

CONSERVING AND RECOVERING BOULDER COUNTY MAMMALS OF SPECIAL CONCERN



4/21/16

Exploring the Systems Needed to Create Thriving Local Habitats

In Boulder County, there are 180 native animal species who are considered sensitive, endangered, or extirpated. This report takes a deeper look at 15 of Boulder County's mammals of special concern and investigates causes and solutions to the ever growing reality of species loss.

“The main thing is that you're showing up, that you're here and that you're finding ever more capacity to love this world because it will not be healed without that. That [is] what is going to unleash our intelligence and our ingenuity and our solidarity for the healing of our world.”

– Joanna Macy

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EXPLORING THE SYSTEMS NEEDED TO CREATE THRIVING LOCAL
HABITATS

ABOUT

Intention of Report

This report was written in collaboration with [Boulder Rights of Nature \(BRON\)](#) with the intention of highlighting sensitive, endangered, and extirpated mammals native to Boulder County, Colorado. The mammals listed are integral contributors to Boulder's vast and beautiful ecosystems. They each provide ecological services from which all species, including humans, benefit. For these reasons, and many more, this report has been written to provide the general public with basic biological information surrounding these animals, to explore the requirements for reintroduction of extirpated species, and investigate the general systems at play causing population decline and extirpation.

The information in this report was obtained from over a dozen personal interviews with community leaders and personal research. For questions about this report or if you have important information to add, please reach out to the developer, Hailey Hawkins, at haileyrenehawkins@gmail.com.

Boulder Rights of Nature

[BRON](#) is a community group whose mission is to establish legal rights for naturally functioning ecosystems and native species. BRON's statement of purpose is as follows: "It is our understanding that we are part of nature, not owners of nature; that living in balance with nature is essential for life, liberty, and well-being for all species; and that it is our responsibility to ensure that these naturally occurring ecosystems continue to exist and flourish within Boulder County; so that the benefits of biodiversity may accrue also to humans." BRON engages the Boulder community by attending public meetings to advocate for Rights of Nature and by informing the public through educational and awareness events. To learn more about BRON and to get involved, please visit boulderrightsofnature.org or email info@boulderrightsofnature.org.

Glossary of Terms

Sensitive: Species are considered “sensitive” if there is a significant downward trend in population numbers or habitat quality that would reduce population numbers¹.

Endangered: The species is in danger of extinction²; for the use of this report, “endangered” also indicates the species is considered federally endangered, meaning they are protected under the Endangered Species Act of 1973.

Extirpated: A species who no longer inhabits an area considered part of their historic range²

Native: Established in an area prior to European conquest (S. Jones, personal communication, February 17, 2016)

Home Range: The distance a species typically travels, outside of seasonal migrations, in the regular course of their life (S. Jones, personal communication, February 17, 2016)

Hibernaculum: A place where creatures hibernate (i.e. a cave, abandoned mine, or burrow); the plural form of this word is “hibernacula” (S. Jones, personal communication, February 17, 2016)

Riparian: A streamside area³

Coniferous Forest: Forest dominated by needle-bearing trees (e.g. Ponderosa pine forest) (S. Jones, personal communication, February 17, 2016)

Crepuscular: Active in the hours around dawn and / or dusk³

Diurnal: Active during the day

Nocturnal: Active at night

Buffer Areas: Designated area designed to protect home ranges of various species. Buffer areas are commonly placed between animal habitats and human activity or development (S. Jones, personal communication, February 17, 2016).

Carrying Capacity: The maximum number of a given species that an area can support without causing permanent damage (S. Jones, personal communication, February 17, 2016)

Stakeholder: Any group or individual being that would be affected by a particular outcome, including communities, the surrounding natural environment, and wildlife

Rights of Nature: “The legal recognition that humans are a part of, not apart from, the earth community. This movement embodies the principle that ecosystems and natural communities are not merely property to be owned, but are entities that have an independent right to exist and flourish. Rights of Nature honors the right of every member of the Earth community to fulfill, to its full potential, its role in the community of life.”⁴

Conversion reference: 1 square mile = 640 acres

1 Pivorunas, D. (2005, October 31). Forest Service Sensitive Species Summary. Retrieved February 15, 2016, from http://www.fs.fed.us/biology/resources/pubs/tes/ss_sum_by_region_31Oct2005_fs.pdf

2 Glossary. (2015, April 14). Retrieved February 15, 2016, from <http://www.fws.gov/Midwest/endangered/glossary/index.html>

3 Fitzgerald, J. P., Meaney, C. A., & Armstrong, D. M. (2011). *Mammals of Colorado* (2nd ed.). Denver: Denver Museum of Nature & Science.

4 The Need. (n.d.). Retrieved February 15, 2016, from <http://boulderrightsofnature.org/the-need/>

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Kitty Brigham (President)

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Michael Thomason (Treasurer)

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Dale Ball

Howard Witkin

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TABLE OF CONTENTS

ABOUT..... 2
 Intention of Report 2
 Boulder Rights of Nature 2
 Glossary of Terms..... 3

SPECIAL THANKS 4

MAMMAL SPECIES OF SPECIAL CONCERN 6
 Criteria for Choosing Mammal Species..... 6
 NOTE..... 6

SENSITIVE AND ENDANGERED MAMMAL SPECIES 7
 American Badger..... 7
 Townsend’s Big-eared Bat..... 8
 White-tailed Jackrabbit..... 9
 Canada Lynx 10
 Preble’s Meadow Jumping Mouse 11
 River Otter..... 12
 North American Porcupine..... 13
 Black-tailed Prairie Dog..... 14

EXTIRPATED MAMMAL SPECIES..... 15
 Grizzly Bear 15
 Bison..... 16
 Black-footed Ferret 17
 Swift Fox..... 18
 Pronghorn 19
 Gray Wolf 20
 Wolverine..... 21
 NOTE..... 22

HUMAN CAUSES OF EXTIRPATION AND SPECIES DECLINE 23
 Development & Fossil Fuels..... 23
 Recreational Trails 23
 Specific Agricultural Practices 24
 Habitat Fragmentation 24
 Our Worldviews..... 24

