in that approach. However, it is important to recognize that relocating prairie dogs is significantly more costly and time consuming than eradication for a property owner or developer.

Thank you for the dialogue and considering these wonderful creatures.

Thank you for your comment.

What can City do to persuade developers to relocate rather than exterminate prairie dogs?

The City could encourage developers to relocate prairie dogs through regulatory incentives. For example, reducing or eliminating requirements for mitigation of the loss of a prairie dog colony in exchange for relocating the colony instead. The City can also provide information about relocation opportunities to developers who are interested in that approach. However, it is important to recognize that relocating prairie dogs is significantly more costly and time consuming than eradication for a property owner or developer.

Is it possible to create an animal/wildlife sanctuary on private property? How large would the area need to be?

Yes, it is possible for the private sector to establish sanctuaries on private properties within the considerations of the City's Land Use Code. Financial resources and long-term stewardship would be required to ensure the health and sustainability of the land and wildlife.

As a Wildlife Biologist who understands the importance prairie dogs play in healthy ecosystems they should be equally valued by the city.

The City agrees that prairie dogs are an important component of urban and regional natural areas.

Ft. Collins should celebrate its keystone species such as prairie dogs – I find them endearing and the colonies are the main reason I bring my family members to visit Ft Collins!!

Great!

Fort Collins' Natural Areas Program serves as both a respected example to other cities looking to conserve local and regional natural areas as well as being a key factor in what makes Fort Collins such a special place to live. One of the most prominent assets of Fort Collins' natural areas is wildlife, which is an important part of Fort Collins' natural and cultural heritage. It is imperative that native wildlife be protected from exotic threats. Feral cats pose such a threat, and need to be kept from natural areas. Scientific studies show that, nationally, feral cats kill billions of native birds, mammals, reptiles, and amphibians annually.

Natural Areas agrees. Scientific studies document the devastating impact of feral cats on native bird populations.

(1). These numbers far exceed the take of native predators and are a significant factor in the decline and extinction of many native wildlife species. Even though many feral-cat supporting organizations desire feral cats to be considered protected wildlife, they are an

exotic species (2) and a major problem for wildlife management (3). Trap, Neuter and Release (TNR) programs, sponsored by some organizations, appropriately provide neutering, which helps prevent unwanted reproduction. Unfortunately, many feral cats are then returned to a harsh and cruel life in the wild, where they continue to kill native wildlife. Additionally, numerous scientific studies have shown that Trap, Neuter and Release fails to reduce population numbers (4). Feral and free-roaming cats contract diseases beyond those they have been inoculated against and are subjected to traffic and other accidents, harsh weather, attacks by wild animals and dogs, and human mistreatment.

Thank you for your comment.

We propose feral cats be trapped, neutered and adopted whenever possible, or if not adoptable, kept in an enclosed area where they can be provided food and water, shelter, veterinary care, regular waste removal, and safety (for both the cats and wildlife). Many animal and wildlife organizations oppose abandoning or returning cats to the wild, including The Wildlife Society, American Bird Conservancy, National Association of Public Health Veterinarians, National Audubon Society, and Fort Collins Audubon Society. Consistent with the City's current regulations protecting wildlife and against the release of cats into the wild, cats should be kept out of the City's natural areas. (1)The Impact of Free-ranging Domestic Cats on Wildlife in the U.S. Nature Communications 4, article #1396 (2) The Wildlife Society, Feral Cats: Impacts of an Invasive Species (3) Why American Songbirds Are Vanishing. Scientific American, 226:98-104 (4) Trap-Neuter-Release programs: the reality and the impacts. Journal of the American Veterinary Medical Association, 225:1369-1376. Submitted: Bill Miller, Ron Harden – Fort Collins Audubon Society Board Members

Current City Municipal code prohibits animals at large (see below).
Sec. 4-93. Animals at large prohibited.

(a) All pet animals, except birds, shall be kept under restraint. It shall be unlawful for the owner or keeper of any pet animal, except birds, to permit such animal to be at large in the City, with or without the owner or keeper's knowledge.

It's <u>refreshing</u> to see the City working <u>with</u> local and regional groups to find humane ways of dealing with prairie dogs. I was part of a group that tried very hard, 10 – 15 years ago and was rejected, lied to and deceived by City officials.

Thank you for your comment.

Prairie dogs are a natural part of the world – remove them and a whole ecosystem collapses. They can and always have co-existed with bison and other prairie animals.

Thank you for your comment.

Prairie dog colonies are much prettier than that horrid development.

Thank you for your comment.

