



# Colorado Parks and Wildlife



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# Eldorado Canyon State Park

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## Stewardship Plan – Public Version

April 16, 2020



Prepared by:  
**Collective Ecological Consulting, LLC**

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GREAT OUTDOORS  
COLORADO

This stewardship plan was developed as a reference to facilitate the protection and care of the natural resources within the parks. The material in this document is intended solely to provide insight and recommendations to assist park management with more effectively managing and preserving the quality of the Park resources. This document was created for internal purposes only and was not created for public review or scrutiny. Actual Park policies will be identified in the Park **General Management Plan** and may or may not include any or all of the information, or recommendations, provided in this plan.

Thanks to the following agencies for providing GIS data and research: Colorado Natural Heritage Program, Division of Water Resources, Colorado Geological Survey, Colorado Department of Transportation, United States Fish and Wildlife Service, Bureau of Land Management, and the United States Geological Survey, Environmental Protection Agency. The stewardship project team extends its appreciation to all staff members at Eldorado Canyon State Park for contributing to this project.

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Jared Polis, Governor



Dan Gibbs, Executive Director



Dan Prenzlw, Director

*Mention of trade names or commercial products does not constitute their endorsement by the State of Colorado.*



## Executive Summary

The goal of the **Stewardship Project** is to pursue a better understanding of the nature, extent, and condition of the natural resources within, and adjacent to, each Colorado State Park. Coupling that understanding with effective stewardship practices will help to sustain those resources. The **Stewardship Plan** is a comprehensive document of findings, along with a body of useful appendices, which is provided to Park management as a resource to help identify appropriate goals, guidelines, and potential threats to the Park resources, as well as recommended measures to help protect precious Park resources. Through this process, we can continue to provide recreation opportunities to visitors in a natural setting.

### **Significant Natural Resources**

The most significant **vegetation community and rare plant** resources are:

- Riparian areas, especially along South Boulder Creek that are important for wildlife habitat, erosion and flood control, and water quality.
- Four rare plant communities and two historical rare plant occurrences have been documented in or in the vicinity of the Park. Several other species have the potential to occur in the Park.
- A large quantity of the Park's vegetation is in excellent condition and can be found in all three parcels of land.

The significant **wildlife and rare animal** resources include:

- The perennial flow of South Boulder Creek provide aquatic, wetland, and riparian habitat for several taxa including fish, amphibians, birds, and mammals.
- Several raptor species have been observed in the Park including golden eagles, that have been documented to use the cliffs for nesting.
- The sensitive mammal species, Preble's meadow jumping mouse, has been documented outside of the Park in the past. Habitat for the species exists within the Inner Canyon and Crescent Meadows parcels.
- The Park contains excellent bird diversity, including over 82 species being documented. A CNHP listed species, ovenbird, was documented in 2019.

The Park contain habitat for the federally-threatened mammal, Preble's meadow jumping mouse.



Source: CPW

The **water resources** at Eldorado Canyon State Park are also important features of the Park, including:

- South Boulder Creek supports several fish species, as well as species of macroinvertebrates, which improve water quality and are an important link in the food chain.
- The rich riparian soils along South Boulder Creek have high water storage potential, which can reduce the risk of detrimental flooding downstream.

- Water, wetland, and riparian areas provide important habitat for wildlife as well as game fish species.

The other main geophysical features at the Park, the **soils and geology**, include:

- A variety of soils provides, in concert with different local geologic units, a variety of substrates for upland and wetland plant communities and therefore associated wildlife species.
- Wetland soils act as a filter between surface and groundwater and these soils play a key role in trapping sediments that would otherwise enter South Boulder Creek and other drainages in the Park.
- The canyons and mountains of Eldorado Canyon State Park record a remarkable portion of the Earth's geologic history. The cliffs and slopes provide excellent exposures of rocks that enable us to unravel the complicated geology of the area

There are also several **cultural/historical resources** at the Park, including:

- Native American tribes once inhabited the area and frequented Eldorado Canyon.
- European settlement of the land resulted in the construction of the railroad that is now the Fowler Trail, the construction of the Moffat Road rail line and its current operation, and the Eldorado Springs Resort in the early 1900's.
- The Park has a rich and long history of rock climbing.

## **Stewardship Goals and Objectives**

Based on the current natural resource assessment of Eldorado Canyon State Park, as well as likely staff and financial resources, we recommend the following goals to serve as the basis land management actions at the Park.

### **Vegetation**

Preserve and protect native vegetation communities by sustaining healthy structure and promoting native species growth.

**Objective:** Improve the condition of existing plant communities, including forests, grasslands, shrublands, riparian forest, and emergent wetlands. Create or improve habitat for rare plant species and communities. Prevent the establishment of noxious weed species that are not already present in the Park and contain, suppress, or eradicate occurrences of other noxious weeds present in the Park, as appropriate for each species. Control the spread and presence of cheatgrass in the Park employing control actions that do not materially harm other Park resources. Protect vegetation in high-traffic areas (and revegetate with native species if necessary) to decrease bare areas susceptible to erosion and invasion by weeds.

**Actions/Plans/BMPs:** Restore non-native grassland communities with native species seed mixes provided in this plan. Restore emergent wetlands to provide better habitat for rare amphibians. Protect sensitive wetland and riparian communities. Continue to implement the Noxious Weed Management Plan from 2019 and aggressively control noxious weeds. Avoid future development and disturbance in sensitive areas such as wetland and riparian communities and near rare plants. Monitor coniferous forests for disease and pests and continue to implement the Forest Management Plan from 2017.

**Monitoring:** Continue monitoring vegetation at designated monitoring vegetation plot points every five years. Monitor noxious weeds annually and note any increases in severity of infestations or new infestations. Monitor for disease and pests in forests.

## **Wildlife**

Preserve and protect existing wildlife populations that use the Park and improve habitat to increase use by a variety of species.

**Objective:** Maintain habitat for sensitive species and associated habitats. Restore areas that could provide habitat for sensitive wildlife species and monitor for their presence. Continue to provide habitat for other wildlife species that use all habitats within the Park, including upland, wetland, riparian and aquatic areas. Coordinate with adjacent landowners to provide connected landscapes for wide-ranging species.

**Actions/Plans/BMPs:** Control and reduce the spread of noxious weed species in order to maintain and improve wildlife habitat quality by implementing the Noxious Weed Management Plan recommendations. Minimize resource degradation by closing and revegetating non-designated (social) trails that have developed, which impact sensitive habitat areas such as wetlands and riparian zones. Update or conduct new surveys for species that could occur in the Park or have historically been documented, such as Mexican spotted owl, Preble's meadow jumping mouse, bat species, amphibians, breeding and migratory birds, and rare insects.

**Monitoring:** Monitor raptor nests, amphibians, reptiles, and butterflies to ensure populations are healthy and viable.

## **Wetlands and Waters**

The wetlands and waters in the Park are locally and regionally significant and are important for plants and wildlife, maintenance of high water quality, and recreational opportunities.

**Objective:** Improve the water quality of South Boulder Creek by implementing monitoring programs for erosion and sedimentation. Restore and maintain riparian vegetation along South Boulder Creek. Remove noxious weed species from wetland and riparian communities.

**Actions/Plans/BMPs:** Delineate and assess wetland and waters conditions to ensure all water resources are accurately documented within the Park. Control and reduce the spread of noxious weed species in order to maintain and improve riparian and wetland habitat quality by implementing the Noxious Weed Management Plan recommendations. Discourage use of social trails in riparian areas near South Boulder Creek.

**Monitoring:** Monitor shoreline erosion along South Boulder Creek by using established protocols. Monitor erosion during construction activities to ensure water resources are not being damaged by sedimentation.

Douglas-fir Tussock Moth is a pest that affects Douglas-fir trees. It has not been previously documented in the Park but could occur in the future. Monitoring for the presence of forest pests is critical for keeping Park vegetation healthy.



Source: Rocky Mountain Forestry, LLC.

## **Geology/Soils**

The geology and soils are regionally significant in that several unique rock features exist within the Park. The soils are highly susceptible to erosion and care and maintenance are necessary for sustaining the resource.

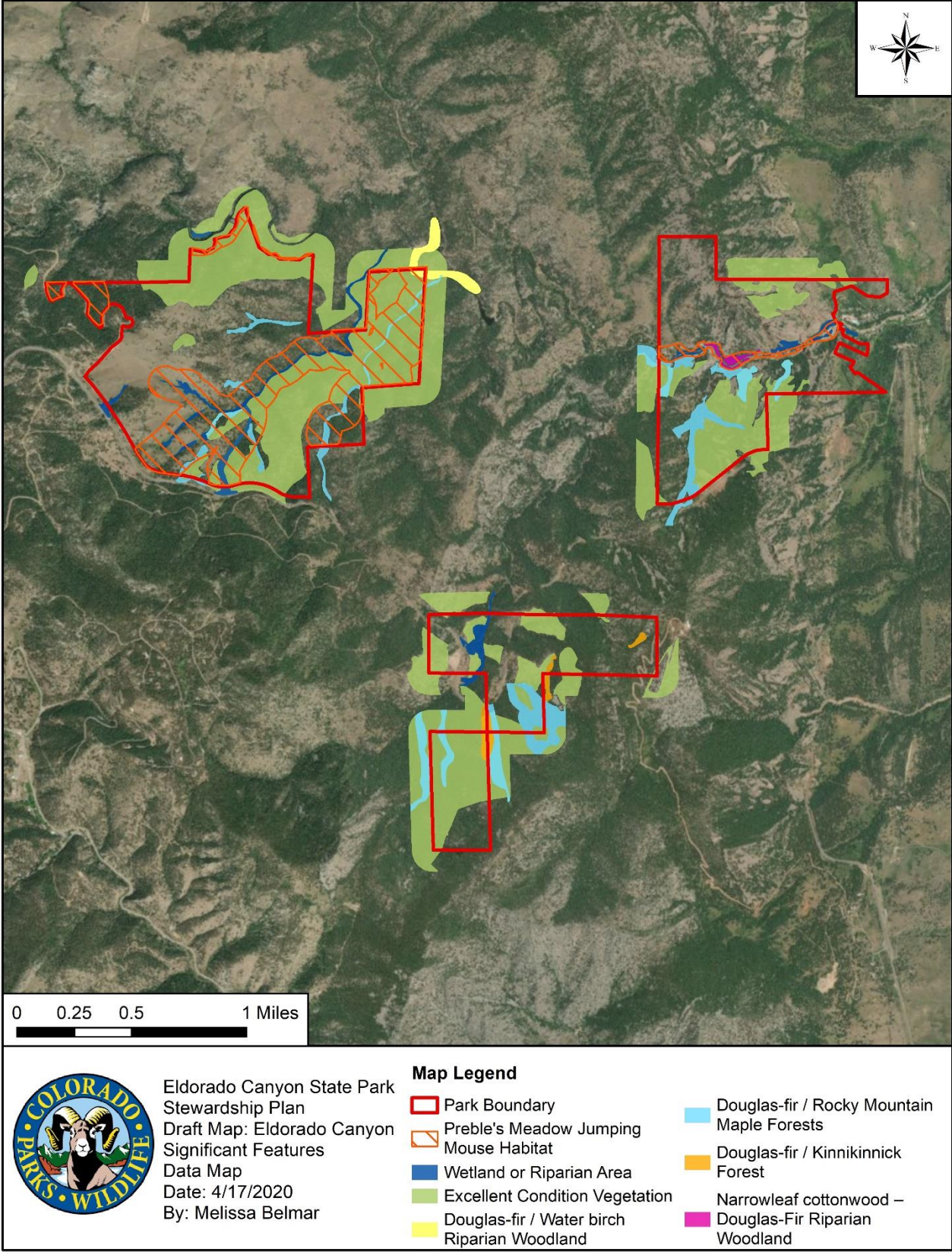
**Objective:** Manage soil erosion on trails and near other developed areas caused by increased visitation. Maintain hydric soils (and associated wetlands and riparian areas) in their current undeveloped condition, with all new recreational facilities located out of wetlands and riparian areas. Maintain a sufficient cover of living plants and plant litter on upland areas to minimize soil erosion.

**Actions/Plans/BMPs:** Trails should be carefully planned and well-engineered prior to construction in order to best prevent soil erosion. Minimize resource degradation by closing and revegetating non-designated (social) trails.

**Monitoring:** Monitor erosion during construction activities to ensure geological resources and soil are not being damaged by development. Monitor trail erosion through photo documentation.



**Figure 1.** Significant Features at Eldorado Canyon State Park.





## **Introduction**

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### **Purpose and How to Use this Plan**

The *Stewardship Project* is a committed and cooperative effort by a team of individuals within Colorado Parks and Wildlife and contracted professional consultants outside the agency to develop a document to assist each Park with the best possible management of our natural resources. The team is tasked with identifying the nature and extent of the natural resources each Park and developing guidelines to facilitate a better understanding of these resources and providing suggestions for short-term and long-term management. The process includes examining each natural resource through field work and research, through collecting GIS data. Advice is provided to the Park staff in the form of a clear set of resource objectives, and a list of actions to try to meet these objectives, and then a monitoring plan to observe trends over time.

The goals and objectives should be carefully reviewed and edited by the Park manager and then incorporated into the general management plan. This integration of specific resource objectives into the governing document of the Park is key to ensuring the sustainability of the resources and making this plan into a working document. This plan will be updated by the stewardship section every five years, but the Park staff can clip in changes into the three-ring binder or make changes to the document during that interim period in order to keep it up to date.

The actions, plans, or studies will require significant money and time to implement, and so they are prioritized. The Park staff then should turn these lists into a long-term budget and a set of work priorities for each year. It is hoped that the Park staff will be able to accomplish many of these recommendations over a five-year period. Also, the stewardship staff may be able to help line up some academics or agency people to accomplish some of the studies for plans for low cost. It may also be possible to get grants to address some of the issues. The resource stewardship section intends to perform the more complicated and costly resource monitoring every five years, such that this is not a burden on the Park budget.

The detailed appendices to this plan should help Park staff address particular resource issues, the resource descriptions and the GIS maps should be helpful for interpretive and planning uses, and the monitoring information should be detailed enough for the Park to organize some volunteer monitoring of certain aspects of the resource issues.

### **Mandate for the Stewardship Process**

This Stewardship Plan is to help guide management for a State Park. This is the basis of the stewardship process and is mandated by the definition of a State Park in Colorado. According to the Colorado Revised Statute 33-10-102 (23):

**A State Park is defined as ‘having outstanding scenic and natural qualities and often containing significant archaeological, ecological, geological and other scientific value so as to make imperative the preservation of the area by the Division of Parks and Outdoor Recreation for the enjoyment, education and inspiration of residents and visitors.’**

Along with the definition of a State Park, the 2015 Colorado Parks and Wildlife (CPW) Strategic Plan guides the direction of the stewardship plan (CPW 2015a). CPW summarizes the current management goals of the State Park system in the new Strategic Plan. The mission for State Parks is:

**“To be leaders in providing outdoor recreation through the stewardship of Colorado’s natural resources for the enjoyment, education, and inspiration of present and future generations.”**

The agency-wide CPW Strategic Plan was created after the Division of Wildlife and the State Park system were merged into Colorado Parks and Wildlife in 2011. The 2015 CPW Strategic Plan outlines Colorado Parks and Wildlife’s mission, vision statement, goals, and objectives. This Plan presents a roadmap and understanding for where CPW is headed in the future. The Plan specifically outlines six major goals:

- Goal 1 - Conserve wildlife and habitat to ensure healthy sustainable populations and ecosystems.
- Goal 2 - Manage state parks for world class outdoor recreation.
- Goal 3 - Achieve and maintain financial sustainability.
- Goal 4 - Maintain dedicated personnel and volunteers.
- Goal 5 - Increase awareness and trust for CPW.
- Goal 6 - Connect people to Colorado’s outdoors.

Goal 2 specifically relates to the management of State Parks and the stewardship plan process. Within Goal 2, three Objectives with strategies have been identified. Objective A states that CPW is to, **“Manage facilities and outdoor recreation amenities within state parks to provide positive experiences for Coloradans and visitors.”** Under Objective A, five strategies have been identified. Strategy 2 addresses Stewardship Plans and states that CPW is responsible to:

**“Develop and implement Park stewardship plans to enhance natural resources at State Parks.”**

## **Goals and Objectives of the Stewardship Project**

### **Goals**

- To provide direction for the protection of natural resources into the foreseeable future.
- To provide the appropriate tools to Park staff for effective conservation of natural resources.

## **Objectives**

- Compile a comprehensive knowledge base including existing resource information and field data on boundaries, wildlife, soils, water, wetlands, geologic and paleontological resources, and vegetation, including rare plants and noxious weeds.
- Summarize the current conditions of a Park's natural resources and define a desired future condition for each resource.
- Identify specific impacts, influences, and threats to the natural resources.
- Provide a prioritized set of management recommendations and suggestions for Park staff, consultants, or other agencies to conduct specified work over a five-year period.
- Outline specific resource goals and objectives to apply over the next five years, which may be incorporated into the next general management plan to ensure protection of resources.

## **Terminology and Elements of Stewardship**

The State Parks Stewardship Project planning process is based on the National Park Service planning handbook and The Nature Conservancy's planning process. Key state Parks employees adapted those processes to Colorado State Parks. Both agencies examine a Park's resources as separate components and as part of a holistic ecosystem affected by interrelated issues and threats. The three major components of the State Parks process are a Baseline Resource Assessment, a Stewardship Plan, and a GIS. The staff of the Resource Stewardship Section within CPW is completing a stewardship plan for each state Park to serve as a guiding document for comprehensive resource management.