CHANGING OUR WORLDVIEW 25
 Education 25
 Policy 25
 Awareness 26
 Community Collaboration..... 26
 Rights of Nature 27

RESOURCES 28

MAMMAL SPECIES OF SPECIAL CONCERN

ANIMAL PROFILES

Criteria for Choosing Mammal Species

The mammal species below have been chosen based on [Boulder County Wildlife Species of Special Concern](#) – a report updated in 2013. Boulder County has designated these 15 mammals as either a 1, 3, or 7, meaning:

- “1. Species with Federal status (listed or proposed threatened or endangered, candidates for listing, or under review for listing) or State status (threatened or endangered) ...
3. Species that have undergone a documented long-term noncyclical population decline, or whose abundance is critically low relative to their expected abundance in a given habitat type or quality ...
7. Extirpated species that historically occupied and are native to Boulder County”⁵

According to the list, 64 new vertebrate species have been added and 37 vertebrate species have been removed from the list since 1994.

Much of the information below, unless otherwise specified, was obtained from:

Fitzgerald, J. P., Meaney, C. A., & Armstrong, D. M. (2011). *Mammals of Colorado* (2nd ed.). Denver: Denver Museum of Nature & Science.

and

Personal Interviews with Will Keely, Carron Meany, Steve Jones, Susan Spaulding, Michelle Durant, Beverly Baker, Mike Sherman, Jeff Thompson, Kristin Cannon, Jeff Davis, and Ava Hamilton

NOTE

Many of the animals listed below are either prey or predator of another animal listed. From this, we can see the system in motion. In general, as populations of a prey species decline, so does the predator species. On the other hand, as a predator species population declines, their prey species populations may temporarily increase; however, without the proper predation of weak and unhealthy prey individuals, over time prey populations may suffer from disease or whole populations can die off as a result of exceeding the carrying capacity of their immediate habitat. An example of this is the prairie dog population in Boulder County. Without proper predation, prairie dogs are given the opportunity to overgraze and sylvatic plague has swept through the colonies leading to a dramatic decline in an already nationally declining species. Although increased predation would not eradicate plague in prairie dog towns, it could help slow transmission as the ill prairie dogs would be more easily captured by predators.

⁵ Boulder County Wildlife Species of Special Concern. (2013, November 12). Retrieved February 8, 2016, from <http://www.bouldercounty.org/doc/landuse/bccp-wssc.pdf>

SENSITIVE AND ENDANGERED MAMMAL SPECIES

American Badger

DESCRIPTION

Criteria: 3

Recent Sightings: Confirmed sightings in Nederland and South Central Grasslands (S. Spaulding, personal communication, April 11, 2016)

Habitat: Grasslands, subalpine meadows and forests, alpine tundra, and semidesert shrublands

Food Source: They are considered “opportunistic predators,” meaning they will eat almost any prey they can capture. Common staples of their diet are mice, squirrels, prairie dogs, gophers, rabbits, snakes, lizards, insects, birds, and eggs.



SPECIAL THANKS TO PETER HARTLOVE

Home Range: Varies between 0.5 to 1 square mile; males have larger home ranges than females.

Mating Season: June to August; cubs are born the following March and April.

Predators: Few natural predators, but coyotes, domestic dogs, and golden eagles can kill young badgers

Unique Features: Badgers become more nocturnal in areas with high human activity.

CURRENT CONSERVATION EFFORTS IN BOULDER COUNTY

- Boulder County Parks and Open Space is *considering* doing snow track surveys for badger to get a better idea of their population numbers.

NEEDS FOR RESTORING POPULATION NUMBERS

- Initiate spotting programs, which involve placing wildlife cameras within prairie dog colonies.
- Add stronger language to Boulder County’s grassland management plan, explaining how we will study and eventually recover the American badger.
- Reduce fragmentation of existing grasslands by 50% by removing invasive trees, reducing the density of recreational trails, and implementing stricter boundaries for off-leash dog areas.

Townsend's Big-eared Bat

DESCRIPTION

Criteria: 3

Recent Sightings: There are reports of colonies west of Shanahan Ridge and Coffin Top Mountain (S. Spaulding & M. Durant, personal communication, January 14, 2016). These colonies *must* remain undisturbed by human presence.

Habitat: Semidesert shrublands, woodlands, and forests; they are often found in caves, rocky outcrops, and abandoned mines and buildings; they are very sensitive to disruptions and will leave a roost if human activity disturbs them.

Food Source: Insects, including moths and flies

Home Range: Rather sedentary; when feeding, they stay close to their day roost; they travel short distances between their hibernaculum and summer roost.

Mating Season: Late fall or winter; bat pups are born in May and June.

Predators: Most likely predators are birds of prey, raccoons, and snakes.

Unique Features: They are “late flyers,” meaning they leave the roost well after dark to hunt for food.

CURRENT CONSERVATION EFFORTS IN BOULDER COUNTY

- City of Boulder Open Space and Mountain Parks, Boulder County Parks and Open Space, the USDA Forest Service, and Colorado Parks and Wildlife (CPW) all report conducting bat surveys in abandoned mines and buildings before any kind of construction takes place. If a Townsend's big-eared bat is found during a survey, construction is delayed or special gates are installed which allow the bats to enter and exit safely.

NEEDS FOR RESTORING POPULATION NUMBERS

- Continue to monitor roost areas and enforce buffers around them.



PHOTO CREDIT: COLORADO BAT WORKING GROUP

White-tailed Jackrabbit

DESCRIPTION

Criteria: 3

Recent Sightings: Boulder County Parks and Open Space and the Boulder County Wildlife Inventory reported no white-tailed jackrabbit sightings on the plains of Boulder County from 2007 – 2015⁶.

Habitat: Prairie, alpine tundra, and open land

Food Source: Grasses and other vegetation

Home Range: Varies widely depending on access to food and other resources

Mating Season: Spring through summer; females can have 3 to 4 litters a year.