Online Comment Form

A comment form was available at fcgov.com/naturalareas. The questions were:

- Please share your thoughts on the proposed Natural Areas Wildlife Management Guidelines
- Please share your thoughts on the proposed Land Use Code changes
- Any other comments?
- Are you a Larimer County resident? (circle one) Yes No
- How did you hear about this project?
- If you would like to stay involved as the guidelines and code are developed, please share your email address. We will only contact you about this project.

Comments received as of August 10 include:

I wholeheartedly support protecting prairie dogs in the city and requiring all developers to relocate prairie dogs. If relocation is not possible, humanely euthanizing colonies is the only acceptable way for developers to move forward with construction. At this point they are just digging right into colonies, which results in much suffering for these sentient beings. See above. I will also note that I find the city's lack of prairie dog protections to be very much at odds with what I see throughout town - e.g., the museum encourages protection and prairie dogs are painted on city property. It's hypocritical.
The requirement for a colony to be 50 acres or greater is just silly. The city should take every opportunity to promote and further conservation such as through relocation or fees for mitigation when habitat or colonies are destroyed for development. I agree with the proposed change of removing the 50 requirement. I also think that the 10-20% prairie dog occupation goal has its ups and downs. On one hand it provides a minimum goal to work toward but on the other hand, once that goal is met, it can be used as an excuse to do nothing when something should be done especially with black-footed ferrets in Soapstone. It might be advantageous to develop a program which allows people to volunteer doing hands on conservation work in order to accomplish more without significantly increasing costs. I understand that there is a colony in town being relocated by volunteers. More of this grassroots type of involvement in conservation could go a long way.
I think we need more land set aside for prairie dog relocation. I do not agree with lethal control and think we should show / teach compassion. I like the idea of a Prairie Dog Park I like many of the proposed changes as it moves us to consider more details, I do not agree that lethal control is the best way. I think we can come up with some great solutions without killing. If you continue to allow the killing, make it the last choice. have people relocate first and have regulations in place for public notices to give opportunity for rescue. We vote every year to fund our public land and we should be able to fund land for the prairie dogs.
A. Moving prairie dogs from private to public lands needs to be an option. If you don't allow this movement it will be too difficult for private landowners to find suitable properties. They'll choose the extermination option. Basically, we're signing prairie dog death warrants.

B. The City's proposal to increase the current 1500 acres allotted to prairie dogs in Soapstone and Meadow Springs Ranch to 3000 acres is great. I'd like to see this increased even more in the future.

A. The proposal to remove the current rule that lacks any protection or mitigation of impacts to prairie dog colonies less than 50 acres in size is much needed. These smaller colonies are viable, and the proposal that recognizes this is a good one.
B. Extermination options need to be removed completely. Regardless of how "humane" we try to frame it, the fact is it is still extermination and it's a lazy and cruel way to deal with matters. Fort Collins is on the brink of destroying many of our best assets through over development. We have to protect what makes our City special. We're already overloading our roads and green spaces with housing, traffic and overcrowding. We now have to search to find a small place where we can view our foothills, due to parking garages, stadiums and residential development. We'll never get that back. Preserving our wildlife, and the open spaces and land they need to survive, is more important than ever. If we don't, we're just another congested city that went for money over quality of life, with nothing unique or special about it.

I appreciate the systems-based approach that the City is taking in addressing not just prairie dogs, but also ferrets, bison, etc. as our Natural Areas, in order to be successful, will need to conserve entire systems -- not just a few animal species. A diverse mix of native plants and animals are an important part of any successful approach.
I enthusiastically support the City's proposal to eliminate the 50-acre minimum acreage for prairie dog colonies, understanding that smaller colonies are viable and serve an important role in preserving biodiversity. Prairie dogs are a keystone species and make possible the existence of many other species. Thank you for taking such an enlightened approach to this issue.
I think it's important, as we think about managing prairie dogs in Colorado, to keep in mind just how diminished prairie dogs' populations are from what they were naturally, and to also keep in mind that we're one of just a few states that still have prairie dogs in our midst. Because they're commonly seen locally, we can sometimes fall into a mindset of thinking of them as if they're a plentiful species, when in fact there are far fewer of them than might be ideal in a prairie ecosystem. The guidelines that are proposed do seem to acknowledge this, but as we make decisions going forward, it would be helpful to keep prairie dogs' small populations in mind when (as an example) we're faced with the choice between killing them (the quick, cheap choice) and relocating them (the more time consuming, more expensive choice.) Preserving this species, including adequate population numbers to keep its genetic diversity healthy, is important and we should think long and hard before killing any of them.