### **Baseline Resource Assessment**

To effectively manage the natural systems, each Park must be aware of the significant resources present. Several baseline resource inventories have been conducted over the last decade to document wildlife, plant, cultural, geological, and paleontological resources in the Park.

### **Stewardship Plan**

The stewardship plan is an effort to synthesize existing information about the Park's resources and incorporate new data collected during the Baseline Resource Assessment. Resource element descriptions provide current and desired future conditions of the Park's natural resources. The plan also provides prioritized management recommendations to protect these natural assets. In five years, a new stewardship plan will be necessary to update goals and objectives and to address current issues.

**This Stewardship Plan is a summary of findings by the Stewardship Team. For detailed reports, assessments, protocols, and prescriptions, please refer to the accompanying Appendices notebook.**

### **Stewardship Recommendations**

Recommendations are prioritized and are provided in several forms:

- **Actions** – These are measures that Park management can complete immediately without further planning. For example, “Post signs mark property boundaries on newly acquired parcel.” Implementation should follow the guidelines suggested in the “Best Management Practices,” which are state-of-the-art techniques that limit impacts to natural resources.
- **Resource Management Plans** – These recommendations address more complex issues and require more time, money, and expertise than is available under this project. However, the

stewardship plan does evaluate the plan's priority in relation to other needs, suggests parameters, and recommends appropriate agencies or contractors to complete the process.

- **Management Prescriptions** – Where time and budget allow, more detailed management strategies will be provided. Prescriptions are generally 3-20 page documents detailing specific management actions to address a situation that may occur at several Parks. For instance, “How to manage prairie dogs on state Park lands,” or “How to control Canada thistle (*Cirsium arvense*).” Several prescriptions are provided as appendices, but some require additional research and will be supplied to the Park at a later date.
- **Monitoring** – An important focus of this stewardship process is to create monitoring processes that evaluate the health and condition of resources over time. This is a critical component of decision making for maintenance procedures and new development projects. The stewardship plan suggests areas to be monitored, explains the protocol, and suggests appropriate personnel for the task. Utilizing GIS for organizing, storing, and analyzing the monitoring data is highly recommended.

## **Using GIS for Resource Management**

The use of GIS by Park staff is a vital component of this stewardship process. GIS is a computer-based mapping tool with powerful database capabilities for viewing, tracking, and planning over time. Large amounts of information can be displayed on a map and linked to tables of descriptive information, such as maintenance and monitoring data or detailed graphic imagery. For example, using GIS to track noxious weeds within the Park allows one to see patterns of weed distribution over time. Projecting future scenarios, planning of a new trail to the cost of a new fence, and observing trends in resource condition are all easier to realize with the help of GIS.

## **Park Purpose and Significance**

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### **Description**

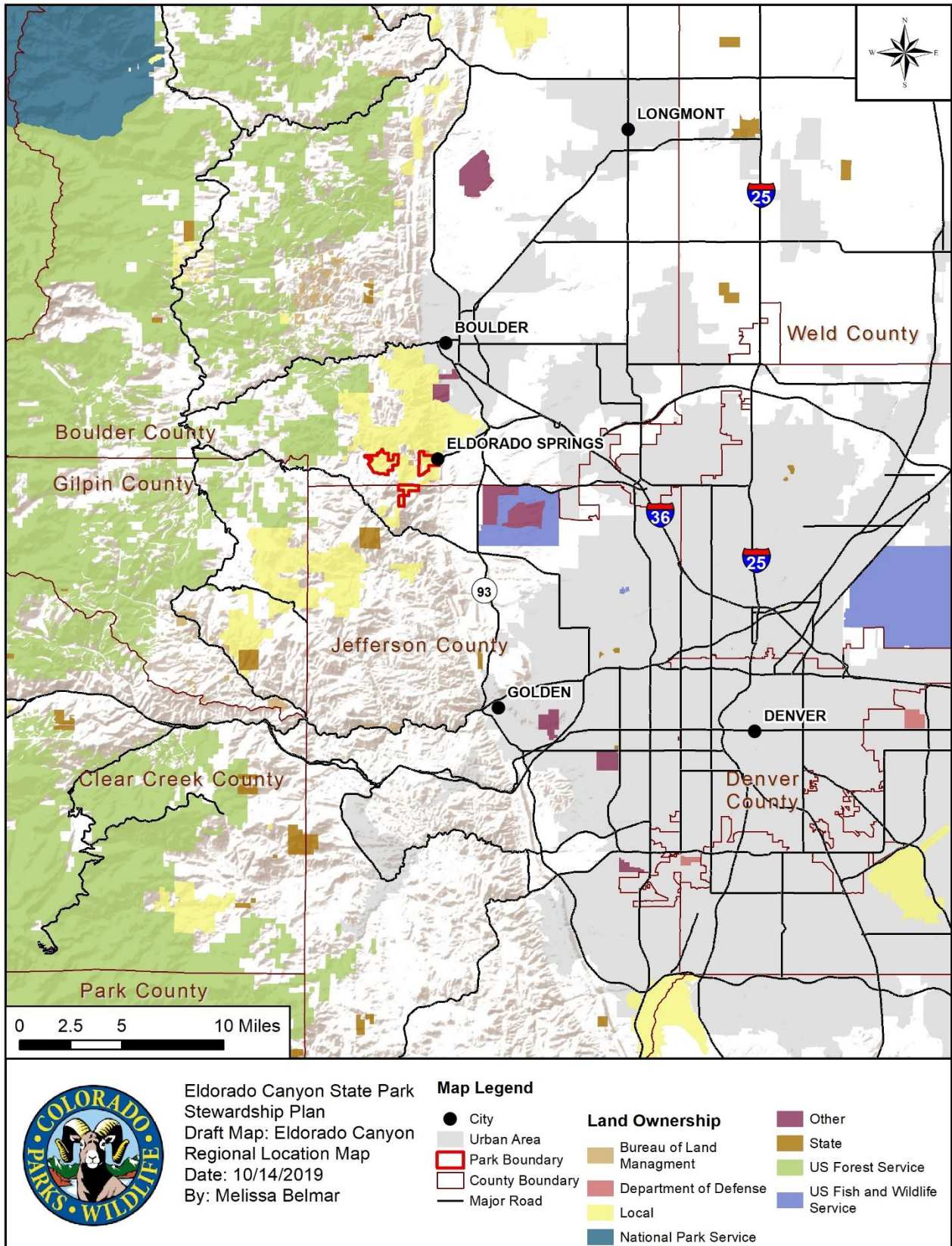
The land comprising Eldorado Canyon State Park (Park) became a state park in 1978. The Park lies eight miles southwest of the City of Boulder along the eastern edge of the Front Range of the Rocky Mountains and is situated in a canyon on the Front Range, near municipalities that are rapidly growing in population. The Park is comprised of 1,392 acres in Boulder and Jefferson Counties. The Park elevation ranges from 5,800 feet at the Park’s eastern entrance along CO-170 to 8,800 feet at the southern boundary of the parcel in Jefferson County. Eldorado Canyon State Park occupies multiple ecotones between the higher elevation mixed conifer forests, mid elevation ponderosa pine forests/meadows, and lower elevation meadows and shrublands (Rocky Mountain Forestry, LLC. 2017).

The Park consists of three distinct sections, the Inner Canyon, Crescent Meadows, and the Jefferson County Parcels. The Inner Canyon, the historic entrance to the canyon, receives the vast majority of visitation. The Inner Canyon is bordered on the east by the unincorporated village of Eldorado Springs and by private land owned by Eldorado Artesian Springs, Inc. The City of Boulder owns and manages open space areas to the north and south of the Inner Canyon.

Eldorado Canyon is a popular recreation destination, especially for people from the Front Range and the Denver metropolitan area. A world-renowned technical rock climbing area, the canyon also offers fishing, hiking, picnicking and a quiet retreat from the city. The Park provides over 1,100 climbing routes, 10 picnic sites, and 17.1 of multi-purpose trails (CPW 2017a). Trails in the Park connect to trails on Boulder County Open Space and City of Boulder’s Open Space and Mountain Parks lands. Visitation has increased steadily over the past decade, with about 524,000 visits occurring in 2018 (CPW 2019a). The main recreation season runs from late-May through late-October.



**Figure 2.1.** Location of Eldorado Canyon State Park.



## **General Management Plan**

The Eldorado Canyon State Park Management Plan identifies four objectives related to resource protection, which are stated below. This stewardship plan suggests implementing the current Park goals by providing stewardship goals in Chapter 5, *Stewardship Recommendations*. Stewardship goals are based on the significant resources listed in the next chapter, *Resource Element Descriptions*.

The management plan, published in 2000, states the following are management priorities:

- Maintain the Park as a multiple-use outdoor recreation site with open space areas, and appropriate facility development.
- Provide interpretive and environmental education opportunities using the Great Outdoors Colorado program and Park staff and resources.
- Protect and preserve the Park's natural resources while providing recreation through sound Park and land management practices.
- Provide safe, quality outdoor recreation opportunities for the visitors who have a wide variety of recreation preferences.

## **Baseline Inventories and Assessments**

Below is the current list of inventories and assessments upon which this stewardship plan is based. Many of these were performed as part of this stewardship process.

<b>Type of inventory/assessment</b>	<b>Date</b>	<b>Entity Responsible</b>
Wetland Inventory and Report	1995	Colorado Natural Areas Program
Zoological Inventory	1998	Colorado Natural Heritage Program
Climbing Management Plan	2003	CPW
Mexican Spotted Owl Survey and Report	2006	ERO Resources, Inc.
Preble's Meadow Jumping Mouse Survey Report	2006	Walsh Environmental
Owl, Goshawk, and Boreal Toad Survey Report	2007	ERO Resources, Inc.
Noxious Weed Inventory and Management Plan	2015	CPW Resource Stewardship
Breeding and Migratory Bird Survey	2015	Steve Jones
Forest Management Plan	2017	Rocky Mountain Forestry, LLC
Raptor Nest Surveys and Monitoring	2006-Present	CPW Resource Stewardship
Inventory of Plants	2019	John Vickery
Vegetation Assessment Survey and Report	2019	Collective Ecological Consulting
Survey of Amphibians, Reptiles, and their Habitats	2019	Adaptation Environmental Services
Noxious Weed Inventory and Management Plan	2019	CPW Resource Stewardship

Visitation and Carrying Capacity Study	2019	CPW
Traffic Study	2019	CPW
Paleontology and Geology Report	2020	Dr. Karen Houck
Cultural Resources Report	2020	Public Lands History Center

Below are resource categories for which no inventories or assessments were found to exist, or where inventories should be updated:

Type of inventory/assessment	Comments
Climbing Assessment and Management Plan	A climbing plan should be developed to identify conflicts between increased rock climbing with raptor nesting. Determine if some access trails need to become designated trails or if sensitive areas need to be closed.
Mexican Spotted Owl Surveys	Mexican spotted owl surveys were last conducted from 2006-2007. Repeat surveys should be conducted to determine if this sensitive species is using the Park.
Preble's Meadow Jumping Mouse Surveys	Preble's meadow jumping mouse surveys were last conducted from 2010. Repeat surveys should be conducted to determine if this sensitive species is using the Park.
Bat Surveys	Surveys for bats have not been conducted in the Park and there is potential for several species to occur. Townsend's big-eared bat historically was documented in the Park in 1972. Use bat detectors to identify species composition and habitat use within the Park.
Rare Insect Surveys	Three rare species were observed in the past, and an updated, focused survey should be completed to ensure the species are still present at the Park. A survey for wild hops, the host plant for hops feeding azure should also be inventoried to establish a potential habitat map.
Breeding Bird Survey	Breeding bird surveys were conducted in the Park in 2015 and should be conducted every 5 years by a qualified biologist. Reports should continue to be submitted that have comparisons on bird populations from year to year.
Trails Survey and Condition Assessment Report	With increased visitation to the Park there is a need to evaluate the condition of existing trails and document the extent of social trails in the Park.
Wetland and Water Resources Inventory	The last wetland delineation was completed in 1995. An updated field delineation along with a function assessment should be completed to ensure wetlands are healthy and able to provide habitat for plants and wildlife in the future.

## **Resource Plans**

Below is a list of management plans that address resource issues at the Park:

Type of plan	Date
General Management Plan	2000

Stewardship Plan	2002
Forest Management Plan	2017
Noxious Weed Management Plan	2015, 2019
Visitor Use Management Plan	2020
General Management Plan	2020



## Resource Element Descriptions

This section describes the significance of the natural resources found in the Park and assesses their current and projected conditions. The Description of each resource element are discussed, and the Current Conditions of the resource are summarized in terms of an excellent, good, fair, or poor condition statement. The Desired Future section describes the ideal condition of the resource in the future, while the Resource Trajectory identifies a projected future health based on current resource condition. Each resource is then evaluated in terms of what is needed in order to achieve the desired future condition. Prioritized Stewardship Recommendations are found near the end of the plan. The significant resources found at the Park are summarized below.

- **Vegetation and Rare Plants**
- **Wildlife and Rare Animals**
- **Wetlands and Water Resources**
- **Geology and Soils**
- **Cultural Resources**

**Figure 3.1.** Photo of wandering gartersnake seen in the Park during 2019 herpetofauna surveys.



Source: Adaptation Environmental Services, LLC, 2019



# Resource Element Description: Vegetation and Rare Plants

## Resource Summary: Vegetation and Rare Plants

### Significant Features

- The Park occurs in an ecotone between mixed grass prairie and montane woodland, which lends to the unusually high level of diversity of plants within the Park.
- The Park contains four documented rare plant communities and two historical rare plant occurrence in the vicinity. Several other species have the potential to occur in the Park.
- The Park contains many riparian areas, especially along South Boulder Creek. Riparian communities are important for wildlife habitat, erosion and flood control, and water quality.

### Threats

- Noxious Weeds - The presence of noxious weeds in certain areas of the Park is of concern due to their known ability to displace the native vegetation, reduce biodiversity, and degrade wildlife habitat.
- Visitation and Development - Social trail use, including climbing access routes, result in trampling of native vegetative communities, erosion, and the spread of noxious weeds. Infrastructure development can directly destroy vegetative communities, as well as create disturbances that allow for weed invasion
- Wildfire - Wildfire ignitions are always a possibility and large scale high intensity wildfires can clear all vegetation to lay bare highly erosive soils. Because of a lack of historic wildfires in this area, the resulting high density of timber in the Park is such that it invites disease, insect infestations, and catastrophic wildfire.

## Description

### Vegetation

Eight miles south of the City of Boulder, Eldorado Canyon State Park exemplifies the diversity of vegetation types found in Colorado's Front Range foothills. This diversity is attributed to the Park's varied topography, soils, microclimates of the canyon, and specifically to the Park's location in the ecotone between mixed grass prairie and montane woodland. The Park's vegetation is dominated by Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*) forests. Riparian woodlands surround South Boulder Creek and contain narrowleaf cottonwood (*Populus angustifolia*), willow (*Salix* sp.) shrublands, and a diverse herbaceous understory. Grasslands are present in lower elevation areas of the Crescent Meadows parcel and contain a variety of graminoid and forb species. A total of 21 vegetation community Alliances and Associations

**Figure 3.2.** Western wallflower, a common species identified in several NVC communities in Eldorado Canyon State Park.



Source: Collective Ecological Consulting, LLC, 2019

(classified according to the 2008 National Vegetation Classification [NVC] system) were identified in the Park, including 11 forest and woodland, nine shrub and herb, and one desert and semi-desert (Belmar 2019). Some areas could not be identified to the Association level. These areas contained a vegetative composition that did not directly fit the specific Associations provided by the NVC, and therefore were identified to the broader level of Alliance.

The 21 primary plant community Associations and Alliances at Eldorado Canyon State Park as depicted in **Figure 3.2** are:

- A3398 Southern Rocky Mountain Ponderosa Pine Forest & Woodland
- CEG000861 Ponderosa Pine / Rocky Mountain Juniper Woodland
- A3454 Southern Rocky Mountain Douglas-fir Forest & Woodland
- CEG000424 Douglas-fir / Kinnikinnick Forest
- CEG000911 Douglas-fir Scree Woodland
- CEG000439 Douglas-fir / Common Juniper Forest
- CEG000442 Douglas-fir / Creeping Barberry Forest
- CEG000418 Douglas-fir / Rocky Mountain Maple Forest
- A3760 Quaking Aspen Riparian Forest
- A3759 Narrowleaf Cottonwood Riparian Forest
- CEG002641 Narrowleaf Cottonwood - Douglas-fir Riparian Woodland
- CEG002910 Skunkbush Sumac Rocky Mountain Shrubland
- A4031 Western Wheatgrass - Green Needlegrass Northwestern Great Plains Grassland
- CEG005264 Ruderal Smooth Brome Grassland
- A3964 Central Rocky Mountain Montane-Foothill Sumac Shrubland
- CEG001197 Narrowleaf Willow Riparian Wet Shrubland
- CEG001080 Water Birch Wet Shrubland
- A3849 Canadian Horseweed - Canada Thistle - Prickly Lettuce Ruderal Wet Meadow
- CEG002010 (Broadleaf Cattail, Narrowleaf Cattail) Western Marsh
- CEG001813 Nebraska Sedge Wet Meadow
- CEG003019 Ruderal Cheatgrass Annual Grassland

The total study area for the vegetation classification, which included the Park and a 500-foot buffer and did not include water areas, totaled 2,365 acres. A total of 2,198.8 acres was classified according to the NVC system within the Park. The remaining 166.2 acres was comprised of disturbed or developed areas that did not match any NVC community. These areas included the following categories:

- Disturbance facilities (Park infrastructure, areas surrounding infrastructure)
- Roads
- Trails
- Railroads
- Rock outcrops or Scree fields

More details about the composition and structure of the current communities present at Eldorado Canyon State Park can be found in the Current Conditions Section below.