Predators: Coyotes, foxes, birds of prey, and humans

Unique Features: They are mostly crepuscular; the population decline is assumed to be a result of predation from coyotes and habitat loss due to human development.



SPECIAL THANKS TO STEVE JONES

CURRENT CONSERVATION EFFORTS IN BOULDER COUNTY

- City of Boulder Open Space and Mountain Parks are *considering* doing snow track surveys for white-tailed jackrabbit.

NEEDS FOR RESTORING POPULATION NUMBERS

- Initiate regular tracking surveys throughout the winter months on all Boulder County Parks and Open Space and Boulder Open Space and Mountain Parks grassland properties.
- Install wildlife cameras on grassland properties throughout Boulder County to track jackrabbit populations.
- Add stronger language to Boulder County's grassland management plan, explaining how we will study and eventually recover white-tailed jackrabbit.
- Reduce fragmentation of existing grasslands by 50% by removing invasive trees, reducing the density of recreational trails, and implementing stricter boundaries for off-leash dog areas.

⁶ Boulder County Audubon Society. 1978-2015. Monthly wildlife inventories. Data summaries available at www.boulderaudubon.org

Canada Lynx

DESCRIPTION

Criteria: 1, 3

Recent Sightings: There are few confirmed sightings – bobcats are often mistaken for lynx.

Habitat: Coniferous forests

Food Source: Snowshoe hare, grouse, squirrels, mice, beavers, muskrats, and occasionally young deer, moose, and caribou

Home Range: Highly variable; home ranges as small as 5 square miles and as large as 100 square miles have been observed.



PHOTO CREDIT: WILD EARTH GUADIANS

Mating Season: March to May; kittens are born about 9 weeks later.

Predators: Humans (fur harvesting) and occasionally gray wolves and wolverines

Unique Features: Nocturnal; they are mainly solitary, but they have been observed hunting cooperatively.

CURRENT CONSERVATION EFFORTS IN BOULDER COUNTY

- In 1999, the Colorado Division of Wildlife (DOW) reintroduced the lynx in the San Juan Mountains, which was deemed extremely successful⁷. It is believed that the lynxes in Boulder County may be descendants of the individuals reintroduced over 15 years ago.

NEEDS FOR RESTORING POPULATION NUMBERS

- Initiate lynx surveys in the high mountains of Boulder County.
- Actively conserve and protect **Environmental Conservation Areas** and migration corridors designated in the **Environmental Resources Element of the Boulder County Comprehensive Plan**.

⁷ DOW Declares Colorado Lynx Reintroduction Program a Success. (2010, September 17). Retrieved February 15, 2016, from <http://dowlegacyapps.state.co.us/newsapp/Press.asp?PressId=6650>

Preble's Meadow Jumping Mouse

DESCRIPTION

Criteria: 1

Recent Sightings: The St. Vrain Corridor and South Boulder Creek support the highest populations of Preble's meadow jumping mouse in Boulder County (S. Jones, personal communication, February 17, 2016).

Habitat: Riparian habitat

Food Source: Insects, seeds, fruit, and fungi

Home Range: Estimated at less than 1 acre; male home ranges are a bit larger than female home ranges.

Mating Season: Summer; females can have 2 to 3 litters per year.

Predators: Birds of prey, skunks, weasels, foxes, and badgers

Unique Features: They hibernate in winter. Contrary to concern, their population remained relatively stable after the 2013 floods.



PHOTO CREDIT: [COLOARDO NATURAL HERITAGE PROGRAM](#)

CURRENT CONSERVATION EFFORTS IN BOULDER COUNTY

- Both Boulder County Parks and Open Space and City of Boulder Open Space and Mountain Parks actively track populations through trap and release programs and actively participate in habitat improvement efforts in wetlands throughout the County. Both offices also incorporate the jumping mouse in all management plans.
- CPW conducts surveys for Preble's meadow jumping mouse.
- Private land owners are required to consult with U.S. Fish & Wildlife before making any alternations to riparian areas. Citizens can call and check with the [Army Corp of Engineers](#) to make sure a private property owner has consulted with them.

NEEDS FOR RESTORING POPULATION NUMBERS

- Expand habitat areas by removing invasive trees and promoting natural flooding of streams.
- Strengthen programs to educate the public about the negative consequences stemming from releasing trapped European mice onto open space properties.

River Otter

DESCRIPTION

Criteria: 1

Recent Sightings: Confirmed sightings at Walden Ponds and west of Peak to Peak highway (S. Jones, personal communication, February 17, 2016)

Habitat: Riparian habitats ranging from semidesert shrublands to subalpine forests; they require permanent, high quality water with significant and consistent water flow.

Food Source: Fish and crustaceans

Home Range: Averages about 20 miles

Mating Season: March and April; pups are born the following March or April.

Predators: They have few natural predators, but bobcats, coyotes, foxes, and domestic dogs have been known to kill otters.

Unique Features: Otters are very social and form family groups with an adult female as the leader; they are diurnal in winter and more nocturnal in summer.



PHOTO CREDIT: THE NATURE CONSERVANCY

CURRENT CONSERVATION EFFORTS IN BOULDER COUNTY

- City of Boulder monitors trail cameras for river otters.
- Boulder County Parks and Open Space is investigating the concept of increased in-stream flow to support water dependent species.
- CPW surveys for them on state and federal lands.
- Boulder County is considering doing more water quality monitoring programs.

NEEDS FOR RESTORING POPULATION NUMBERS

- Limit run off from agriculture by adding buffer areas between crop fields and water sources.
- Restore adequate stream flows in County rivers and streams by advocating for eliminating planting of bluegrass lawns throughout Boulder County, eliminating trans-mountain diversions of Colorado River water, and encouraging local municipalities to decrease their per capita water use by at least 30%.

North American Porcupine

DESCRIPTION

Criteria: 3

Recent Sightings: Populations are declining throughout the Western United States. There have been a couple of sightings since 2008 in Deer Canyon and around Coal Creek (S. Spaulding & M. Durant, personal communication, January 14, 2016).

Habitat: Subalpine forests and woodlands, and semidesert shrublands

Food Source: Foliage from shrubs and trees

Home Range: Approximately 35 acres

Mating Season: Fall and early winter; porcupettes are born in spring.

Predators: Mountain lions, black bears, bobcats, coyotes, and lynx; as a result of collisions with cars and extermination programs, humans are also responsible for many porcupine deaths.

Unique Features: Usually nocturnal, but can be seen at all times of the day



SPECIAL THANKS TO STEVE JONES

CURRENT CONSERVATION EFFORTS IN BOULDER COUNTY

- None

NEEDS FOR RESTORING POPULATION NUMBERS

- Little information is known about the current state of the porcupine in Boulder County. Determining porcupine population trends through the use of tracking surveys and installation of wildlife cameras is the first step.

Black-tailed Prairie Dog

DESCRIPTION

Criteria: 3

Recent Sightings: Although sightings are common in Boulder County, population numbers are historically low.

Habitat: Prairie dog “towns” are located in mixed prairie and shortgrass; prairie dogs have adapted to human presence and towns are commonly found in urban areas; town populations can range from a few to thousands.

Food Source: Grasses and other vegetation

Home Range: They usually stay within their towns, which increase or decrease depending on population trends and access to resources.

Mating Season: February to March; pups are born about a month later

Predators: Birds of prey, coyotes, badgers, foxes, bobcats, black-footed ferrets, and rattlesnakes; humans are the main agents of population control, as entire towns are commonly exterminated for agricultural and development interests in Boulder County and across the United States.



SPECIAL THANKS TO STEVE JONES

Unique Features: Prairie dogs are considered a *keystone species* because approximately 200 vertebrate species rely on prairie dog activities for their survival; they have one of the most complex uses of vocal communication in the animal kingdom; sylvatic plague threatens the vitality of their populations and an oral vaccination is in the process of being developed, which would decrease the need to dust colonies with pesticides.

CURRENT CONSERVATION EFFORTS IN BOULDER COUNTY

- City of Boulder and Boulder County map prairie dog colonies yearly.
- Boulder County Parks and Open Space is extending the dates for relocation from July 1st to October 15th annually. Previously, these dates were July 1st to September 15th⁸. If weather permits, the relocation timeframe can be extended at the discretion of staff.
- CPW surveys for them every 5 to 6 years. This year, 2016, CPW will do another survey, which will be contracted out to [Western Ecosystems Technology Consulting](#).

NEEDS FOR RESTORING POPULATION NUMBERS

- Halt all lethal control on Boulder County properties.
- Use landowner incentives, where feasible, to expand the areas of occupied prairie dog colonies.

⁸ Prairie Dog Management. (n.d.). Retrieved March 14, 2016, from <http://www.bouldercounty.org/os/openspace/pages/pdog.aspx>

EXTIRPATED MAMMAL SPECIES

Grizzly Bear

DESCRIPTION

Criteria: 1, 7

Extirpated Since: Exact date unknown

Habitat: Not bound by habitat restrictions

Food Source: 90% vegetarian diet which includes grasses, fruits, and roots; grizzly bears will also eat small mammals and occasionally elk, deer, and bison calves.

Home Range: Varies from 20 to 1000 square miles; daily movement can be over 5 miles

Mating Season: Spring and summer; cubs are born in January

Predators: Humans

Unique Features: Like the American badger, grizzly bears will become more nocturnal in areas with high human activity; grizzlies dig their own dens in the ground and go into hibernation in late fall and emerge in spring.



SPECIAL THANKS TO PETER HARTLOVE

CURRENT RECOVERY EFFORTS IN BOULDER COUNTY

- None

REQUIREMENTS FOR FUTURE REINTRODUCTION

- For the grizzly bear to thrive in Colorado again will first require a change in human perception.
- In 2000, the U.S. Fish and Wildlife Services announced they completed the planning stages for grizzly bear reintroduction in the Bitterroot Mountains, located in western Montana and central Idaho. After conducting an environmental impact assessment, the Service decided they would reintroduce “a minimum of 25 [grizzly] bears over five years into 5,785 square miles of wilderness area surrounded by more than 15,000 square miles of public land”⁹. Based on research of the Service’s website, it seems that this reintroduction has yet to take place; however, the information from the assessment is important for it outlines that over 20,000 square miles of contiguous habitat is necessary for the reintroduction of 25 grizzly bears.
- The Colorado National Forest, which extends through Boulder and Larimer Counties, is 828,744 acres (1,295 square miles)¹⁰. Reintroducing the grizzly bear would need to be a state-wide initiative.

⁹ Final Steps Completed for Plan to Reintroduce Grizzly Bear in Montana and Idaho. (2000, November 16). Retrieved March 11, 2016, from <http://www.fws.gov/mountain-prairie/pressrel/00-33.htm>

¹⁰ National Forests of Colorado. (2011, September 12). Retrieved March 11, 2016, from <http://www.foresthistory.org/ASPNET/Publications/region/2/colorado/sec2.htm>

Bison

DESCRIPTION

Criteria: 7

Extirpated Since: 1870

Habitat: Grasslands, mountain valleys, woodlands, and even alpine tundra

Food Source: Grasses and other vegetation

Home Range: About 20 square miles; free-ranging bison also make large migrations between the the warm and cold seasons.



SPECIAL THANKS TO PETER HARTLOVE

Mating Season: July to September; bull roaring is common during these months; calves are born in April through June.

Predators: Wolves and grizzly bears

Unique Features: Between 1830 and 1880, bison were practically eliminated in a military attempt by European settlers to suppress the Plain's Native Americans. The bison habit of grazing, dusting, and rolling in the mud disperse seeds for many plants and creates favorable habitat for black-tailed prairie dogs, black-footed ferrets, and other species. Bison are considered an agricultural species, not a wildlife species, meaning the Department of Agriculture manages them.