## Rare Plants

Habitat for six rare plant species exists within the Park, however conditions have lowered the quality of habitat for rare species to thrive in some areas that experience high traffic and vegetation trampling. Less disturbed areas with native vegetation are present throughout the Park and may provide higher quality habitat for species with potential to occur. Rare plants may still thrive in disturbed areas however, and plant locations near high traffic areas should be closely monitored and closed seasonally to reduce disturbance. In addition to rare plant species, habitat for six rare plant communities is also present in the Park as classified by the Colorado Natural Heritage Program (CNHP).

CNHP Element Occurrence data, the previous Resource Stewardship Plan (2002), and 2019 field surveys were used to develop a list plant communities and plant species that have potential to occur within the Park, which are listed below (Table 3.1) with habitat information and conservation status. Species and plant communities (elements) tracked by CNHP are assigned conservation ranks based upon their relative degree of rarity or imperilment. This ranking system uses a five-point scale (e.g. 1=critically imperiled because of extreme rarity, 5=demonstrably secure). Conservation ranks are assigned both in terms of an element's abundance within Colorado (S or State rank) and over its entire range (G or Global rank). A question mark by a G rank indicates uncertainty about an assigned global rank. A question mark by a S rank indicates that there is some evidence that species may be imperiled, but awaiting formal rarity ranking (CNHP 2013).

**Table 3.1.** Rare plant species and communities with potential to occur in Eldorado Canyon State Park.

Scientific Name	Common Name	Habitat	Status
<i>Amorpha nana</i>	Dwarf wild indigo	Found on rocky slopes and in open prairies, at 5,200 to 7,200 feet.	G5 / S2
<i>Carex sprengei</i>	Sprengel's sedge	Found in dry to mesic deciduous forests and forest openings, floodplain forests and riverbanks, lakeshores, limestone river bluffs, mixed conifer-hardwood forests, thickets, meadows, roadsides, often associated with calcareous rocks and soils.	G5 / S2
<i>Liatris ligulistylis</i>	Strap-style gayfeather	Found in wet meadows and along streams at 4,000 to 8,000 feet.	G5? / S2
<i>Mertensia humilis</i>	Rocky Mountain bluebells	Found in sagebrush shrublands at 5,269 - 9,564 feet.	G2 / S1
<i>Nassella viridula</i> Grassland	Great Plains Mixed Grass Prairie (green needlegrass)	Stands occur in narrow valleys, on stream terraces, and on rolling uplands.	GU / SNR
<i>Pascopyrum smithii</i> - <i>Nassella viridula</i> Grassland	Great Plains Mixed Grass Prairie (Western wheatgrass and green needlegrass)	Stands occur in narrow valleys, on stream terraces, and on rolling uplands.	G3G4 / S1
<i>Populus angustifolia</i> - <i>Pseudotsuga menziesii</i> Riparian Woodland	Narrowleaf cottonwood – Douglas-Fir Riparian Woodland	No description available	G3 / S2



<i>Pseudotsuga menziesii/Acer glabrum</i>	Douglas-fir / Rocky Mountain Maple Forests	Occurs in montane zone a elevations from 4,800 – 8,700 feet in cool, moist areas. Generally found on northern or eastern aspects, on steep, mid to lower slopes.	G4 / S2
<i>Pseudotsuga menziesii/Arctostaphylos uva-ursi</i>	Douglas-fir / Kinnikinnick Forest	Occurs at mid- to upper montane elevations from 4,600 to 5,855 feet. Found on warm, dry sites on southerly aspects or ridgetops.	G4 / S3
<i>Pseudotsuga menziesii / Betula occidentalis</i> Riparian Woodland	Douglas-fir / Water birch Riparian Woodland	This woodland association occurs in cool, narrow foothill canyons of the Colorado Front Range between 6600-8080 feet elevation.	G3? / S2
<i>Viola pedatifida</i>	Prairie violet	Prairies, open woodlands, and forest openings; rocky sites along the Front Range, from 5,800 to 8,800 feet.	G5 / S2
<i>Spirantes diluvialis</i>	Ute's ladies tresses	Rare on floodplains, along streams, and in moist meadows and swales at 4,500 to 7,000 feet.	G2G3 / S2 FT

Sources: (CPW 2002; Ackerfield 2015; CNHP 2017, 2019a, 2019b, 2019c; Flora of North America 2019; NatureServe 2019)

FT – Federally Threatened

Species and ecosystems are ranked on the Global (G), National (N), and Subnational/State/province (S) levels. G1, S1 – Critically imperiled; G2, S2 – Imperiled; G3, S3 – Vulnerable; G4, S4 – Apparently Secure; G5, S5 – Secure; GX, SX – Presumed extirpated or extinct.

## **Current Conditions: Vegetation**

Both natural and human disturbances have played an important role in determining the current vegetative communities of the Park. Natural disturbance due to fire initially shaped the landscape, but since its suppression, an alteration in vegetative communities has occurred. Human disturbances such as logging, an active railroad, habitat fragmentation by roadways, powerline construction, and a long history of grazing and mining have altered the native communities from what likely existed in pre-settlement days on nearly all of the Park land. Construction of the canyon road and early homesteading significantly affected the historic distribution of riparian plant communities, leading to exotic plant invasions.

The prominent natural community types in the Park are Douglas-fir forest, ponderosa pine woodland, mixed grass prairie, and cottonwood riparian forest shrubland. Douglas-fir forests are present on cooler slopes with north and east aspects and in deeper canyons. Historic logging of Douglas-fir throughout Eldorado Canyon in the late 1800's resulted in some stands dominated by ponderosa pine with scatterings of Douglas-fir and quaking aspen (*Populus tremuloides*). The ponderosa pine woodlands occupy warm south-facing slopes and, in addition to ponderosa pine, are often codominated by Rocky Mountain juniper (*Juniperus scopulorum*) with a grassy understory and few shrubs. Mixed grasslands occur in open areas between stands of trees and in the deeper soils of Park meadows. Riparian communities are established along the banks of South Boulder Creek, Rattlesnake Gulch, and portions of other drainages throughout the Park.

The current stands of ponderosa pine and Douglas-fir in the Inner Canyon originated around either 1860 or 1890 after fires burned through the canyon. Regeneration of trees after the fires was followed by fire suppression, resulting in the dense forests that exist today. Cheatgrass is a common herbaceous species present in the understory of ponderosa pine and Douglas-fir dominated woodlands.

The Park saw minimal forest management prior to 1978. The Crescent Meadows parcel was logged in 1880, and much of the existing forest originated around 1890. The Crescent Meadows area became a working ranch in the 1870's and was heavily grazed, as was the surrounding government land. According to the Colorado State Forest Service (COSFS), the Natural Resource Conservation Service (NRCS), and Colorado State University's (CSU) Rangeland and Ecosystem Science Department, the removal of fire and grazing pressures may have caused stagnation in the grasslands of Crescent Meadows, which will need a disturbance for rejuvenation. Since 2005, the Crescent Meadows parcel has seen a substantial amount of thinning work completed by COSFS contractors. Over 190 acres of forest management treatments have occurred including both thinning with hand crews and mastication. Additionally, 82 acres of prescribed burning was completed in 2007 and 2008. Crescent Meadows supports stands of ponderosa pine trees that are generally in better condition than in the Inner Canyon, having been thinned during mountain pine beetle (MPB) infestations or by MPB control efforts. Some Douglas-fir stands show damage from a spruce budworm epidemic. Mistletoe is established in some of the ponderosa pines but is not as severe as in the Inner Canyon. Several noxious weeds are present in the Crescent Meadows Parcel, including bouncingbet (*Saponaria officinalis*), bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), cheatgrass (*Bromus tectorum*), common burdock (*Arctium minus*), common mullein (*Verbascum thapsus*), dalmation toadflax (*Linaria dalmatica*), diffuse knapweed (*Centaurea diffusa*), field bindweed (*Convolvulus arvensis*), houndstongue (*Cynoglossum officinale*), leafy spurge (*Euphorbia esula*), musk thistle (*Carduus nutans*), and sulfur cinquefoil (*Potentilla recta*) (CPW 2019b).

Riparian communities established along South Boulder Creek, Rattlesnake Gulch, and other drainages have been compromised by the invasion of non-native species. The invasion by exotic species began with homesteaders using the seeps and springs of Eldorado Canyon more than a hundred years ago.

More recent urbanization, specifically construction of the Inner Canyon Road, negatively impacted riparian communities, and road upkeep has increased noxious weed levels. The state-listed noxious weeds, bouncingbet, bull thistle, Canada thistle, cheatgrass, Chinese clematis (*Clematis orientalis*), common burdock, common mullein, dalmatian toadflax, field bindweed, houndstongue, musk thistle, myrtle spurge (*Euphorbia myrsinites*), poison hemlock (*Conium maculatum*), sulfur cinquefoil, grow along or near South Boulder Creek in the Inner Canyon Parcel (CPW 2019b).

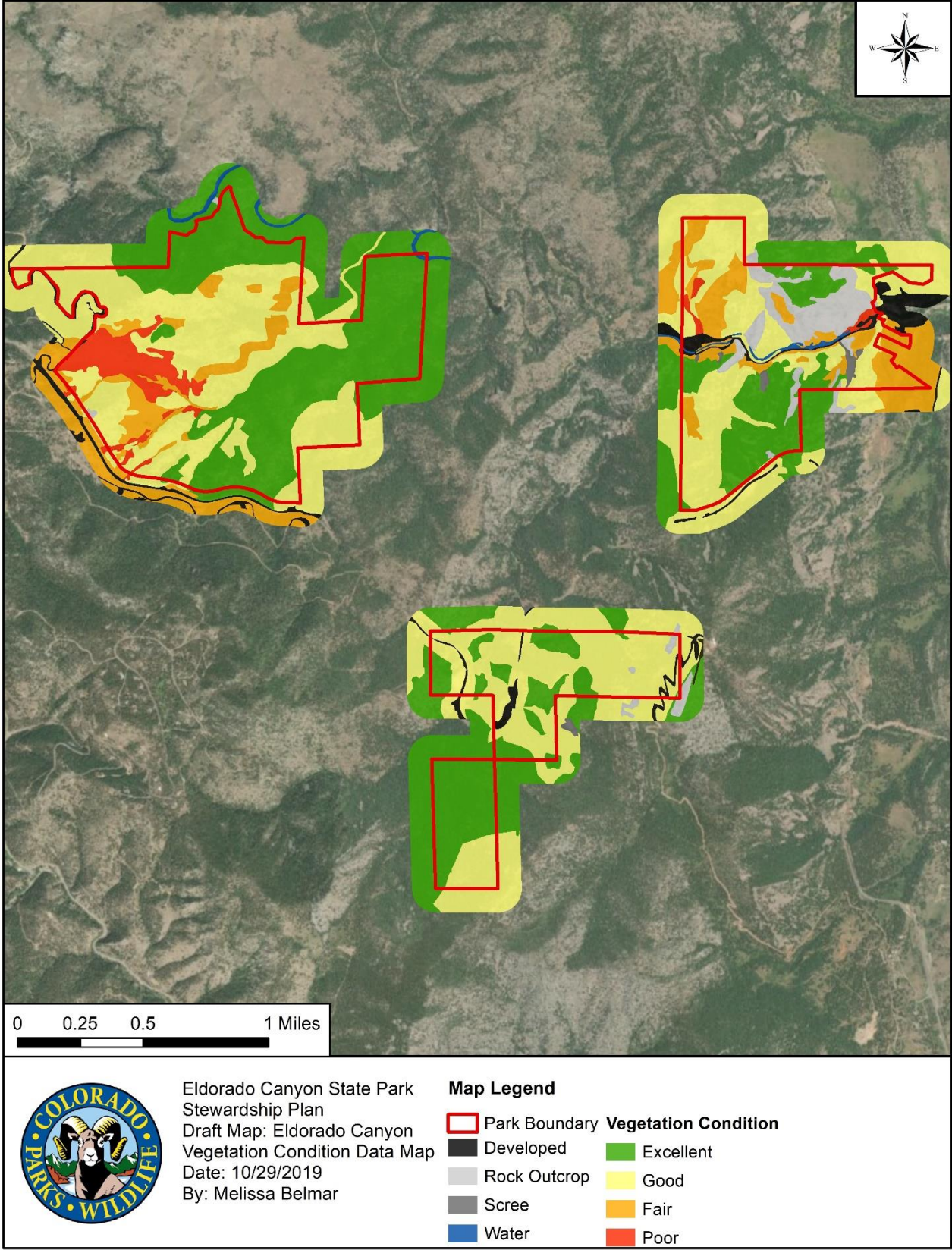
Along South Boulder Creek, from the picnic area east to the bridge in the Inner Canyon, human visitors have trampled the vegetation severely, nearly eliminating it in places. The vegetation in this area was noted as extremely sparse and comprised primarily as invasive species or bare earth during the 2019 vegetation assessment (Belmar 2019).

The Jefferson County parcel of the Park is fairly undisturbed, and surrounding lands currently provide good wildlife habitat. No official trails are present in the Parcel and only a few roads are present that provide access to the Parcel. However, this area has been impacted by the railroad and by the road that runs through its eastern edge. Both of these features have created erosion problems and have altered the hydrology of the area. Forested areas in the region are fairly dense and some of the conifers had historic insect infestations, but overall this section is in fairly good to excellent condition.

The Park has seen a huge increase in visitation in recent years, with thousands of visitors every year that use climbing routes, hiking trails, and riparian areas. The vegetation condition at the Park reflects the level of human use through the presence of non-native species and lack of vegetative diversity in high-use areas. A vegetation assessment and detailed mapping was completed in 2019 for the Park. An accompanying report was completed titled “Eldorado Canyon State Park Vegetation Assessment Report (Belmar 2019).” This report describes in detail the structure and condition of the vegetation communities. In general, the vegetation communities at the Park range from excellent to poor condition. A total of 889 acres of vegetation are in excellent condition, 1,011 acres are in good condition, 235 acres are in fair condition, and 62 acres are in poor condition (Figure 3.4). The majority of the Park does not receive regular visitation from the public due to a lack of access and therefore is in better condition. Areas where infrastructure and trails exist are generally in fair to poor condition. These two ratings generally have high levels of non-native species, dense vegetation/poor structure, or trampled vegetation from human use. Fair and poor vegetation is concentrated around South Boulder Creek, historically grazed areas, and near Park infrastructure (roads, trails, etc.).

Furthermore, the Resource Stewardship group did a 2019 weed inventory which contains current and detailed information about weed infestations within the Park. Species, density, and priority for treatment are provided in the data collected. Additionally, treatment options for the different species and infestations are outlined in the report, with easy to follow instructions for Park staff and managers (CPW 2019b).

**Figure 3.4.** Vegetation Condition at Eldorado Canyon State Park.





The following descriptions general descriptions of the vegetation community Associations and Alliances at the Park:

### **A3398 Southern Rocky Mountain Ponderosa Pine Forest & Woodland Alliance**

This community is the third most abundant in Eldorado Canyon State Park, totaling 341.9 acres. It is found throughout all three parcels in the Park on drier hillslopes with a relatively open tree layer, low density to absent shrub layer, and a dense to sparse graminoid understory with scattered forbs and rock. Within the Rocky Mountains, these forests and woodlands grow at elevations between 1,800-2,600 m (6,000-8,500 feet). The dominant tree species in this community is ponderosa pine but may also include Douglas-fir and Rocky Mountain juniper. Douglas-fir may be almost equally present in some areas in transition zones between Douglas-fir dominant communities and this community. Dominant shrubs within the community include yucca (*Yucca glauca*), wax currant (*Ribes cereum*), and creeping barberry (*Mahonia repens*). Forbs and graminoids present include cheatgrass, alyssum (*Alyssum simplex*), junegrass (*Koeleria macrantha*), prairie sage (*Artemisia ludoviciana*), fringed sage (*Artemisia frigida*), foothills paintbrush (*Castilleja integra*), silvery lupine (*Lupinus argenteus*), blue mist penstemon (*Penstemon virens*), wild buckwheat (*Eriogonum umbellatum*), and western yarrow (*Achillea millefolium*).

### **CEGL000861 Ponderosa Pine / Rocky Mountain Juniper Woodland Association**

The community is the second-most abundant and composes a total of 473.8 acres within the Park. It is commonly found on moderate slopes with a variety of aspects. It is similar to A3398, but contains less open grassland areas, more tree cover overall, and a higher percentage of Rocky Mountain juniper (five to 20 percent). Ponderosa pine is the dominant species, comprising ten to 50 percent of the overall cover. The herbaceous layer may compose 20 to 50 percent and the shrub layer is sparse, composing five to 20 percent in some areas. Shrub species commonly documented in this community include kinnikinnick (*Arctostaphylos uva-ursi*), common juniper (*Juniperus communis*), prickly pear (*Opuntia polycantha*), and yucca. Herbaceous graminoids and forbs documented include fringed sage, sidebells penstemon (*Penstemon secundiflorus*), western wallflower (*Erysimum asperum*), Richardson's geranium (*Geranium richardsonii*), golden aster (*Heterotheca villosa*), prairie sage, sun sedge (*Carex inops ssp. heliophila*), and western wheatgrass (*Pascopyrum smithii*).

### **A3454 Southern Rocky Mountain Douglas-fir Forest and Woodland Alliance**

This Alliance is the most abundant in Eldorado Canyon State Park, totaling 806.7 acres. It is found throughout the montane areas of the Park. The tree stratum is the most common vegetation layer and usually covers 20 to 50 percent, with Douglas-fir being the apparent, dominant species. Ponderosa pine and Rocky Mountain juniper are scattered throughout the tree stratum but only present in low quantities. Shrubs are sparse and cover five to ten percent with creeping barberry and Rocky Mountain juniper being dominant species present. The herbaceous layer is more abundant than the shrub layer, covering 30 to 50 percent with cheatgrass, alyssum, and western wheatgrass commonly documented. Dominant shrubs within the community include creeping barberry, chokecherry (*Prunus virginiana*), wax currant, Boulder raspberry (*Rubus deliciosus*), spreading dogbane (*Apocynum androsaemifolium*), and Wood's rose (*Rosa woodsii*). Forbs and graminoids present include cheatgrass, western wheatgrass, alyssum, fringed sage, prairie sage, Canada violet (*Viola canadensis*), and small-leaf pussytoes (*Antennaria parviflora*).

### **CEGL000424 Douglas-fir / Kinnikinnick Forest Association**

This community composes a small area in the Park, only totaling 10.5 acres. This community is considered a sensitive community by CNHP. It was only located in the southern Park parcel, although it likely exists in other areas of the Park that were not accessible. Sites are warm and dry, often occurring on southerly aspects or ridgetops. Substrates are typically rocky, coarse-textured soils. Douglas fir is the dominant species in the community with kinnikinnick covering the ground. Quaking aspen and ponderosa pine were also found but in lower densities. The shrub layer is low to the ground and almost entirely composed of kinnikinnick but may also contain common juniper and creeping barberry. The herbaceous layer contains a variety of forbs and graminoids, similar to the A3454.

**Figure 3.5.** A3398 Southern Rocky Mountain Ponderosa Pine Forest & Woodland Alliance.



**Figure 3.6.** C EGL000861 Ponderosa Pine / Rocky Mountain Juniper Woodland Association.



**Figure 3.7.** A3454 Southern Rocky Mountain Douglas-fir Forest & Woodland Alliance.



**Figure 3.8.** C EGL000424 Douglas-fir / Kinnikinnick Forest Association.



Source: Collective Ecological Consulting, LLC, 2019

### **CEGL000911 Douglas-fir Scree Woodland Association**

This community composes a large area in the Park, totaling 221.6 acres. It is present usually on the periphery of scree fields and rockslide areas. Scree and vegetation-free areas are the most dominant and cover 40 to 80 percent of the areas. Douglas fir is most often dominant but scattered throughout the community, ranging from 10 to 40 percent cover. Ponderosa pine is also found occasionally, but in low quantities. The shrub layer is scattered and found to cover five to ten percent and the herbaceous layer is often absent or comprises only one to five percent. Common shrubs documented include five-petal cliffbush (*Jamesia americana*), wax currant, Rocky Mountain maple (*Acer glabrum*), Boulder raspberry, spreading dogbane, chokecherry, and smooth-leaf sumac (*Rhus glabra*). Common plants found in the herbaceous layer include poison ivy (*Toxicodendron rydbergii*), larkspur (*Delphinium nuttallianum*), sidebells penstemon, smooth brome (*Bromus inermis*), and leafy wildparsley (*Musineon divericatum*).



### **CEGL000439 Douglas-fir / Common Juniper Forest Association**

This community composes a small area in the Park, only totaling 29.7 acres. It was only located in the Crescent Meadows Parcel, although it likely exists in other areas of the Park that were not accessible. Sites with the community have gentle to steep slopes (11-100 percent), on dry, exposed rocky slopes and ridgetops, at lower to mid elevations of the forested zone, from 1,430 to 2,930 m (4,690-9,620 feet) in elevation. Sites are relatively dry and occur on all aspects and substrates are typically coarse-textured soils. Douglas fir is the dominant species in the community with common juniper covering the ground. Ponderosa pine was also found but in lower densities than Douglas-fir. The shrub layer is low to the ground and is dominated by common juniper but may also include kinnickinnick, wax currant, creeping barberry, and Wood's rose. The herbaceous layer contains a variety of forbs and graminoids, similar to the A3454.

**Figure 3.9.** CEG000911 Douglas-fir Scree Woodland Association.



Source: Collective Ecological Consulting, LLC, 2019

**Figure 3.10.** CEG000439 Douglas-fir / Common Juniper Forest Association.



### **CEGL000442 Douglas-fir / Creeping Barberry Forest Association**

This community composes a small area in the Park, only totaling 13.8 acres. It was only located in the Inner Canyon Parcel, although it likely exists in other areas of the Park that were not accessible. Stands occur on lower mountain slopes and upper canyon slopes. Elevations range from 1,740 to 2,930 m (5,700-9,600 feet). Soils are variable in texture and parent material but are usually deep and often rocky. The vegetation is representative of closed-canopy stands of Douglas-fir where most species other than creeping barberry have been shaded out. Douglas fir is dominant but ponderosa pine was scattered in some areas. The shrub layer is low to the ground, sparse, and almost entirely composed of creeping barberry. Other shrubs that may be present include fivepetal cliffbush, Boulder raspberry, chokecherry, spreading dogbane, and wax currant. The herbaceous layer is sparse and often contained sedge species, Fender's waterleaf (*Hydrophyllum fendleri*), chiming bells (*Mertensia lanceolata*), catchweed bedstraw (*Galium aparine*), and Canada violet.

### **CEGL000418 Douglas-fir / Rocky Mountain Maple Forest Association**

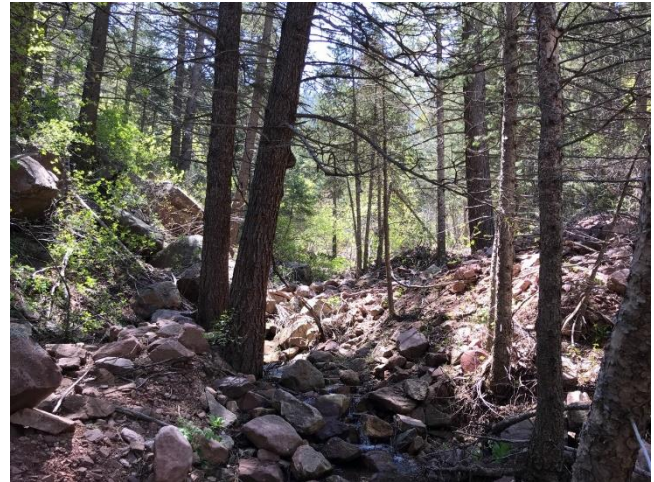
The community is moderately abundant and composes a total of 111.8 acres within the Park. This community is considered a sensitive community by CNHP. Elevations vary from 1,465 to 2,654 m (4,800-8,700 feet). Sites are cool and moist, generally occurring on northern or eastern aspects, on steep, mid to lower slopes, and ravines or stream bottoms where cold-air drainage is a factor. This community is highly diverse and contains a high number of species in each stratum. Overall tree cover is high, with Douglas-fir comprising 60 to 90 percent and Rocky Mountain maple comprising ten to 20 percent typically. Other tree species that may be present in low quantities include ponderosa pine,

quaking aspen, Rocky Mountain juniper, box elder (*Acer negundo*), and cottonwood species. The shrub and herbaceous layers are less dense than the tree layer but typically cover 30 to 60 percent. Shrub species commonly documented in this community include creeping barberry, serviceberry, fivepetal cliffbush, American plum (*Prunus americana*), Wood's rose, wax currant, and Boulder raspberry. Herbaceous graminoids and forbs documented include Canada violet, chiming bells, clematis (*Clematis* sp.), and Fendler's waterleaf. Some areas of this vegetation association have the scattered invasive species Canada thistle, common dandelion (*Taraxacum officinale*), and sulfur cinquefoil.

**Figure 3.11.** CEG000442 Douglas-fir / Creeping Barberry Forest Association.



**Figure 3.12.** CEG000418 Douglas-fir / Rocky Mountain Maple Forest Association.



Source: Collective Ecological Consulting, LLC, 2019

### **A3760 Quaking Aspen Riparian Forest Alliance**

This community composes a very small area in the Park, only totaling 3.4 acres. This community was located in depressional areas within a grassland that is likely seasonally inundated from runoff and precipitation. The community is mostly a pure stand of quaking aspen, with some narrowleaf willow and chokecherry intermixed. The tree stratum is dense and is solely made of quaking aspen. The shrub layer is scattered and mostly present on the periphery of the aspen stand. Shrubs that may be found include narrowleaf willow (*Salix exigua*), chokecherry, and water birch (*Betula occidentalis*). The herbaceous layer is primarily comprised of dense smooth brome but may also contain scattered forbs, including the invasive Canada thistle.

### **A3759 Narrowleaf Cottonwood Riparian Forest Alliance**

The community is found in isolated patches and totals 7.9 acres within the Park. The community was primarily found surrounding South Boulder Creek in the Inner Canyon parcel of the Park. This Alliance is broad-ranging in the Rocky Mountains in latitude and elevation and can contain a variety of plant combinations and dominant species. Overall tree cover is high, with narrowleaf cottonwood commonly dominating but may also contain box elder, Rocky Mountain maple, water birch, eastern cottonwood, green ash, Siberian elm, and red-osier dogwood among many other species. The shrub layer was sparse to dense depending on the area. Common species documented included narrowleaf willow, chokecherry, American plum, Wood's rose, and hops. The herbaceous layer contained a variety of forbs and graminoids such as Kentucky bluegrass (*Poa pratensis*), golden banner (*Thermopsis rhombifolia*), salsify (*Tragopogon dubius subsp. major*), smooth brome, and catchweed bedstraw.



**Figure 3.13.** A3760 Quaking Aspen Riparian Forest Alliance.



**Figure 3.14.** A3759 Narrowleaf Cottonwood Riparian Forest Alliance.



Source: Collective Ecological Consulting, LLC, 2019

#### **CEGL00264 Narrowleaf Cottonwood - Douglas-fir Riparian Woodland Association**

This community composes a very small area in the Park, only totaling 3.8 acres and is only present in a small area of the Inner Canyon Parcel, along South Boulder Creek. This community is considered a sensitive community by CNHP. It This community typically occurs naturally in small stands on wash bottoms, streambanks, cobble bars and terraces where a northern or protected aspect creates cool micro-environments This association represents a transition from lower montane to upper montane habitats and are dependent upon flooding disturbance for regeneration of narrowleaf cottonwood. Douglas-fir and narrowleaf cottonwood are obvious dominant species in the community. The shrub layer sparse in the community but may include Wood's rose, wax currant, and narrowleaf willow. The herbaceous layer is almost absent due to shading and flood disturbance.

#### **CEGL002910 Skunkbush Sumac Rocky Mountain Shrubland Association**

This community occurs in small patches on hillsides of open grasslands, including invasive cheatgrass grasslands, totaling 0.7 acres. The dominant species is skunkbush (threeleaf) sumac but cheatgrass is also present in high densities in the herbaceous strata and codominates in most areas. Other species noted in this community include common mullein and smooth brome.

#### **A4031 Western Wheatgrass - Green Needlegrass Northwestern Great Plains Grassland Alliance**

The community is found in large patches in the Crescent Meadows parcel of the Park and totals 38.8 acres. The community was found in open areas on rolling hills in between ponderosa pine and Douglas-fir woodlands and has a high diversity of forbs. The tree and shrub layers are almost entirely absent, with the exception of scattered ponderosa pine mature trees and shrublings. The herbaceous layer contains a variety of forbs and graminoids. Junegrass, green needlegrass, sun sedge, western wheatgrass, cheatgrass, and smooth brome are all dominant graminoid species. Forb species are abundant and diverse with the most dominant species being prairie sage, fringed sage, wild buckwheat, wooly cinquefoil (*Potentilla recta*), pussytoes, golden aster, western yarrow, Rocky Mountain beeplant (*Cleome serrulata*), foothills paintbrush, among many others. Some areas had very high cheatgrass and alyssum concentrations, with extremely dense areas being classified as CEGl003019. Non-native species included common dandelion, common mullein, smooth brome, dalmatian toadflax, diffuse knapweed, and prickly lettuce (*Lactuca serriola*).

**Figure 3.15.** CEG002910 Skunkbush Sumac Rocky Mountain Shrubland Association.



**Figure 3.16.** A4031 Western Wheatgrass - Green Needlegrass Northwestern Great Plains Grassland Alliance.



Source: Collective Ecological Consulting, LLC, 2019

#### **CEGL005264 Smooth Brome Ruderal Grassland Association**

This community composes a moderate area in the Park, totaling 18.1 acres. It is present in lowland grassland areas and on the periphery of wetland and riparian areas. The herbaceous stratum is the only strata present in this community and is almost entirely dominated by smooth brome with less than five percent bare earth. Canada thistle and common mullein may also be found in the community.

#### **A3964 Central Rocky Mountain Montane-Foothill Sumac Shrubland Alliance**

This community composes a moderate area in the Park, totaling 43.3 acres and is only present in the eastern portion of the Inner Canyon Parcel. This community is present on dry hillsides, between ponderosa pine and Douglas-fir stands. The community is clearly dominated by smooth-leaf sumac but also contains chokecherry, American plum, clematis, Rocky Mountain juniper, box elder, and ponderosa pine. The herbaceous layer is sparse due to heavy shrub cover by smooth-leaf sumac. Herbaceous species present may include alyssum, orchard grass (*Dactylis glomerata*), prairie sage, Rocky Mountain penstemon, and salsify.

#### **CEGL001197 Narrowleaf Willow Riparian Wet Shrubland Association**

The community is found in isolated patches and totals 0.7 acres within the Park. The community was primarily found surrounding South Boulder Creek in the Inner Canyon Parcel of the Park. Narrowleaf willow is the dominant species in this community and comprises 60 to 100 percent of coverage. Other species present in this community include smooth brome, Baltic rush (*Juncus balticus*), common spikerush (*Eleocharis palustris*), Canada thistle, wild hops, and curly dock (*Rumex crispus*).

#### **CEGL001080 Water Birch Wet Shrubland Association**

The community comprises a total of 32.2 acres throughout all three Park parcels. This community composes small areas along isolated, mountain valley ephemeral drainages and is dominated by dense water birch shrubs and trees. The vegetation is characterized by a nearly continuous tall-shrub to small-tree canopy dominated by water birch along the streambank. Tree, shrub, and herbaceous strata are all very dense with much overlap and very little exposed bare earth. Many areas surrounded flowing streams and creeks throughout the summer in 2019. Other species present include Scouler's willow (*Salix scouleriana*), narrowleaf willow, panicked willow-herb (*Epilobium brachycarpum*), smooth brome, Canada thistle, salsify, wild geranium (*Geranium caespitosum*), Baltic rush, silvery lupine, horsetail (*Equisetum arvense*), scouring rush (*Equisetum hyemale*), and Nebraska sedge (*Carex nebrascensis*).



Non-native species density was relatively high in this community, as is common with wetland and riparian communities.

**Figure 3.17.** CEG005264 Ruderal Smooth Brome Grassland Association.



**Figure 3.18.** A3964 Central Rocky Mountain Montane-Foothill Sumac Shrubland Alliance.



**Figure 3.19.** CEG001197 Narrowleaf Willow Riparian Wet Shrubland Association.



**Figure 3.20.** CEG001080 Water Birch Wet Shrubland Association.



Source: Collective Ecological Consulting, LLC, 2019

**A3849 Canadian Horseweed - Canada Thistle - Prickly Lettuce Ruderal Wet Meadow Alliance**

The community is found in isolated patches, totaling 2.2 acres within the Park in disturbed places that are generally seasonally or intermittently flooded, usually drying completely between wet episodes. Canada thistle is dense and dominant in these areas with smooth brome intermixed. Other species present in the herbaceous layer of this community include smooth brome, Baltic rush, paniced willow-herb, and curly dock were also present in various densities. The herbaceous layer is the only strata present in this community.

**CEGL002010 (Broadleaf Cattail, Narrowleaf Cattail) Western Marsh Association**

This community composes small areas along intermittently flooded areas, totaling 0.3 acres. This community is dominated by cattails, including narrow-leaved (*Typha angustifolia*) and broad-leaved (*Typha latifolia*), which frequently makes up nearly 100 percent of the composition. Nebraska sedge, paniced willow-herb, Baltic rush, and common spikerush were also present in the herbaceous layer. The herbaceous stratum is the only strata present.



**Figure 3.21.** A3849 Canadian Horseweed - Canada Thistle - Prickly Lettuce Ruderal Wet Meadow Association.



**Figure 3.22.** C EGL002010 (Broadleaf Cattail, Narrowleaf Cattail) Western Marsh Association.



Source: Collective Ecological Consulting, LLC, 2019

#### **CEGL001813 Nebraska Sedge Wet Meadow Association**

This community composes one small area in an intermittently flooded area in the Crescent Meadows parcel, totaling 0.2 acres. This community is dominated by Nebraska sedge, which composes nearly 100 percent of the area. Panicked willow-herb, Baltic rush, and common spikerush were also present in the herbaceous layer. The herbaceous stratum is the only strata present.

#### **CEGL003019 Ruderal Cheatgrass Annual Grassland Association**

This community is present in large patches in the Park, covering a total of 34.9 acres. This community often covers entire hillsides or occurs in small patches within forested areas. It is also present in areas that would be classified as the native community A4031, where cheatgrass and alyssum have taken over the herbaceous layer, crowding out native species diversity. Areas classified as C EGL003019 are dominated by cheatgrass, which covers nearly 75 percent or more of the herbaceous layer and is often codominated by alyssum. A variety of native graminoids and forbs are present in the understory of this community and are relicts of the native community that once was present. Species documented in this community all listed in A4031. Due to the density of the cheatgrass, bare earth is mostly absent in this community.