CURRENT RECOVERY EFFORTS IN BOULDER COUNTY

- None

REQUIREMENTS FOR FUTURE REINTRODUCTION

- In 2015, Larimer County, the City of Fort Collins, Colorado State University, and the U.S. Department of Agriculture collaborated to reintroduce 10 American Bison to Red Mountain Open Space and Soapstone Prairie Natural Area¹¹. The bison are in a 1,000-acre (1.56 square mile) area with special fencing that allows smaller wildlife passage while containing the herd. According to a [Denver Post article](#), the initial cost of the reintroduction project was approximately \$90,000 and they estimate annual expenses will be \$80,000 or more¹². Funding for the Laramie Foothills Bison Conservation Herd comes from donations and grants. Donations are accepted through Colorado State University and can be accessed at this [website](#).
- Boulder County has 103,118 segmented acres (156 square miles) of "protected land" that is reserved for public recreation, agricultural leasing, or is closed to the public for a variety of reasons, such as

¹¹ Laramie Foothills Bison Conservation Herd. (n.d.). Retrieved March 14, 2016, from <https://www.larimer.org/openlands/bison.htm>

¹² Simpson, K. (2015, October 30). Home (again) on the range: Purebred bison return to Larimer County. Retrieved March 14, 2016, from http://www.denverpost.com/news/ci_29048098/home-again-range-purebred-bison-return-larimer-county

habitat conservation¹³. Within that, the County owns 14,223 acres (22 square miles) of grasslands, which are currently being managed for “plant and wildlife habitat, livestock production, recreation, education and outreach, community buffers, [and] scientific investigation”¹⁴.

- Reintroduction of free-ranging bison (i.e. bison with limited restriction on wandering habits) in Boulder County would require tall fences to keep the bison from wandering onto highways and creation of bison underpasses near busy highways. As outlined later in this report, extensive fencing could endanger the prospect of reintroducing pronghorn to this area.

Black-footed Ferret

DESCRIPTION

Criteria: 7

Extirpated Since: Exact date unknown

Habitat: Mixed and shortgrass prairie; they excavate prairie dog dens to live in and raise young.

Food Source: Prairie dogs and sometimes small mammals, birds, insects, and lizards; there is no evidence that the black-footed ferrets can exist without prairie dogs; one ferret eats about 100 prairie dogs per year.



PHOTO CREDIT: THE NATURE CONSERVANCY

Home Range: About 100 to 150 acres

Mating Season: March and April in captivity; kits are born in May.

Predators: Coyotes, badgers, golden eagles, great horned owls, and domestic dogs; prairie dog poisoning campaigns also negatively effect and can kill ferrets.

Unique Features: They were thought to be extinct until 1981 when a group was discovered in Wyoming; since then, in-captivity breeding and reintroduction programs have been successful throughout the West. Pueblo, Larimer, Prowers, and Baca are among the counties in Colorado that have already reintroduced the black-footed ferret or are in the application process. Sylvatic plague is a concern, because the black-footed ferrets have no immunity to it, but as mentioned earlier, a new oral vaccine is in the process of being developed.

¹³ Acres of Open Space. (n.d.). Retrieved March 11, 2016, from <http://www.bouldercounty.org/os/openspace/pages/posacres.aspx>

¹⁴ Grassland & Shrubland Management Policy. (n.d.). Retrieved March 14, 2016, from <http://www.bouldercounty.org/os/openspace/pages/grassland.aspx>

CURRENT RECOVERY EFFORTS IN BOULDER COUNTY

- Boulder County Parks and Open Space is developing a plan to reintroduce the black-footed ferret by 2020.

REQUIREMENTS FOR FUTURE REINTRODUCTION

- Boulder County Parks and Open Space is looking to reintroduce the black-footed ferret by 2020¹⁵. For reintroduction to occur, 1,500 acres of occupied prairie dog habitat is needed. Potential areas in Boulder County that meet this criterion are Rabbit Mountain and a combination of Rocky Flats and the South Central Grasslands. For the highest success rate possible, they plan to introduce 20 females and 10 males (S. Spaulding, personal communication, January 14, 2016).
- Multiple black-footed ferret reintroductions have already taken place in Colorado, including: [Rocky Mountain Arsenal National Wildlife Refuge](#), [Soapstone Prairie Natural Area](#), and [private ranch land in Pueblo, CO](#).

Swift Fox

DESCRIPTION

Criteria: 7

Extirpated Since: Exact date unknown

Habitat: They are dependent on short and midgrass prairie.

Food Source: Prairie dogs, squirrels, white-tailed jackrabbits, birds, and insects

Home Range: About 7 to 11 square miles

Mating Season: December through February; pups are born from March to April.

Predators: Humans (fur harvesting and poisoning), coyotes, and eagles

Unique Features: They are excellent diggers and live in dens that often have multiple tunnels, entrances, and exits. Swift foxes live in pairs or sometimes trios (one male and two females). Bonds are strong between pairs and males help provide for pups.



SPECIAL THANKS TO STEVE JONES

CURRENT RECOVERY EFFORTS IN BOULDER COUNTY

- CPW surveys for swift fox every 5 to 6 years across their traditional range and they believe they are doing well state-wide. No recovery efforts are taking place in Boulder County.

¹⁵ Prairie Dog Management. (n.d.). Retrieved March 14, 2016, from <http://www.bouldercounty.org/os/openspace/pages/pdog.aspx>

REQUIREMENTS FOR FUTURE REINTRODUCTION

- 123 swift foxes were reintroduced on the Blackfeet Indian Reservation in Montana between 1998 and 2002. The Reservation is over 2,000 square miles of mostly grassland habitat. The foxes were reintroduced on a 12-square-mile, privately-owned ranch. In a journal article published in 2007, the reintroduction was deemed successful after a 14% growth rate was witnessed in 2005¹⁶.
- Boulder County owns and manages over 22 square miles of grasslands, which are currently being managed for “plant and wildlife habitat, livestock production, recreation, education and outreach, community buffers, [and] scientific investigation”¹⁷.