**Figure 3.23.** C EGL001813 Nebraska Sedge Wet Meadow Association .



**Figure 3.24.** C EGL003019 Ruderal Cheatgrass Annual Grassland Association .



Source: Collective Ecological Consulting, LLC, 2019

## Resource Trajectory

Overall, the condition of vegetation will remain in the same condition but may worsen if exotic species continue to spread. Exotic species are a threat to all community types. Visitation and subsequent vegetation trampling and weed spread are inevitable, but proactive management can curb the impacts if implemented consistently over time.

- **Riparian and Wetland Communities (A3759, A3760, C EGL002641, C EGL001197, C EGL001080, C EGL002010, C EGL001813):** These communities are at the highest risk of further degradation and reduced condition. Noxious weeds are capable of invading these communities more than any others because they are conducive to many noxious weed species. Expanding weed populations may also potentially threaten the hops plant required by the hops feeding azure butterfly and other native plants required by wildlife. Without the completion of planned restoration work, human visitors in the Inner Canyon will continue to cause the loss of riparian vegetation and the creation of disturbed areas susceptible to invasion by weeds
- **Upland Forest Communities (A3398, C EGL000861, A3454, C EGL000424, C EGL000911, C EGL000439, C EGL000442, C EGL000418):** These communities have experienced a lack of fire throughout history, and therefore are susceptible to catastrophic fire events and invasion of pests and disease. Ongoing forest management work has been completed and new projects are proposed to maintain treated areas and to implement management activities in new areas. These communities will improve with continued implementation of recommended measures.
- **Upland Shrubland Communities (C EGL002910, A3964):** These communities are relatively healthy, but do contain extensive noxious weed populations. A lack of fire may assist in the expansion of these communities into forest understories and grasslands.
- **Grassland Communities (A4031):** Overall, grasslands should remain in fair to good condition. Past grazing and disturbance have certainly had an influence on the composition of the prairies as witnessed by the abundant fringed sage in some of the prairie areas. Fringed sage is known to increase in abundance with excessive grazing. However, the absence of natural fire and infrequent grazing may also threaten species diversity as these disturbance processes were part of the ecosystem in past centuries. Additionally, lack of fire or herbivory could result in the expansion of shrubland and forest, eventually decreasing the amount of grassland at the Park. If

not managed, Eldorado's existing grasslands will not thrive, and the large fuel load created by fire suppression may lead to major disturbance if ignited. If disturbed areas are not revegetated properly, expanding exotic infestations may completely replace native grass communities which are already being invaded by species like cheatgrass, alyssum, and smooth brome. If not managed, the weed infestations in Crescent Meadows will expand.

- **Ruderal Communities (CEGL005264, A3849, CEGl003019):** These communities are likely to continue to exist and potentially spread if not reverted to native species. Use of the new seed mixes provided in this report will assist in converting these areas to native communities.

## **Desired Future**

For the benefit of current and future visitors, as well as for the preservation of native habitat and ecological processes, the desired future for Eldorado Canyon's vegetation is to maintain healthy native plant communities.

- **Riparian and Wetland Communities (A3759, A3760, CEGl002641, CEGl001197, CEGl001080, CEGl002010, CEGl001813)** Continue to aggressively control noxious weeds by following the 2019 Noxious Weed Management Plan guidelines. Potentially restore riparian areas along South Boulder Creek to natural conditions by revegetating social trails, seeding native species, and improving the structure of the communities. Build any new proposed facilities or trails outside riparian areas and limit access to these areas in the future. Potentially restore wetlands in Crescent Meadows to improve amphibian habitat.
- **Upland Forest Communities (A3398, CEGl000861, A3454, CEGl000424, CEGl000911, CEGl000439, CEGl000442, CEGl000418):** Maintain multi-aged stands of ponderosa pines and Douglas-fir that would be less susceptible to disease and insects. Simulate natural ecological processes through prescribed burnings, selective thinnings, and/or other techniques of forest management. Many forest management activities and efforts have been made in the last 10 years to ensure a healthy future for Eldorado Canyon's woodlands. A Forest Management Plan done in 2016 provides a road map for future forest management and suggests as a rule of thumb, each treated area should be revisited every 5 to 10 years to determine if and how things have changed and what can be done to maintain or facilitate the desired structure. Additionally, monitoring for insects and disease in these communities should begin to help prevent large outbreaks from occurring.
- **Upland Shrubland Communities (CEGL002910, A3964):** Maintain a structurally diverse stand of shrubs through the use of fire, grazing, and/or infrequent, selective thinning. Continue to treat noxious weeds in this community, particularly where thinning work has occurred.
- **Grassland Communities (A4031):** Simulate natural processes through intermittent grazing or fire to maintain diversity and productivity while controlling noxious weeds and maintaining weed free areas. Potentially restore mostly native prairie areas by reducing cheatgrass cover through using native seed mixes.
- **Ruderal Communities (CEGL005264, A3849, CEGl003019):** Control non-native communities from spreading to nearby healthy communities by implementing the Noxious Weed Management Plan. Convert these communities to native vegetation by following suggested seed mixes.

## **Current Conditions: Rare Plants**

Six CNHP-tracked plant species and six CNHP-tracked plant communities have potential to occur within Eldorado Canyon State Park. No rare plant species were found during the 2019 botanical inventory (Vickery 2019) or during the vegetation mapping surveys (Belmar 2019). The botanical inventory found two uncommon species of interest: Maryland sanicula (*Sanicula marilandica*) and Nevada blazingstar (*Mertzelia dispersa*) (Vickery 2019).

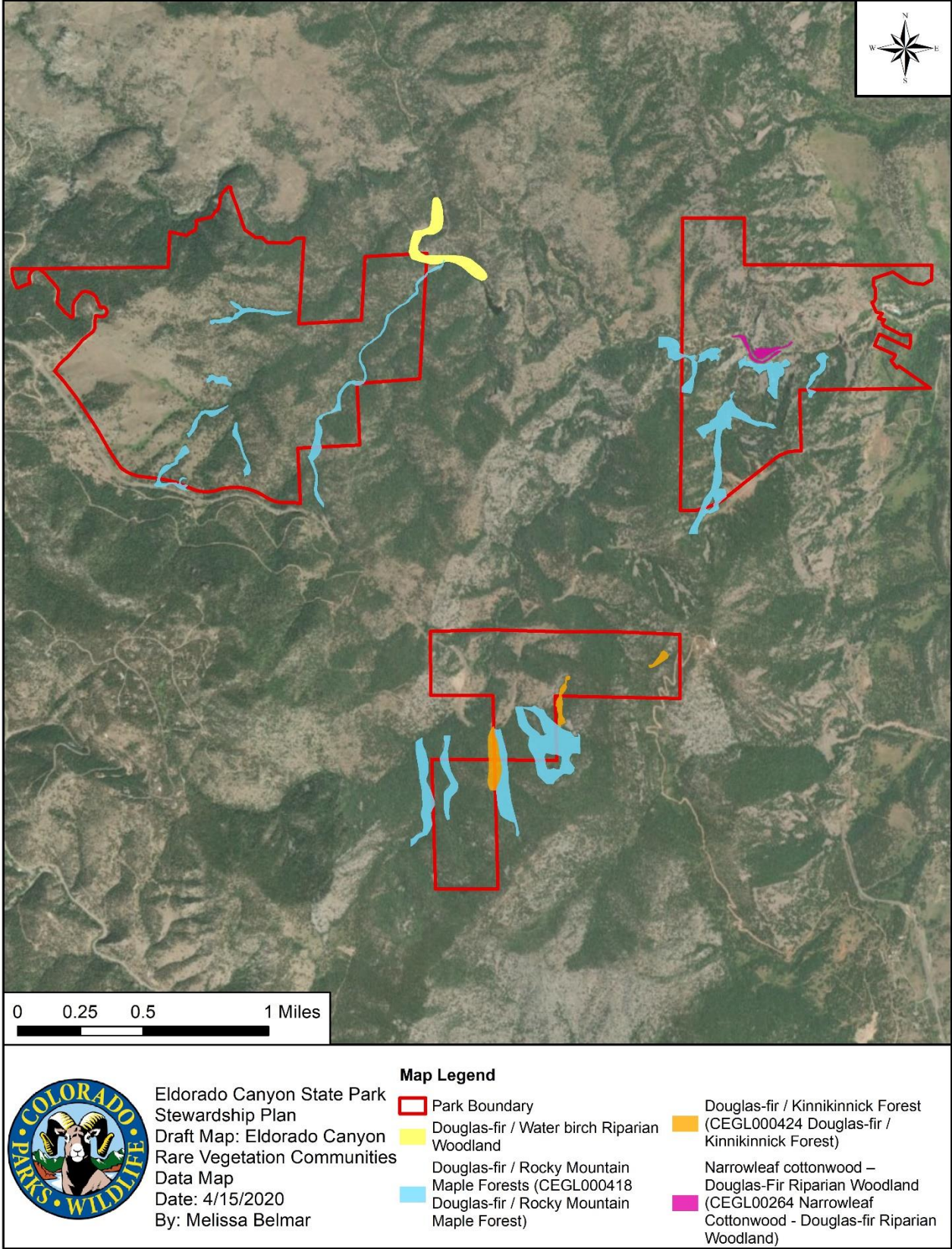
Historically, rare plant species have been documented in the Park. Strap-style gayfeather (*Liatris ligulistylis*) was previously documented in the vicinity of the Park in 1999 according the CNHP data but was not located during plant or vegetation surveys conducted in 2019. Dotted blazingstar (*Liatris punctata*) was found during the vegetation communities mapping surveys and is a similar species. Sprengel's sedge (*Carex spregelii*) was located in the vicinity in 1981 as documented by herbarium specimens. Since neither of these species have been documented for decades, they are considered no longer present in the Park.

Four rare plant communities have been documented within the Park. The Douglas-fir / water birch riparian woodland sensitive plant community was identified in the northeast corner of the Crescent Meadows Park area in 2004, during the previous vegetation mapping and plot survey. This community was unable to be verified in 2019. During the 2019 surveys, three new rare communities were identified: Narrowleaf cottonwood / Douglas-fir riparian woodland; Douglas fir / Rocky Mountain maple forest; and Douglas fir / kinnikinnick forest. Figure 3.25 displays the locations of the rare communities.

The two great Plains Mixed Grass Prairie rare communities with potential to occur were likely present prior to grazing disturbance at the Park in Crescent Meadows and were classified as A4031 Western Wheatgrass - Green Needlegrass Northwestern Great Plains Grassland or CEG003019 Ruderal Cheatgrass Annual Grassland as a result of this vegetation community classification. However, due to the condition of the areas, they are unlikely to qualify as a rare community as they currently exist.



**Figure 3.25.** Rare Vegetation Communities at Eldorado Canyon State Park.



## Resource Trajectory

Three rare communities were confirmed in the Park in 2019, and an additional community was found historically in 2004. Maintaining these rare communities and the rare plant populations through noxious weed control is a priority. Additionally, two rare plant species have occurred in or near the Park in the past but have not been found for several years. Disturbance to native vegetation and introduction of noxious weeds have likely reduced habitat quality for rare plants at the Park. Exotic species compromising the natural vegetation communities and habitat for rare plants is a continuing issue. Control of non-native species is essential in order to see rare plants occur in the Park again. Habitat improvement actions, such as targeting exotic species by following the Noxious Weed Management Plan will continue to increase the possibility of rare plant occurrences.

## Desired Future

The desired future for Eldorado Canyon's rare plant communities and species is to improve habitat conditions and continue to monitor for species in the future. Management and control of noxious weed species is critical to maintaining the integrity of the habitat upon which rare plants depend. Control should begin with the least harmful process (hand pulling or seedhead removal) before moving toward use of chemicals or other less targeted techniques. Biocontrol may be an option for some invasive species, however consultation with experts, both botanists is always warranted when considering the use of chemicals and/or biocontrol. Decisions should be made on a site-by-site basis to prevent (or minimize) negative impacts to non-target rare plant species. Specific desired future goals for rare plants analyzed include:

- **Douglas-fir / water birch riparian woodland and Narrowleaf cottonwood / Douglas-fir riparian woodland Rare Communities** - Riparian habitats are being degraded by vegetation trampling and noxious weed spread. Controlling these two disturbances would improve habitat for these communities and help to ensure the two communities remain in good condition.
- **Douglas fir / Rocky Mountain maple forest and Douglas fir / kinnikinnick forest** – These two communities are found in upland areas and are often found near trails. Encouraging visitors to stay on the trail will help to prevent degradation of these communities through noxious weed introduction and vegetation trampling.
- **Rare plants** - Controlling noxious weed populations and off-trail hiking by visitors in general will foster habitats that support rare plants that have potential to occur in the Park. Closing and revegetating social trails that overlap with potential habitat for rare plants may increase the likelihood that rare plants exist in the Park again.



## **Resource Element Description: Wildlife**

### **Resource Summary: Wildlife and Rare Animals**

#### **Significant features**

- The large expanses of open space and variety of habitats with the Park provides a respite from human encroachment for many wildlife species including deer, elk, black bear, and mountain lion.
- The cliff faces at the Park provide abundant habitat for raptors.
- The perennial flow of South Boulder Creek provides connectivity habitat and streams in Crescent Meadows provide potential suitable habitat for the federally threatened Preble's meadow jumping mouse. The deep ravines provide habitat for wild hops, which in turn provides habitat for the state imperiled butterfly, the hops feeding azure.
- Crescent Meadows wetlands may potentially provide habitat for the sensitive northern leopard frog if restored and enhanced.

#### **Threats**

- Noxious Weeds - These alien plants typically have little wildlife value and, if left unchecked, can reduce the amount and quality of wildlife habitat. This can have serious negative impacts on local wildlife, in terms of both numbers and diversity.
- Degradation of valuable cliff habitat from rock climbing routes – Many birds use the rocky outcrops and cliff faces for shelter and nesting. Increases in climbing routes and the number of people using them can have a negative effect on bird use of these areas.
- Loss of habitat through development – Development of trails and climbing areas within the Park will create a direct loss of habitat, and also a loss of “effective” habitat through increased human activity associated with a State Park.

## **Description**

### **Wildlife**

Eldorado Canyon State Park provides habitat for many species of wildlife common to the foothills of the Front Range and provides opportunities for the public to witness both wildlife and outstanding scenery within close proximity of major metropolitan areas. The presence of many charismatic wildlife species creates opportunities for the public to not only view the wildlife, but also to become educated about the need to conserve their habitats. Primary habitats for wildlife at Eldorado Canyon include ponderosa pine woodlands, Douglas-fir forest, mixed foothills shrubland, short and mixed grass prairie, and riparian and wetland communities. Further, the numerous cliffs and cliff faces provide suitable habitat for many cliff-dwelling bird species.

Large mammals inhabiting the area include mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), black bear (*Ursus americanus*), bobcat (*Lynx rufus*), fox (*Vulpes vulpes*), coyote (*Canis latrans*), and mountain lion (*Puma concolor*). Riparian areas and drainages in the Park serve as movement corridors for these animals. Large tracts of coniferous forests and edge habitat provide preferred vegetation communities and structure for species such as elk and mule deer.

The Park provides habitat for a diversity of avian species. Surveys conducted in the Park found that over 82 species of migratory and residential birds use the Park’s habitats, at least 31 of which are confirmed to breed on Park property. Species observed that are more common for the area and habitats present in the Park include yellow warbler (*Setophaga petechia*), house wren (*Troglodytes aedon*), Stellar’s jay (*Cyanocitta stelleri*), black-capped chickadee (*Poecile atricapillus*), and American robin (*Turdus migratorius*). Raptors commonly nest in the Park on the many rocky outcrops and mature trees. Raptors are an essential component of the ecosystem at the Park.

South Boulder Creek provides aquatic, riparian, and wetland habitats for numerous wildlife species. A number of fish species can be found to use the creek, including trout, longnose (*Catostomus catostomus*) and white (*Catostomus commersonii*) suckers, and the longnose dace (*Rhinichthys cataractae*). Several species of reptiles and amphibians could occur in the Park in wetland, riparian, rocky areas, and shrublands. A survey conducted in 2019 found the presence of three species.

### Rare Animals

Eldorado Canyon State Park may provide habitat for approximately 41 rare animal species, of which 15 have historically been documented in the Park. A summary of the rare animal species with potential to occur in Eldorado Canyon State Park is provided below in Table 3.2. This list includes one amphibian, 25 birds, five invertebrates, and 10 mammals.

**Table 3.2.** Rare animal species with potential to occur in Eldorado Canyon State Park.

Scientific Name	Common Name	Federal Status	Global Rank / State Rank	CPW Rank	Element Occurrence Rank <sup>1</sup>
<b>Amphibians</b>					
<i>Lithobates pipiens</i>	Northern leopard frog	-	G5 / S3	SC, Tier 1	NA (not detected)
<b>Birds</b>					
<i>Accipiter gentilis</i>	Northern goshawk	-	G5 / S3B	Tier 2	NA (not detected)
<i>Aimophila cassinii</i>	Cassin’s sparrow	-	G5 / S4B	Tier 2	NA (not detected)
<i>Ammodramus savannarum</i>	Grasshopper sparrow	-	G5 / S3S4B	Tier 2	NA (not detected)
<i>Athene cunicularia</i>	Burrowing owl	-	G4 / S4B	ST, Tier 1	NA (not detected)
<i>Aquila chrysaetos</i>	Golden eagle	-	G4 / S3B, S4N	Tier 1	E (detected in 2019)
<i>Botaurus lentiginosus</i>	American bittern	-	G4 / S3S4B	Tier 2	NA (not detected)
<i>Calamospiza melanocorys</i>	Lark bunting	-	G5 / S4	Tier 2	NA (not detected)
<i>Circus cyaneus</i>	Northern harrier	-	G5 / S3B	Tier 2	NA (not detected)
<i>Contopus cooperi</i>	Olive-sided flycatcher	-	G4 / S3S4B	Tier 2	H (detected in 2015)
<i>Dolichonyx oryzivorus</i>	Bobolink	-	G5 / S3B	Tier 2	NA (not detected)
<i>Falco mexicanus</i>	Prairie falcon	-	G5 / S4B, S4N	Tier 2	H (detected in 2015)

Scientific Name	Common Name	Federal Status	Global Rank / State Rank	CPW Rank	Element Occurrence Rank <sup>1</sup>
<i>Falco peregrinus</i>	Peregrine falcon	-	G4T4 / S2B	Tier 2	NA (not detected)
<i>Haliaeetus leucocephalus</i>	Bald eagle	-	G4 / S1B, S3N	SC, Tier 2	H (detected in 2017)
<i>Lanius ludovicianus</i>	Loggerhead shrike	-	G4 / S3S4B	Tier 2	H (detected in 2017)
<i>Leucosticte australis</i>	Brown-capped rosy-finch	-	G4 / S3B, S4N	Tier 1	NA (not detected)
<i>Melanerpes lewis</i>	Lewis's woodpecker	-	G4 / S4	Tier 2	H (detected in 2015)
<i>Oreothlypis virginiae</i>	Virginia's warbler	-	G5 / S5	Tier 2	H (detected in 2015)
<i>Otus flammeolus</i>	Flammulated owl	-	G4 / S4	Tier 2	H (detected in 2006)
<i>Passerina amoena</i>	Lazuli bunting	-	G5 / S5B	Tier 2	H (detected in 2017)
<i>Patagioenas fasciata</i>	Band-tailed pigeon	-	G4 / S4B	Tier 2	NA (not detected)
<i>Peucaea cassinii</i>	Cassin's finch	-	G5 / S5	Tier 2	H (detected in 2015)
<i>Seiurus aurocapilla</i>	Ovenbird	-	G5 / S2B	-	E (detected in 2019)
<i>Selasphorus rufus</i>	Rufous hummingbird	-	G5 / SNA	Tier 2	NA (not detected)
<i>Spizella breweri</i>	Brewer's sparrow	-	G5 / S4B	Tier 2	NA (not detected)
<i>Strix occidentalis lucida</i>	Mexican spotted owl	FT	S1B,SUN	ST, Tier 2	NA (not detected)
<b>Invertebrates</b>					
<i>Callophrys mossii schryveri</i>	Moss's elfin	-	G4 / S2S3	Tier 2	H (detected in 2009)
<i>Celastrina humulus</i>	Hops feeding azure	-	G2G3 / S2	Tier 2	H (detected in 1998)
<i>Erynnis martialis</i>	Mottled duskywing	-	G3 / S2S3	Tier 2	H (detected in 1998)
<i>Hesperia ottoe</i>	Ottoe skipper	-	G3G4 / S2	Tier 2	NA (not detected)
<i>Polites origenes</i>	Cross-line skipper	-	G4G5 / S3	-	NA (not detected)
<b>Mammals</b>					
<i>Corynorhinus townsendii</i>	Townsend's Big-eared bat	-	G4 / S2	Tier 1	H (detected in 1972)
<i>Cynomys ludovicianus</i>	Black-tailed prairie dog	-	G4/ S3	SC, Tier 2	NA (not detected)
<i>Lasiurus borealis</i>	Eastern red bat	-	G2G3 / S2	-	NA (not detected)
<i>Lasiurus cinereus</i>	Hoary bat	-	G5 / S5B	Tier 2	NA (not detected)

Scientific Name	Common Name	Federal Status	Global Rank / State Rank	CPW Rank	Element Occurrence Rank <sup>1</sup>
<i>Lynx canadensis</i>	Canada lynx	FT	G5 / S1	SE, Tier 1	NA (not detected)
<i>Myotis lucifugus</i>	Little brown myotis	FP	G3 / S5	Tier 1	NA (not detected)
<i>Myotis thysanodes</i>	Fringed myotis	-	G4 / S3	Tier 1	NA (not detected)
<i>Perimyotis subflavus</i>	Tricolored bat	-	G2G3 / S2	-	NA (not detected)
<i>Sciurus aberti</i>	Abert's squirrel	-	G5 / S5	Tier 2	H (detected in 2019)
<i>Zapus hudsonius preblei</i>	Preble's meadow jumping mouse	FT	G5T2 / S1, ST	ST, Tier 1	NA (not detected)

Sources: (CPW 2002, 2019c; CPW et al. 2010; Jones 2015; Swigart & Jamison 2017; Triage et al. 2019)

FP – Federally Proposed, FE – Federally Endangered, SE – State Endangered, ST – State Threatened, SC - State Special Concern

<sup>1</sup> Element occurrence ranking definitions: E = extant, H = historical, X = extirpated

Global Ranking Codes: G3, vulnerable to extirpation or extinction; G4, widespread, abundant, and apparently secure; G5, demonstrably widespread, abundant, and secure; T, rank applies to subspecies or variety.

State Ranking Codes: S1, state critically imperiled; S2, state imperiled; S3, state rare or uncommon; S4, state apparently secure; B, breeding populations; N, non-breeding populations.

## **Current Conditions: Wildlife**

Wildlife populations at Eldorado Canyon State Park are currently in good condition. The results from monitoring programs have provided valuable data for making sound resource management decisions. Park management has done an excellent job in monitoring the impacts of climbing activities on raptors, implementing the appropriate route closures, and educating recreation users.

However, conditions in other parts of the Park may be limiting wildlife communities. Noxious weed infestations occur in both the Inner Canyon riparian areas and in Crescent Meadows, threatening to displace native vegetation upon which wildlife depends. Riparian areas subject to high volumes of visitors in the Inner Canyon are highly degraded exhibiting incised banks and trampled vegetation. These conditions are poor for fish habitat and other aquatic species. Ponderosa pine forests in and around Eldorado Canyon are overly dense and are predominantly even-aged trees vulnerable to large, catastrophic fires and insect epidemics. Suppression of natural thinning processes, such as fire, have contributed to these conditions. Wildlife habitat and diversity would be increased with a more multi-layered canopy and understory, higher percentage of saplings and young trees, as well as more snags. Recent forestry management practices were done with the intention of accomplishing this goal.

## **Amphibians and Reptiles**

Amphibian and reptile habitat is present within the Park but is very limited. Tributary drainages such as Rattlesnake Gulch, South Draw, and Johnson Gulch provide riparian habitat and rocky cliffs, slopes, and outcrops that can host a variety of herptile species. Wetland habitat is also found along South Boulder Creek and Crescent Meadows.

Noxious weed infestations occur in both the Inner Canyon riparian areas and in Crescent Meadows, threatening to displace native vegetation upon which herptile species depends. Riparian areas subject to high volumes of visitors in the Inner Canyon are highly degraded exhibiting incised banks and trampled vegetation. These conditions are poor for herptile species.

Native herptile species that are likely to occur in the Park: western tiger salamander (*Ambystoma mavortium mavortium*), Woodhouse's toad (*Anaxyrus woodhousii*), wandering gartersnake (*Thamnophis elegans vagrans*), eastern yellow-bellied racer (*Coluber constrictor flaviventris*), prairie rattlesnake (*Crotalus viridis*), bullsnake (*Pituophis catenifer sayi*), smooth green snake (*Opheodrys vernalis*), and prairie lizard (*Sceloporus consobrinus*). Northern leopard frog (*Lithobates pipiens*) could possibly occur in the Park with habitat restoration activities. American bullfrog (*Lithobates catesbeianus*) is a non-native species that could be present at the Park.

**Figure 3.26.** Prairie lizard is one of the three species documented during herptile surveys in 2019 at the Park.



Source: Triece et al. 2019

Surveys for herpetological species and habitats were conducted in 2019 and a zoological assessment was conducted in 1998 (CNHP 1998; Triece et al. 2019). The 1998 zoological survey did not document any herptile species. As a result of the 2019 surveys, three species were detected including: wandering gartersnake, prairie lizard, and smooth greensnake. The smooth greensnake occurrence was unconfirmed however. Wandering gartersnake was the most numerous and wide-ranging species detected (Triece et al. 2019). Park staff noted they saw a western tiger salamander in 2017 (McHugh & Carson 2020).

Prairie rattlesnake activity is high in the Park and some areas provide higher quality habitat. Habitat for the species is available in areas with open grasslands, semi-desert shrubland, riparian zones, and montane woodlands up to 9,500 feet in elevation (COPARC 2018).

The stream seep in Crescent Meadows is potential amphibian breeding habitat. If restored, it could provide areas for amphibian egg and larvae development. Native vegetation benefits amphibians by providing breeding and

egg incubation habitat. The shallow water and vegetation allow tadpoles to develop with reduced predation risk from fish, birds, and other potential predators. Additionally, tadpoles and young frogs persist in the habitat on various invertebrate larvae (aquatic stage) and adults.

Although currently unknown from the area, invasive American bullfrogs should be routinely monitored for, as populations are known downstream in Boulder County. Any efforts that can be made to screen the fry for bullfrog eggs and larvae will substantially reduce the presence of this invasive species and enhance the potential for native amphibians. These introduced amphibians have caused a decline in native species, particularly the northern leopard frog (Triece et al. 2019). The northern leopard frog, which could be present, is likely vulnerable to predation by the bullfrog and predatory fish (Hammerson 1999).

Numerous habitat enhancement opportunities are present for reptiles and amphibians at the Park. More details about these recommendations may be found in the 2019 report (Triece et al. 2019).

## **Birds**

Eldorado Canyon State Park supports a diverse assemblage of migratory and breeding birds. The Park contains diverse habitats such as wetlands and riparian areas with large cottonwood trees and dense shrubby understory. These areas typically attract species such as black-headed grosbeak (*Pheucticus melanocephalus*), song sparrow (*Melospiza melodia*), yellow warbler, house wren, and warbling vireo



(*Vireo gilvus*). The property also contains unique cliff faces and canyons that attract a wide-variety of uncommon species such as white-throated swift (*Aeronautes saxatalis*), golden eagle (*Aquila chrysaetos*), and prairie falcon (*Falco mexicanus*). The dense coniferous forests in the Park covers the majority of land present and provide excellent habitat for a large number of species. Some species that may occur in the coniferous forests include western tanager (*Piranga ludoviciana*), white-breasted nuthatch (*Sitta carolinensis*), and red crossbill (*Loxia curvirostra*). Grasslands are primarily present in the Crescent Meadows parcel and provide important foraging and breeding grounds for numerous species, including mountain bluebird (*Sialia currucoides*), vesper sparrow (*Pooecetes gramineus*), and lesser goldfinch (*Spinus psaltria*).

Bird surveys were completed in 2015 and documented 82 species of birds from surveying 12 points in the Park. Of the birds observed, 31 were confirmed to be breeding in the Park. Combining the survey results with other sources such as Ebird found a total of at least 101 species within the Park during their documented nesting season and 45 of these species have been confirmed nesting (Jones 2015).

Data for bird species is presented in Figure 3.28. Additional data on rare bird species is discussed in the rare animals section and is presented on Figure 3.31.

### Waterbirds, Shorebirds, and Wading Birds

Waterfowl and shorebird habitat within the Park is limited by the steep topography and the absence of lakes or ponds. No waterfowl or shorebird nesting was documented during the 2015 survey. Species documented on the surveys include common merganser (*Mergus merganser*) and Wilson's snipe (*Gallinago delicata*). Other species documented in the Park through other resources such as Ebird include mallard (*Anas platyrhynchos*) and Canada goose (*Branta canadensis*) (Jones 2015). Habitat for these species is present along South Boulder Creek and in wetlands found in the Crescent Meadows parcel.

### Raptors

Raptor monitoring has occurred at Eldorado Canyon State Park since 2006. Species observed during the 2019 monitoring season include bald eagle (*Haliaeetus leucocephalus*), rough-legged hawk (*Buteo lagopus*), golden eagle, red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), and American kestrel (*Falco sparverius*). Species observed in past years include, Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), red-tailed hawk, prairie falcon, and golden eagles.

Fewer than 20 golden eagle nest sites have been documented within Boulder County, and no more than 12 of those appear to be active during any given year (Lederer & Figgs 2015), so protection of this species is of high priority. In addition, nesting golden eagles are protected under the federal Bald and Golden Eagle Protection Act (BGEPA), and recreationists can be fined for disturbing an active nest (Jones 2015).

Prairie falcon, American kestrel, great horned owl (*Bubo virginianus*), and northern pygmy owl were also documented using the Park in 2015 during breeding bird surveys (Jones 2015). CNHP also has historical occurrence records for ferruginous hawk in the Park (1984, 1993), but this data is not displayed due to its historic nature.

### Game Birds

Game bird species documented in the Park include dusky grouse (*Dendragapus obscurus*) and wild turkey (*Meleagris gallopavo*) (Jones 2015; Swigart & Jamison 2017). CPW Species Activity Mapping

**Figure 3.27.** Golden eagles, a protected raptor species, have nested in the Park for several years at a few different locations.

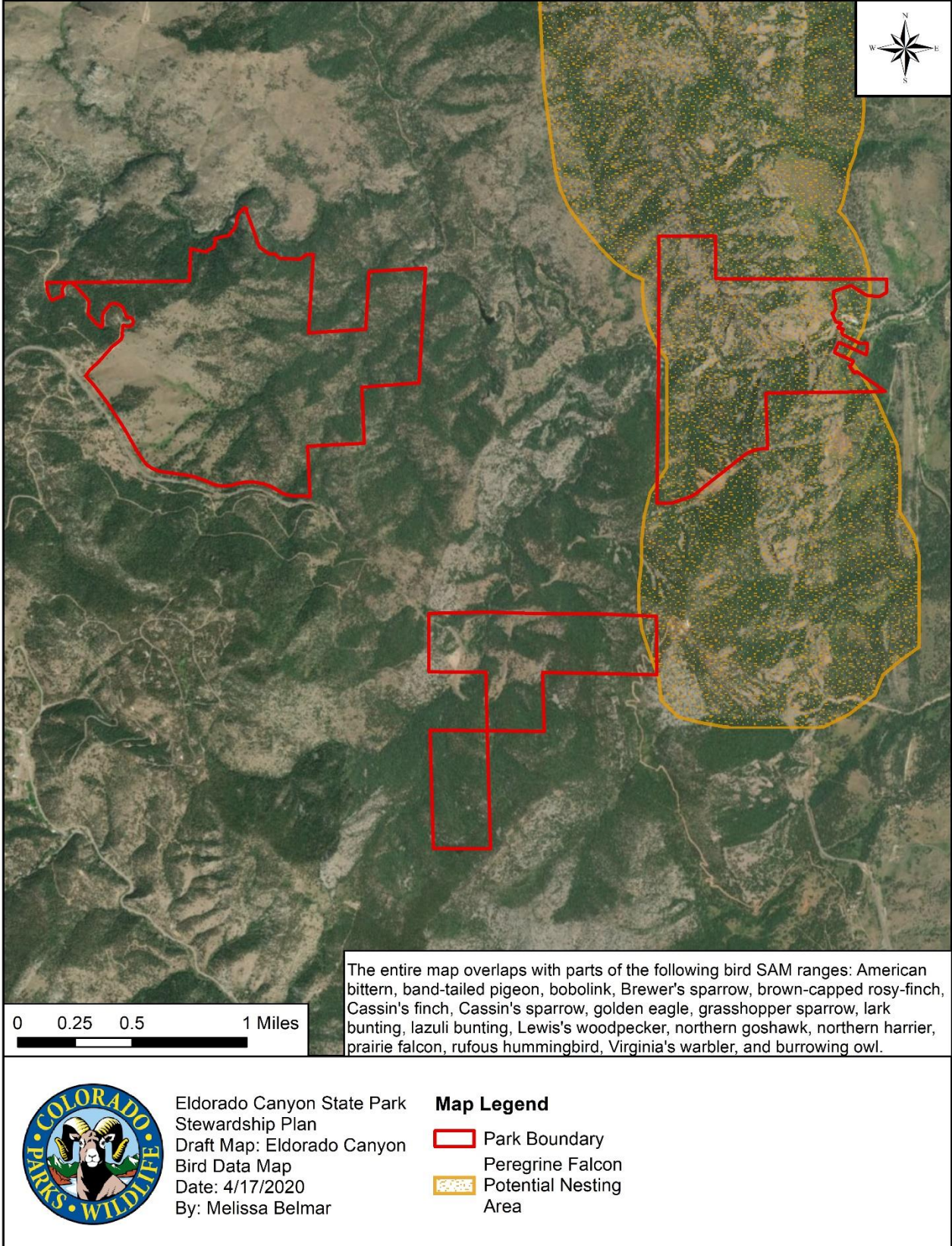


Source: Cornell Lab of Ornithology

data for wild turkey overall range and winter range area overlaps with the Park and a concentration area is located just north of the Park (Figure 3.28).



**Figure 3.28.** Bird Data for Eldorado Canyon State Park.



## **Fish**

Fishing is becoming increasingly popular on South Boulder Creek as people escape from the urban areas to a close, tranquil setting. The dominant species in the creek are rainbow and brown trout. Other fish found there include brook trout (*Salvelinus fontinalis*), longnose dace, and longnose and white suckers. Many of these fish are found naturally in South Boulder Creek, others have found their way downstream to the Park from Gross Reservoir where they are stocked by CPW (CPW 2000). Fish populations are increasingly being affected as fishing pressure is concentrated in a small area and fish habitat structures have been disturbed in certain locations.