Pronghorn

DESCRIPTION

Criteria: 7

Extirpated Since: Exact date unknown

Habitat: Grasslands and semidesert shrublands

Food Source: Grass, cactus, and other types of vegetation; they are considered to be more selective than other grazing animals.

Home Range: Varies depending on the season and habitat quality; ranges from about 400 to over 5,000 acres (0.5 to 8 square miles), with winter home ranges being a bit smaller; they make seasonal migrations, but their movements seemed to be tied more to vegetation availability, rather than weather.



SPECIAL THANKS TO STEVE JONES

Mating Season: Fall; fawns are born from May to June

Predators: Humans (hunting), bobcats, coyotes, and golden eagles; accidental deaths caused indirectly by humans are common – pronghorns cannot jump and often get trapped in fencing and die.

Unique Features: Pronghorn can run up to 60 mph. Living in herds, they are highly social and make a variety of vocalizations.

CURRENT RECOVERY EFFORTS IN BOULDER COUNTY

- None

¹⁶ Ausband, D. E., & Foresman, K. R. (2007). Swift fox reintroductions on the Blackfeet Indian Reservation, Montana, USA. *Biological Conservation*, 136(3), 423-430. Retrieved March 11, 2016, from <https://cpw.state.co.us/Documents/WildlifeSpecies/Grasslands/Reintroduction2007final.pdf>.

¹⁷ Grassland & Shrubland Management Policy. (n.d.). Retrieved March 14, 2016, from <http://www.bouldercounty.org/os/openspace/pages/grassland.aspx>

REQUIREMENTS FOR FUTURE REINTRODUCTION

- According to two news articles, in late January of this year (2016), 52 pronghorns were relocated from northern Nevada to the **Colville Reservation** in Washington state. This area in north-central Washington is abundant in sagebrush^{18,19}, one of the pronghorns' food sources. Little other information concerning the requirements for this reintroduction can be deciphered from these articles.
- CPW believes that pronghorns are doing well state-wide. Perhaps more research is needed, not on how to reintroduce pronghorns, but how to create the habitat needed to attract and sustain them in Boulder County.

Gray Wolf

DESCRIPTION

Criteria: 1, 7

Extirpated Since: According to Fitzgerald et al (1994), no authentic records of wolf sightings exist past 1935 in Colorado, but unverified sightings have been reported.

Habitat: Not bound by habitat restrictions

Food Source: Elk, bison, deer, and mountain sheep

Home Range: Typically, between 30 and 5,000+ square miles, depending on the size of the pack; daily movements can be up to almost 10 miles per day.

Mating Season: January through April; pups are born approximately 2 months later from March to May; wolves mate for life.

Predators: Humans; they are often killed as a result of agricultural and ranching interests.

Unique Features: Gray wolves are highly social and live in hierarchical packs with the alpha male and alpha female at the top and the omega at the bottom. Pack size can vary from 2 to over 30 individuals.



SPECIAL THANKS TO HOWARD WITKIN

CURRENT RECOVERY EFFORTS IN BOULDER COUNTY

- None

18 Mapes, L. (2016, February 14). Colville tribes' risky bid: Bring back pronghorn antelope. Retrieved March 15, 2016, from <http://www.seattletimes.com/seattle-news/environment/colville-tribes-risky-bid-bring-back-pronghorn-antelope/>

19 Kramer, B. (2016, February 1). Pronghorn reintroduced to north-central Washington. Retrieved March 15, 2016, from <http://www.spokesman.com/stories/2016/feb/01/pronghorn-hunted-to-extinction-in-the-1900s-are-re/>

REQUIREMENTS FOR FUTURE REINTRODUCTION

- Like the grizzly bear, for the gray wolf to thrive in Colorado again will first require a change in human perception. As individuals, we need to advocate strongly for CPW to reverse their stance against reintroduction of wolves into Colorado. We need to ask the Boulder County Commissioners to advocate for this change of policy.
- The famous wolf reintroduction at Yellowstone National Park (3,472 square miles) began with 8 wolves in January of 1995²⁰. Based on their [website](#), Yellowstone officials estimated that in 2014 there were over 100 wolves in 11 packs that live primarily in the park²¹. According to wildlife biologists, the wolves have drastically changed the ecosystem for the better: songbird, beaver, and bear populations increased; elk populations became healthier; and with native vegetation no longer being overgrazed by elk and deer, the banks of rivers stabilized²². Wolves increased the life in Yellowstone National Park. [Defenders of Wildlife](#) report that during the past two decades in the northern Rockies, only 1% of livestock has been lost due to wolves²³.
- There is over 20,000 square miles of National Forest in the state of Colorado; however, these forests are fragmented²⁴.

Wolverine

DESCRIPTION

Criteria: 1, 7

Extirpated Since: Prior to 2009, when the tagged wolverine called M56 wandered into Colorado from Grand Teton National Park, the last reported sightings in Colorado were in 1919²⁵.

Habitat: Forests and tundra

Food Source: Roots, berries, rabbits, squirrels, birds, eggs, fish, and porcupines

Home Range: Varies between 35 and 250 square miles; males typically have larger ranges than females

Mating Season: Spring to fall; kits are born the following March through April.