## **Invertebrates**

The hops feeding azure, mottled duskywing, and Moss' elfin (*Callophrys mossii*), three rare butterflies, were historically observed in Eldorado (CNHP 1998; Swigart & Jamison 2017). Additionally, Ottoe skipper (*Hesperia ottoe*) and cross-line skipper (*Polites origenes*) all have previous occurrence records nearby that are documented by the CNHP element occurrence data. These species are discussed in more detail in the Rare Animals section. Park staff see the rare hops feeding azure butterfly nearly every year in the Inner Canyon parcel. CNHP plans to conduct a survey in the Park in 2020 to confirm these findings.

Surveys conducted from 2007 through 2013 by volunteers for butterfly species in Crescent Meadows found the presence of approximately 40 butterfly species present (Swigart & Jamison 2017). This study shows the extreme invertebrate diversity present in the Park and the need for further invertebrate inventories.

## **Mammals**

Eldorado Canyon State Park contains and connects large tracts of land that provide excellent habitat for mammalian species. Several well-vegetated drainages in the Park provide links to adjacent montane and plains habitats for species such as mule deer, black bear, and mountain lion. Bighorn sheep are a rare sight in the Park, but have been documented by Park staff in 2017 and 2018. Small mammals also occur in the Park and include several common species for the state of Colorado, such as raccoon, muskrat, beaver, Abert's squirrel, and fox squirrel. The Jefferson County parcel is largely undeveloped and provides ample habitat with minimal impacts to wildlife.

**Figure 3.29.** Red fox is a mammalian species that commonly uses the Park as habitat.



Source: CPW

## **Elk and Deer**

The Park provides ample habitat for both elk and mule deer. Elk likely utilize the semi-open ponderosa pine forests and forest edge habitats present throughout much of the property (Fitzgerald et al. 1994).



Mule deer could be found in open meadows and montane forest edge in the summer and montane forests with adequate shrubby understory in the winter. The Park contains ample browse of trees, shrubs, grasses and forbs for both species throughout the year. The two species do not typically compete for resources and therefore are able to coexist on resources provided by Park land. Both species are seasonally migratory and move from higher elevations in the summer to lower elevations in the winter (Fitzgerald et al. 1994).

CPW Species Activity Mapping overall range, summer range, and winter range for mule deer and elk overlaps with the entire Park. Mule deer severe winter range, winter concentration area, and resident population ranges all overlap with portions of the Park. Elk severe winter range also overlaps with parts of the Park. Figure 3.30 displays range data for these species.

Eldorado Canyon State Park is within game management unit (GMU) 29 and the data analysis unit (DAU) for deer is 27 and elk is 38 (CPW 2019d). Hunting is permitted within the Crescent Meadows south of the trail to the railroad tracks from after Labor Day to Memorial Day. It is important to note that chronic wasting disease (CWD) has been documented within GMU 29 (CPW 2019e). CWD is a fatal neurological disease found in deer, elk, and moose. It belongs to a family of diseases caused by prions (misfolded protein). This particular prion disease attacks the brains of infected deer, elk, and moose, causing the animals to display abnormal behavior, become uncoordinated and emaciated, and eventually die (CPW 2017b).

### **Black Bear and Mountain Lion**

Habitat for both black bear and mountain lion exists throughout the Park in the canyons, coniferous and deciduous woodlands, and riparian areas. Black bears are highly adaptable to landscapes, as long as food availability is present (Fitzgerald et al. 1994). In recent years, the species has become much more common along the Front Range of Colorado and individuals frequently travel into the western suburbs of the urban zones. Black bears are likely present throughout the Park and take advantage of food sources such as raspberry and chokecherry shrubs. The Park provides ample vegetative and rock outcrops for escape cover. Like black bears, mountain lions have also become more common along the Front Range of Colorado, especially in the Boulder area. Mountain lions are likely to utilize the rough canyon terrain, montane coniferous forests, and shrublands in the Park as habitat. The Park supports populations of deer and elk, which are prey for the species (Fitzgerald et al. 1994).

CPW Species Activity Mapping data for black bear and mountain lion overall range overlaps with the entire Park. Additionally, black bear fall concentration area overlaps with the Inner Canyon Parcel. Figure 3.30 displays range areas for these two species.

### **Moose**

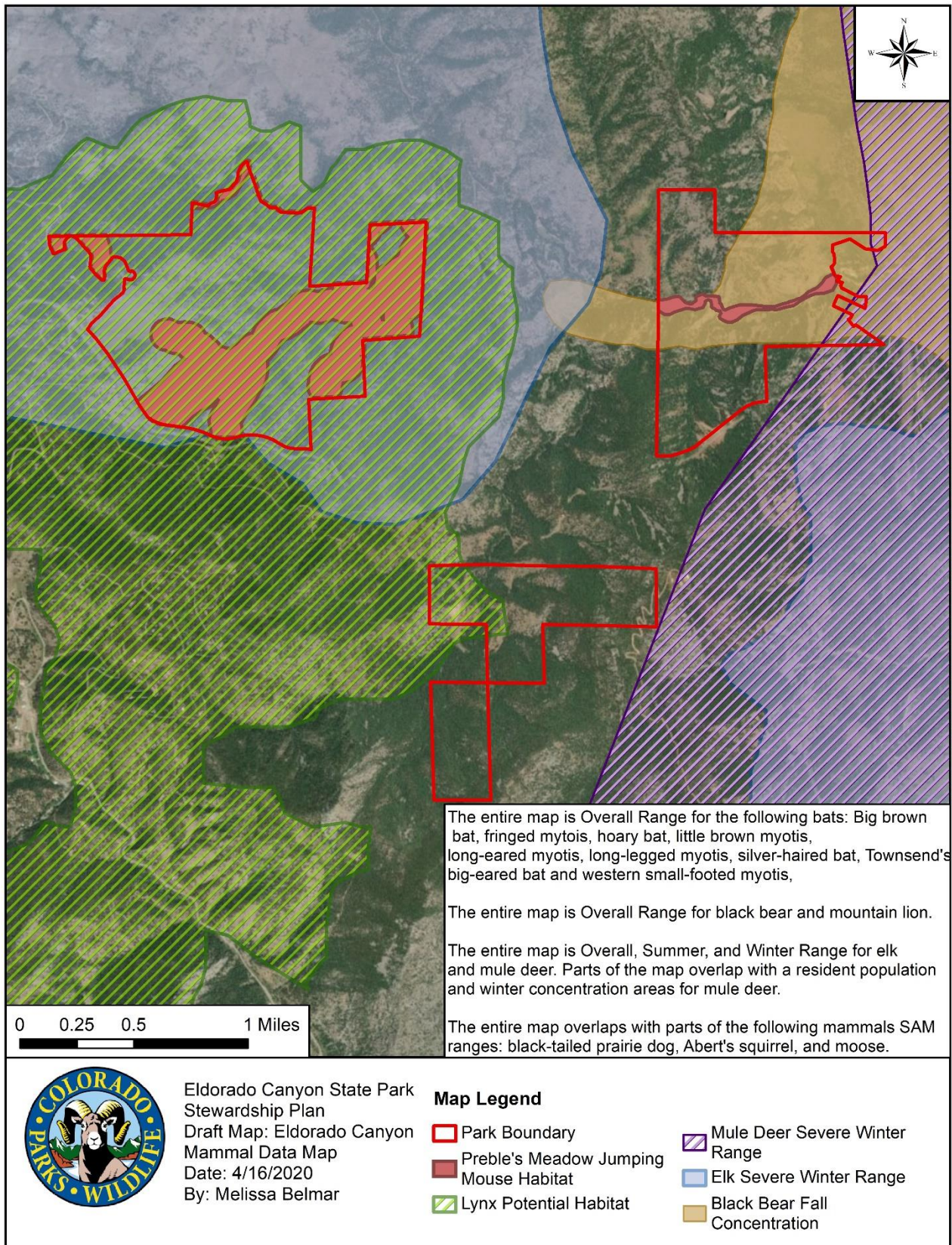
Moose prefer openings in forests adjacent to water with species such as willow, aspen, alder, and birch (Fitzgerald et al. 1994). Habitat for this species is sparse in the Park, and it is unlikely to occur. However, it is possible the species could wander into the Park considering available habitat in the surrounding areas, including Gross Reservoir. A moose was documented in 2017 in Crescent Meadows by volunteers surveying the parcel for natural resources (Swigart & Jamison 2017) and in the Inner Canon in 2017 by Park staff. CPW Species Activity Mapping data for moose overall range overlaps with the western-side of Crescent Meadows.

### **Bat Species**

The CPW Species Activity Mapping data shows several bat species' ranges as overlapping with the Park. Big brown bat, long-eared myotis (*Myotis evotis*), long-legged myotis (*Myotis volans*), silver-haired bat (*Lasiorycteris noctivagans*), and western small-footed myotis (*Myotis leibii*) all overlap with the Park. In addition to these species, six rare bat species could also occur in the Park, as their Species Activity Mapping ranges also overlap with the Park. These species are discussed in the Rare Animals section. Habitat for bat species may be present on rock outcrops in crevices, cracks, and caves, in snags, and trees in both upland and riparian areas.

Bat surveys were conducted in 1998 when CNHP did a zoological inventory of the Park. To survey the bat population one Japanese mist net was set across a pool in South Boulder Creek beneath the rock formation named the Whale's Tail. However, this report did not document any bat occurrences as a result of the survey (CNHP 1998).

**Figure 3.30.** Mammal Data for Eldorado Canyon State Park.



## **Resource Trajectory**

As has happened all over Colorado, the encroachment of development poses huge problems for wildlife in terms of habitat loss. The Park is partially protected due to a high amount of conserved public lands in the surrounding areas, but development is still occurring from homes being built in the vicinity of the Park. These trends are expected to continue in future years.

The mammals that occur in the Park are, for the most part, extremely tolerant of human activity. These species, such as raccoon, coyote, and red fox will have no problem and will use the Park in a manner relatively confluent with the adjacent developed landscape. However, larger ranging species such as elk, mountain lion, and black bear will likely incur disturbance with increased human activity. The human-wildlife interface that the Park presents creates room for conflict between humans and these species.

The migratory birds will continue to use the Park for its vast forested areas, grasslands, and shrublands. Continued management of forests to ensure proper forest succession and stand health will only increase the habitat value for migratory birds in the long run. open water for raptors and waterfowl is critical to keeping foraging and nesting habitat available for various species year-round. Maintenance of wetland and riparian areas for dependent species is also important, and removal of noxious weeds could improve habitat for a variety of species. Preservation of existing native grasses and removal of invasive species will improve grassland habitat for species dependent upon these areas. However, nesting success of many bird species in the Park may decline over time due to habitat encroachment, invasive species, and increased disturbance from Park visitors.

Reptiles and amphibians could experience impacts from the spread on invasive species in wetland habitats, which could reduce the amount of suitable habitat for amphibian species that require cover but not dense vegetation. If bullfrogs are eventually found in the Park, they could cause a decline in native species. However, restoration activities could help to introduce the northern leopard frog to the Park, which has not been found in recent years.

## **Desired Future**

The desired future for wildlife is maintaining viable populations of the existing resident fish and wildlife species, with the wildlife supported by healthy and diverse natural communities. In order to protect biodiversity, Park management should strive for continued high habitat quality to encourage raptor, small mammal, reptile, and amphibian breeding. This may mean seasonal trail closures and/or curtailing visitation at certain times of the year to assure this happens. More specifically:

- A healthy forest ecosystem exemplifying more characteristics of forests subject to natural thinning processes. These forests should provide better conditions for use by mammals, insects, and birds.
- Degraded riparian areas on South Boulder Creek are restored to protect more habitat for fish, amphibian, and reptile species.
- All of the bird species that currently nest in the Park will continue to do so. Other raptor species continue to use the Park for nesting and foraging. Appropriate trail and rock climbing route closures are continued to be implemented to protect nesting bird species.
- Native amphibians and reptiles will continue to use the Park as habitat. The Park contains good habitat for amphibians and habitat can be further improved to better provide for these species by eliminating invasive plants species, discouraging the creation of social trails in habitat areas, and not allowing development in sensitive habitat areas.
- Regular monitoring will continue for amphibians, raptors, and breeding birds present in the Park, in addition to consistent communication with the Park Manager to share information regarding wildlife management and sightings.



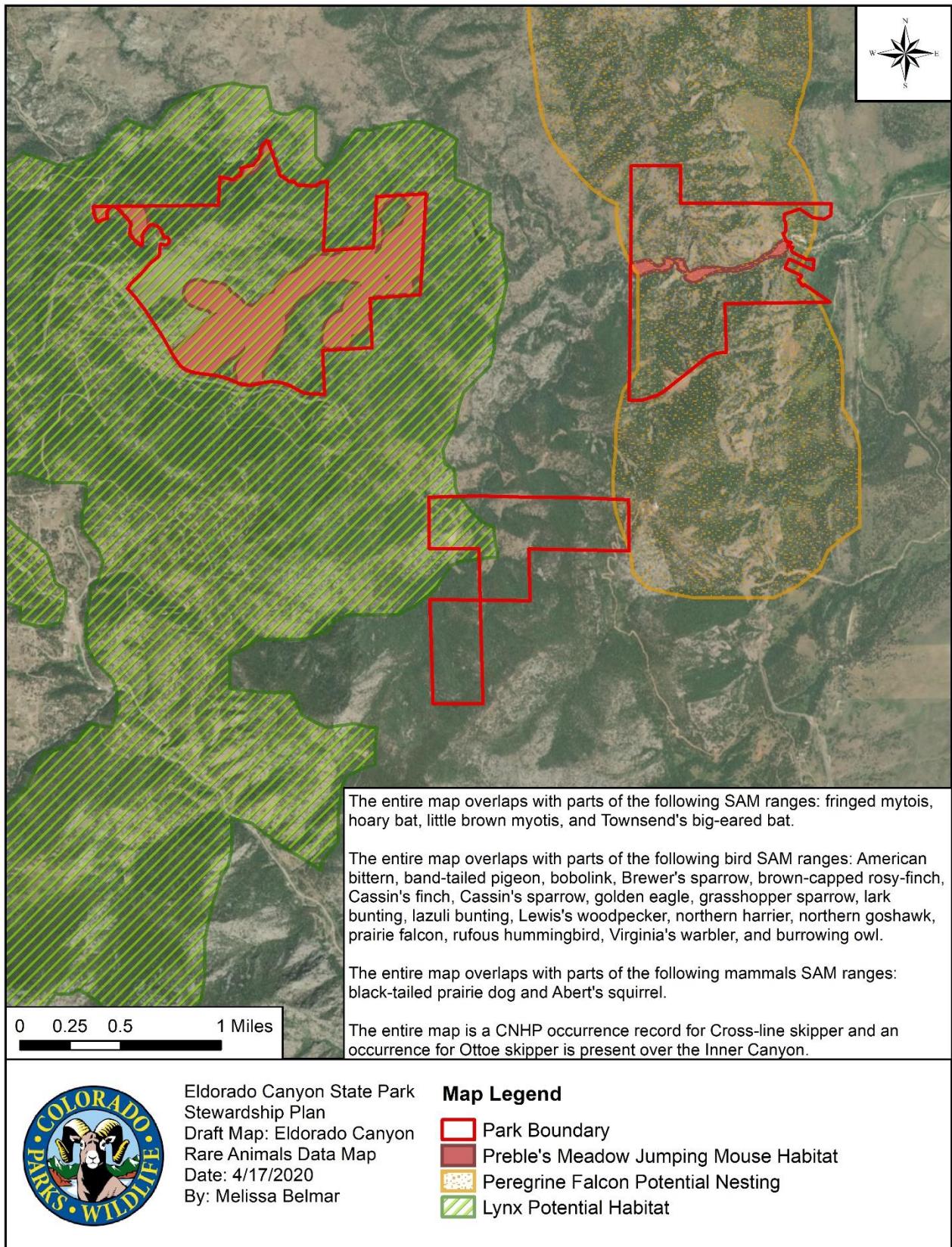
- Riparian and wetland areas will remain in good condition and regular upkeep should occur to maintain these important habitat areas for wildlife species currently present. Protect these areas by limiting new development, including facilities and trails. Also, protect natural vegetation connectors between riparian and upland areas to provide protected travel corridors between riparian and other habitats.
- Potentially restore and integrate new fish habitat structures to help alleviate pressures on species present. Many structures were destroyed in the 2013 flood and have not been replaced.
- Control and reduce the spread of noxious weed species should continue to maintain and improve wildlife habitat quality.
- The negative impacts of the trail system are minimized through maintenance of designated trails and restoration of social trails.
- Collaborative programs and decisions with open space management agencies adjacent to the Park are continued and enhanced. A boundary-less approach to natural resources management facilitates more comprehensive and successful management actions.

## **Current Conditions: Rare Animals**

Wildlife populations in general in Eldorado Canyon State Park appear to be in moderate to good condition. The varied habitats found at Eldorado Canyon provides for an equally diverse suite of wildlife species – both common and rare. However, the Park experiences higher amounts of disturbance due to elevated visitation levels.

Bird surveys performed in 2015 confirmed the presence of several rare bird species that are discussed in further detail in this section (Jones 2015). Additionally, the rare ovenbird was heard in 2019 in the Park. No rare amphibians or reptiles have been located in the Park, but habitat for the CNHP-listed northern leopard frog was found in Crescent Meadows in 2019 (Triece et al. 2019). Additionally, some of the riparian areas in the Park provide suitable migration and year-round habitat for the federally threatened Preble's meadow jumping mouse (CPW et al. 2010). The Park also provides potential habitat for six bat species that have not been previously found in the Park. Finally, three rare invertebrate species, hops feeding azure, Moss' elfin, and mottled duskywing, were historically documented on surveys in the Park (CNHP 1998; Swigart & Jamison 2017). Figure 3.31 displays the CNHP element occurrence data for species documented within or in the vicinity of the Park.