PHOTO CREDIT: WILD EARTH GUARDIANS

20 20 Years of Wolves Back in Yellowstone. (n.d.). Retrieved March 16, 2016, from <http://www.yellowstonepark.com/20-years-after-wolves-reintroduction/>

21 Wolf Management. (n.d.). Retrieved March 16, 2016, from <http://www.nps.gov/yell/learn/nature/wolfmgnt.htm>

22 Wolf Reintroduction Changes Ecosystem. (n.d.). Retrieved March 16, 2016, from <http://www.yellowstonepark.com/wolf-reintroduction-changes-ecosystem/>

23 Stone, S. (2015, January 12). Reintroducing Wolves to Yellowstone & Idaho: The 20th Anniversary. Retrieved March 16, 2016, from

<http://www.defendersblog.org/2015/01/reintroducing-wolves-yellowstone-idaho-20th-anniversary/>

24 National Forests of Colorado. (2011, September 12). Retrieved March 11, 2016, from

<http://www.foresthistory.org/ASPNET/Publications/region/2/colorado/sec2.htm>

25 CPW Supports Decision to Withdraw Proposed Wolverine Listing. (2014, August 13). Retrieved March 16, 2016, from

<http://cpw.state.co.us/aboutus/Pages/News-Release-Details.aspx?NewsID=4916>

Predators: Humans and occasionally wolves

Unique Features: Mostly nocturnal and solitary, except for mating seasons

CURRENT RECOVERY EFFORTS IN BOULDER COUNTY

- None

REQUIREMENTS FOR FUTURE REINTRODUCTION

- In 2013, CPW was considering reintroducing the wolverine back to Colorado; however, the federal decision to not protect the wolverine under the Endangered Species Act shifted the trajectory of the reintroduction²⁶. The Colorado Division of Wildlife, which became CPW on June 6, 2011, estimated that “Colorado has the potential to support approximately 100 [wolverines] at full carrying capacity. Because the animal needs large areas of cold, rocky habitat, the vast majority of land where the animal would live occurs on high-elevation public lands”²⁷. A study conducted by Lucas Danzinger from the University of Minnesota concluded that there is a large amount of potential habitat for wolverines in Colorado; however, some habitat fragmentation is present from major roadways and development²⁸.

NOTE

Generally, City of Boulder Open Space and Mountain Parks, Boulder County Parks and Open Space, and the USDA Forest Service focus on habitat management, while CPW does wildlife management. According to CPW’s [website](#), moose were reintroduced in Grand Mesa beginning in 2005. For this reintroduction to take place, community members approached CPW with a proposal to re-establish the moose in 2001. Deliberations were held internally and externally, which gave way to a habitat assessment to determine if the landscape could sustain a new moose herd. After receiving public input, CPW approved the reintroduction and 91 moose were reintroduced between 2005 and 2007²⁹. Although, CPW’s formal reintroduction process may vary from species to species, this short account may offer us a bit of insight into the process.

26 Webb, D. (2014, August 13). Wolverine ruling causes shift for Colo. reintroduction idea. Retrieved March 16, 2016, from http://www.gjsentinel.com/special_sections/articles/wolverine-ruling-causes-shift-for-colo-reintrodu

27 Colorado Division of Wildlife - Wolverines. (2010, December 10). Retrieved March 16, 2016, from <https://cpw.state.co.us/Documents/WildlifeSpecies/SpeciesOfConcern/Mammals/Wolverineoverviewhandout.pdf>

28 Danzinger, L. J. (n.d.). Using GIS to Examine Potential Wolverine Habitat in Colorado: An Analysis of Habitat Fragmentation and Wildlife Corridors. Retrieved March 16, 2016, from <http://www.gis.smumn.edu/GradProjects/DanzingerL.pdf>

29 Moose Reintroduction Program - Grand Mesa. (n.d.). Retrieved March 8, 2016, from <http://cpw.state.co.us/learn/Pages/MooseReintroductionProgram.aspx>

HUMAN CAUSES OF EXTIRPATION AND SPECIES DECLINE



PHOTO CREDIT: DAILY CAMERA

Many different human-made systems are having lasting affects on habitats and wildlife. After more than a dozen interviews with government officials and local community leaders, common threads formed that brought clarity into some of the systems causing species decline in Boulder County. Some of these explanations are obvious, others are not, and there are more yet that are not discussed below.

Development & Fossil Fuels

Residential and industrial development and fossil fuel mining are the greatest contributors to habitat loss in the Front Range (M. Sherman, personal communication, January 25, 2016). The northern Front Range is the fastest growing area in the county. As more people come to enjoy this wonderful area, more resources are needed to sustain the way of life we have all become accustomed. Many of the species listed previously are dependent on prairie habitats, which in Boulder County are now fragmented by commercial development, housing, and transportation infrastructure.

Reflection: How can we meet our personal needs without jeopardizing the needs of our local ecosystems?

Recreational Trails

Our love of nature can actually harm nature. Increased human and domestic dog presence on recreational trails often disrupts wildlife activities and further segments and erodes land. According to [The Boulder Convention and Visitors Bureau's website](#), Boulder Mountain Parks has approximately 2 million visits every

year³⁰. This is great for economic development, but takes a huge toll on the land and local species. Local agencies are constantly looking for the sweet spot within the concept of “balancing conservation and recreation.”

Reflection: How can we challenge the idea of “balancing conservation and recreation” and instead create a system that enhances conservation of native ecosystems and their native species populations while also enhancing recreational opportunities?

Specific Agricultural Practices

As mentioned earlier, irrigating agricultural lands from drainage areas has had a negative impact on river otter habitats, as a result of a decrease in water flow and an increase in tainted run off back into the drainage areas. This practice has also negatively affected the Preble’s meadow jumping mouse: “Doubtless such practices as gravel mining and converting natural wetlands into irrigation reservoirs over a century of agricultural, industrial, and residential development have had seriously negative impacts on populations.”³¹.

Reflection: How can we support our local, organic farmers and ensure our native species have the resources they need to flourish?

Habitat Fragmentation

As a result of housing and commercial development, transportation infrastructure, large scale fencing, recreational trails and more, habitat fragmentation has become a real challenge for species that migrate seasonally and have large home ranges, such as the gray wolf, pronghorn, and other extirpated species.

Reflection: As Boulder County continues to grow, how can we develop responsibly with all stakeholders in mind?

Our Worldviews

Our collective worldview has created the society we live in today. The above causes of species decline are the result of how our society sees the “beyond-human” (i.e. natural) world. Some of us may feel that sacrificing our needs and wants is the only way to save these struggling mammal species. Others, however, may feel that there is no sacrifice. In fact, perhaps the only way to heal ourselves is by healing the natural world around us.

Reflection: How can we expand our worldviews to include all plants, animals, and landscapes?

30 Boulder Trivia. (n.d.). Retrieved March 1, 2016, from <http://www.bouldercoloradousa.com/about-boulder/boulder-trivia/>

31 Fitzgerald, J. P., Meaney, C. A., & Armstrong, D. M. (2011). Order Rodentia. In *Mammals of Colorado* (2nd ed.) (pp.189). Denver: Denver Museum of Nature & Science.

CHANGING OUR WORLDVIEW



SPECIAL THANKS TO STEVE JONES

In order for us to change our current trajectory and halt species loss, we must change the way we interact with the beyond-human world. We must incorporate an awareness that everything on our planet is interconnected. Many different strategies exist to change our societal worldview. A few are below:

Education

Changing how we educate ourselves and our children is a fundamental step toward creating the future we want for generations to come. Keeping ourselves informed about local issues and demanding transparency from government offices is critical to understanding the current systems that are continually threatening local species and habitats.

We can promote a culture of understanding and deep respect for this land and its original keepers by educating ourselves and our children about Native American history and Boulder County's First Nations, which includes the Arapaho, Ute, Cheyenne, Comanche, and Sioux, according to the brief description on the City of Boulder's [website](#)³². As parents, we can ensure that our schools include the history of this land at all levels within the curriculum.

Policy

Some of the above extirpated mammals may never live in Boulder County again. Habitat fragmentation and dense human population in this area may not allow the space and resources needed for these larger mammals. What can we do to ensure that they thrive in other parts of Colorado? Alternative policy options include requiring developers to donate a certain amount per acre to go into an extirpated species habitat

³² History of Boulder. (n.d.). Retrieved March 14, 2016, from <https://bouldercolorado.gov/visitors/history>

fund that could be used to help expand acreages of national grasslands, U.S. Forest Service lands, and private preserves where these species are being reintroduced.

Another example would be “requiring that Boulder County Parks and Open Space, Boulder Open Space and Mountain Parks, and other agencies include recovery plans for all locally extirpated vertebrate species in their area management plans. In the recent [North Foothills Trail Study Area Plan](#) released by Boulder Open Space and Mountain Parks, there was virtually no mention of white-tailed jackrabbits, black-footed ferrets, or any of the other vertebrate species recently extirpated from that area” (S. Jones, personal communication, March 3, 2016).

As individuals, we can also challenge the concept of “balancing conservation and recreation.” The recreational activities that Boulder County is famous for are dependent on healthy, flourishing ecosystems. Prioritizing conservation over recreation, is not a sacrifice; in fact, it is the best long-term economical solution. By reducing off-trail hiking; limiting off-trail wandering dogs; and reducing habitat fragmentation, which will also improve trail routing; we can easily do both.

Awareness

Being mindful of consequences can drastically change the choices we make daily. As mentioned earlier, recreational trails and other outdoor activities can harm local habitats and disrupt native species. Our love for nature can actually harm nature. We can be conscious about which trails we choose to hike by researching local species’ mating, migrating, feeding, and hibernation patterns, to ensure we will not disturb the creatures whose lives depend on these activities. For more information about the habits of Boulder’s native species, check out [Wild Boulder County: A Seasonal Guide to the Natural World](#), by Ruth Carol Cushman & Stephen Jones.

Many animals are experiencing a decrease in access to food as a result of land development. Interestingly, the environmentally responsible act of growing our own food is actually attracting animals. Reports of mink, fox, and bobcats preying on chickens; bears harvesting from domestic bee hives; and deer eating from gardens account for a portion of Boulder’s reported human-wildlife conflicts (K. Cannon, personal communication, Jan. 29, 2016). We can take the proper precautions to keep our personal harvests safe and also advocate for development that considers the needs of our wild neighbors.

Community Collaboration

We are stronger as a community. By getting involved with local environmental and wildlife organizations, we are directly benefiting our local ecosystems and their inhabitants, including humans. Some of Boulder and Colorado’s local groups with a focus on wildlife include: [Boulder Rights of Nature](#), [Boulder County Audubon Society](#), [Boulder Wolf Pack](#), [Colorado Native Plant Society](#), [Prairie Dog Coalition](#), [Community Fruit Rescue](#), [Bee Safe Boulder](#), [Greenwood Wildlife Rehabilitation Center](#), [Wild Earth Guardians](#), [Wildlands Restoration Volunteers](#), [Rocky Mountain Chapter of the Sierra Club](#), and many more!

Rights of Nature

Boulder County's Species of Special Concern List is a great tool we can use to see which animals are currently sensitive, endangered, or extirpated; however, local and state listings, such as this, don't bring with them any special protections. Only a species classified as federally endangered, under the Endangered Species Act of 1973, has rights and protections. Sensitive and state-threatened animals have no legal rights to exist. Rights of Nature holds the promise of changing this dated perception.

Rights of Nature refers to “the principle that ecosystems and natural communities are not merely property to be owned, but are entities that have an independent right to exist and flourish. Rights of Nature honors the right of every member of the Earth community to fulfill, to its full potential, its role in the community of life. Rights of Nature does not eliminate property ownership, but seeks to eliminate the authority of a property owner to destroy, or cause substantial harm to, natural communities and ecosystems that exist and depend upon that property.”³³

“The fundamental tenet in the Rights of Nature movement is that all naturally occurring ecosystems and their native species populations have the right to exist and flourish. Based on that belief, not only do we not have the right to extirpate native species, but we have the legal responsibility to restore any species that we extirpate” (S. Jones, personal communication, March 3, 2016).

Including Rights of Nature within our legal infrastructure has the potential to change the way we develop and protect wildlife and ecosystems in Boulder County. For more resources about Rights of Nature and to get involved with BRON and help establish legal Rights of Nature in Boulder, check out their [website](http://boulderrightsofnature.org) or email info@boulderrightsofnature.org.



SPECIAL THANKS TO STEVE JONES

³³ The Need. (n.d.). Retrieved February 15, 2016, from <http://boulderrightsofnature.org/the-need/>

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