**Figure 3.31.** Rare Animal Data for Eldorado Canyon State Park.





## **Amphibians**

### **Northern Leopard Frog**

Northern leopard frogs are greenish-brown in color with a pearly white underside and large, rounded, or oval spots (CPW 2016). They reach lengths from head to vent of up to 4.3 inches. They breed from March to June depending on elevation, in shallow, quiet portions of permanent water sources or in areas of seasonal flooding with close connection to permanent water sources. They require a mosaic of habitats to meet the requirements of all of its life stages including wet meadows, banks of shallow marshes, ponds, lakes reservoirs, streams, and irrigation ditches (CPW 2016).

CNHP ranks the northern leopard frog as S3 (State ranked vulnerable to extirpation) and it is fully tracked. It is listed as a Tier 1 species by CPW State Wildlife Action Plan.

No individuals were located within the Park during the 2019 surveys. However, habitat for the species exists in wetlands in Crescent Meadows, which could be restored and enhanced to attract this species (Triece et al. 2019).

## **Birds**

Twelve species of special concern were previously documented within the Park during the 2015 breeding bird survey, other monitoring conducted in 2019, volunteer bird surveys from 2007-2017, or during focused owl surveys in 2006 (ERO Resources Corp. 2006; Jones 2015; Swigart & Jamison 2017; Belmar 2019). Two species of concern, golden eagle and Lewis's woodpecker, were confirmed to be breeding in the Park during the 2015 breeding bird surveys (Jones 2015).

Focused surveys for Mexican spotted owl (MSO) (*Strix occidentalis lucida*) were conducted at the Park in 2006 and 2007 (ERO Resources Corp. 2006, 2007). Although the surveys did not result in any sightings of the species, this species is discussed in more detail below because it is federally-listed under the Endangered Species Act (ESA).

### **Bald Eagle**

Bald eagles breed and nest in areas with at least some mature forests or riparian areas. Nests are built in tall trees or occasionally on cliff ledges. Access to water resources with active fish populations is key for foraging, as they rely primarily on fish as prey during spring and summer. However, the species may expand their prey base to include small mammals and birds in inland areas. The species has been recorded to nest at elevations up to 8,695 feet. Bald eagles were previously considered only a migrant or winter resident in Colorado, but now actively breed in the state. Nesting and egg-laying begins in February but can be much later at higher elevations. Fledglings have been observed as late as early August in the state (Wickersham 2016a). During the winter they congregate around larger rivers and open lakes and reservoirs where they roost in large or small numbers on cottonwoods and conifer snags adjacent to these water bodies (Rocky Mountain Ecological Services Inc. 2005).

Bald eagles are listed as a Tier 1 species under the Colorado State Wildlife Action Plan and a species of concern by the State of Colorado (CPW 2015b, 2017c). The species is also protected under the Bald and Golden Eagle Protection Act (BGEPA), administered by the US Fish and Wildlife Service (USFWS). Populations of bald eagles has increased since the banning of DDT in 1972. Threats are still present however and include illegal shootings, habitat loss and degradation, electrocutions, lead poisoning, and collisions (Wickersham 2016a).

**Figure 3.32.** Northern leopard frog is a rare amphibian species that could occur within the Park but has not been documented.



Source: CPW

An active nest was documented in 2001 approximately eight miles from the Park (CPW 2002) and a bald eagle was also sighted in Crescent Meadows in 2017 during breeding bird surveys conducted by volunteers (Swigart & Jamison 2017). Suitable habitat for the species is present near the Park at Gross Reservoir (Rocky Mountain Ecological Services Inc. 2005). The species could potentially use habitat along South Boulder Creek within the Park for foraging and winter roosting, but they have not been documented in the past.

### **Cassin's Finch**

Cassin's finch (*Haemorhous cassinii*) are primarily found breeding between 3,000 and 10,000 feet in mature forests of lodgepole pine and ponderosa pine. Occurrences have been documented in Jeffrey pine, Douglas-fir, limber pine, Engelmann spruce, subalpine fir, grand fir, red fir, pinyon pine, bristlecone pine, and quaking aspen (Cornell University 2019a). The majority of Colorado occurrences were in higher elevation coniferous and mixed aspen-coniferous forests. Cassin's finches are year-round residence in Colorado and are mostly seen west of the Front Range foothills (Lyon 2016a). Nests are typically located on top of a conifer tree or on a side branch away from the trunk (Cornell University 2019a).

Cassin's Finches are listed as a Tier 2 species in the State Wildlife Action Plan due to habitat disturbance, but other threats are poorly understood (CPW 2015b). Other threats could include predator threats and nest depredation by males ceasing to sing and defend their territories at onset of incubation. Breeding bird surveys comparing Atlas 1 and Atlas 2 showed a decline in population, but the differences between Atlases support that Cassin's finches follow food abundance rather than maintain breeding site fidelity (Lyon 2016a).

A singing male Cassin's finch was recorded during the 2015 surveys, in mixed coniferous forest. A Cassin's finch was also sighted in Crescent Meadows in 2007 during breeding bird surveys conducted by volunteers (Swigart & Jamison 2017). Ample habitat exists for the species in the large acreage of the Park covered in ponderosa pine and Douglas-fir forests. The CPW Species Activity Mapping (SAM) data maps parts of the Crescent Meadows and Jefferson County Parcels as breeding range for the species (CPW 2019c).

### **Golden Eagle**

Golden eagles are primarily found in open and semi-open grasslands with nearby hills, cliffs, or mountains of up to 12,000 feet. Occurrences have been documented in a variety of habitats ranging from arctic to desert, tundra, shrublands, coniferous forests, farmland, and areas along rivers and streams (Cornell University 2017a). The majority of Colorado occurrences were in cliff habitat or woodlands and forests (Wickersham 2016b). Golden eagles tend to be year-round residents in Colorado and are mostly seen in western North America with northern breeding pairs being short-to medium-distance migrants. Nests are typically located on cliffs but may also nest in trees, on the ground, or in human-made structures (Cornell University 2017a).

Golden eagles are listed as a Tier 1 species in the State Wildlife Action Plan due to habitat reduction of habitat from development and conversion, reductions in prey source, and secondary poisoning (CPW 2015b). Other threats to the species include electrocutions, collisions, lead poisoning, and pesticide poisoning. Human disturbance may also indirectly affect nest success and cause nest abandonment or failure, resulting in death of young. Breeding bird surveys conducted since 1966 in Colorado do not show a significant change in the population. A decline between the 1998 and the 2016 breeding bird atlases in Colorado was documented, but the change is attributed to natural fluctuations in prey abundance and corresponding nest movements (Wickersham 2016b).

Golden eagles use the park for breeding and foraging. Ample habitat for the species exists along large cliff faces that are prominent throughout the Inner Canyon and Jefferson County Parcels. The Crescent



Meadows parcel does not have as much habitat for the species, but it could provide foraging grounds. The CPW SAM data maps all three parcels as breeding range for the species (Figure 3.31) (CPW 2019c).

### **Flammulated Owl**

In Colorado, flammulated owls (*Psilosops flammeolus*) prefer ponderosa pine forests but may also be found in aspen, or ponderosa pine and Douglas-fir mixed forests. The species requires mature trees with large diameters that provide nesting cavities or snags. A well-developed understory that is rich in shrub and grass species is important to provide insects as a prey source. The species can be found at elevations up to 9,100 feet. Flammulated owls migrate to Colorado in April to early May. The species shows very high nest site fidelity, with approximately 96 percent of pairs in Colorado returning to the same site used in previous years (Wickersham 2016c).

Flammulated owls are a Tier 2 species under the Colorado State Wildlife Action Plan (CPW 2015b). Threats to the species include habitat degradation through large, mature tree removal and insects and disease (Wickersham 2016c).

A flammulated owl was heard calling in 2006 during surveys conducted for MSO in the Park. The individual was located near the Rattlesnake Gulch trail (ERO Resources Corp. 2006). The Park contains ample habitat for this species, with the dominant cover being ponderosa pine and Douglas-fir.

### **Lazuli Bunting**

Lazuli buntings (*Passerina amoena*) are primarily found in shrubby habitats from sea level up to 10,000 feet, although in Colorado, they are primarily found up to 7,000 feet. Occurrences have been documented in arid, shrubby hillsides, riparian shrublands, woodlands and forests with shrubby understory, burned areas, and urban, rural, and agricultural areas. The majority of Colorado occurrences were in riparian habitats in the 2016 Breeding Bird Atlas. Lazuli buntings arrive in Colorado in late April and begin breeding shortly after. Nests are located in dense, shrubby vegetation about one meter off the ground (Wickersham 2016c). Individuals depart for fall migration in July to mid-August. The species stops over to complete molting in Arizona, New Mexico, or southern California for a month, before arriving in wintering grounds in western Mexico (Greene et al. 2014).

Lazuli buntings are listed as a Tier 2 species in the State Wildlife Action Plan due to declining populations and altered native vegetation used as habitat (CPW 2015b). Populations were documented as declining from 1968 to 2002 but are apparently stable based on 2002 to 2012 data. Brown-headed cowbird parasitism has affected some parts of their range but has not affected Colorado populations (Wickersham 2016d).

A young lazuli bunting was recorded during the 2015 surveys, indicating the species successfully bred in the Park that year. Lazuli buntings were also sighted in Crescent Meadows in 2009-2015 and 2017 during breeding bird surveys conducted by volunteers (Swigart & Jamison 2017). Ample habitat exists for the species in the montane shrublands, cottonwood and willow riparian areas, and pine and fir forests with shrubby understory. The CPW SAM data maps all three parcels as breeding range for the species (CPW 2019c).

### **Lewis's Woodpecker**

Lewis's woodpeckers are often associated with ponderosa pine, pinyon-juniper woodlands, and burned areas. They may also be found along riparian corridors in Colorado. They are weak excavators, so they rely on decaying or dead trees for nesting substrates. The species can be found in parts of Colorado year-round. Most of the occurrences in Colorado were in riparian forests. The species primarily eats insects in the summer and switches to acorns and other nuts in the winter (Ortega 2016).

Lewis's woodpeckers are a Tier 2 species under the Colorado State Wildlife Action Plan (CPW 2015b). A decrease of the species by 47 percent in the number of blocks it was detected in was noted between the 1998 and 2016 Breeding Bird Atlases. Threats to the species include pesticides reducing prey or directly killing the species, fire suppression reducing open habitat in forests used for foraging for insects, and the lack of regeneration and presence of snags in riparian cottonwood areas, reducing nesting cavity availability (Ortega 2016).

Two adults and a fledgling Lewis's woodpecker were observed during the 2015 survey in the Crescent Meadows parcel in a Douglas-fir snag. A Lewis's woodpecker was also sighted in Crescent Meadows in 2015 during breeding bird surveys conducted by volunteers (Swigart & Jamison 2017). Periodic controlled burns or other management strategies that lead to creation of potential nesting snags throughout Crescent Meadows and in Rattlesnake Gulch would create more habitat for this species (Jones 2015). The CPW SAM data maps all three parcels as breeding range for the species (Figure 3.31) (CPW 2019c). CNHP has a historical occurrence record mapped in the Park from 1987 near the Jefferson County parcel, but this data is not displayed on maps due to its historic nature.

### Loggerhead Shrike

Loggerhead shrikes (*Lanius ludovicianus*) prefer open habitats with shelterbelts, hedgerows, and roadside trees for nesting habitats. Isolated trees and shrubs, including tamarisk are preferred as nesting substrates. Areas with barbed wire fences are used for hunting, where individuals hang prey for later consumption. Individuals move north into Colorado for breeding between April and early May. Pairs often reuse old nest sites or refurbish dilapidated nests (Kibbe 2016). Fall migration generally occurs from September to November (Yosef 1996).

Loggerhead shrikes are listed as a Tier 2 species in the State Wildlife Action Plan and are threatened by herbicide and pesticide spraying (CPW 2015b). Populations in Colorado are relatively stable, but many states have determined the species to be threatened or endangered. Threats to the species include removal of hedgerows and loss of native pastures, and pesticide poisoning (Kibbe 2016).

A loggerhead shrike was seen in Crescent Meadows in 2017 during breeding bird surveys conducted by volunteers (Swigart & Jamison 2017). Crescent Meadows contains good foraging habitat for this species with open grasslands and scattered shrubs and fence lines that could be used as hunting perches.

**Figure 3.33.** A loggerhead shrike (left) was documented in 2017 in the Park and a Mexican spotted owl (right) which has not been documented in the Park but could be present. Both are species of special concern in Colorado and Mexican spotted owl is federally-threatened under the Endangered Species Act.



Source: Cornell Lab of Ornithology

### **Mexican Spotted Owl**

Mexican spotted owl is a subspecies of spotted owl that historically has been found in the southwestern US, in Colorado, Utah, New Mexico, Texas, and Arizona (USFWS 2019). The species is found in pine-oak forests, mixed-conifer forests, and in steep, narrow canyons. Occurrences have been documented in a variety of habitat types centered around mature forests with dense canopies (Cornell University 2017b). The majority of Colorado occurrences were on rocky ledges with tall conifers or between bands of cliffs, and narrow slickrock canyons that are among pinyon-juniper woodlands and small stands of dense mixed conifer (Torretta & Boyle 2016). Mexican spotted owls tend to be year-round residents in Colorado. Mexican spotted owls do not build their own nests. Nests are dependent on suitable naturally occurring nest sites in caves or on cliff ledges in steep-walled canyons where pairs may reuse a nest site over many years, though most pairs do not nest every year (Cornell University 2017b).

The Mexican spotted owl is listed as threatened under the Endangered Species Act (ESA) of 1973 (USFWS 2019). Mexican spotted owls are listed as a Tier 2 species in the State Wildlife Action Plan due to habitat reduction as a result of encroachment on public and Tribal lands from oil and gas development and fire suppression leading to catastrophic wildfires (CPW 2015b).

MSO has historically been documented in the vicinity of the Park. In November 1982 a MSO was observed south of Flagstaff Mountain Road, near the Gregory Canyon Trail, which is close to the Park (ERO Resources Corp. 2006). However, no recent observations of MSO in Eldorado Canyon or the vicinity have been recorded. Surveys for MSO were conducted in the Inner Canyon Parcel (2006) and in Crescent Meadows (2007) and neither survey resulted in findings of the species (ERO Resources Corp. 2006, 2007). Nesting and foraging habitat within the Park is present in canyon areas with Douglas-fir and ponderosa pine and open ponderosa pine woodlands. Areas that historically received fuels treatment do not provide adequate habitat for the species (Rocky Mountain Ecological Services Inc. 2005). Critical habitat designated by the US Fish and Wildlife Service exists about 33 miles to the south of the Park (CPW 2002; USFWS 2018).

### **Olive-sided Flycatcher**

Olive-sided flycatchers (*Contopus cooperi*) are often found in edge habitat areas where late-successional forests meet bogs, marshes, or open water. They may also use early-successional forests depending on the availability of snags. Preferred forests include spruce-fir and mixed conifer, but the species may also inhabit aspen woodlands, mixed forests disturbed by logging, and beetle-infested forests. They have been documented as one of the most abundant species in early post-fire communities. In Colorado, 92 percent of occurrences were located in woodlands and forests (Lyon 2016b). Colorado is within the species' breeding range. Arrival to breeding grounds in the spring varies by latitude and elevation. The species has been documented to arrive in the US between late April through mid-June and departs in the fall from August through September (Altman & Sallabanks 2000).

Olive-sided flycatchers are a Tier 2 species under the Colorado State Wildlife Action Plan (CPW 2015b). Colorado populations of the species seem to be stable, but a decline in populations nationally has been documented from 1966 to 2012. Although the species often prefers disturbed habitats, studies have shown that human-altered landscapes are correlated with decreased survival. This may be a result of providing adequate nesting habitat but not enough insects for food (Lyon 2016b).

A singing male olive-sided flycatcher was documented during the 2015 bird survey in ponderosa pine forest (Jones 2015). The Park contains ample habitat for the species within Douglas-fir and ponderosa pine woodlands, especially areas that have received fuels treatments.

## Ovenbird

Ovenbirds (*Seiurus aurocapilla*) are primarily found in tall, closed-canopy, uninterrupted deciduous forests as their primary summer territory. Occurrences have been documented in shade coffee trees or mangroves, on dry scrubland or regenerating agriculture land, and in moist upland or dry lowland forests. The majority of Colorado occurrences were in foothill ponderosa pine communities with an understory of Gambel oak (*Quercus gambelii*). Colorado contains a small breeding population, disjunct from the rest of its breeding range. It occupies dispersed patches along a narrow strip of the Front Range from Jefferson County to the New Mexico state line (Kingery 2016). Nests are typically located on the open forest floors and made from leaf litter (Cornell University 2019b).

Ovenbirds are not listed as a Tier 1 or 2 species but are listed by CNHP as imperiled in its breeding range (S2B). Threats to ovenbirds include forest fragmentation and disruption by industrial noise, forest road-building, and logging. Nest parasitism by Brown-headed cowbirds, egg predation, and migrating with storm fronts also pose a threat to ovenbird populations (Cornell University 2019b). Breeding bird surveys conducted in Colorado investigated all appropriate foothills habitats from 2007-2012 and suggests a large population is present. The Colorado population has sustained itself for at least 25 years (Kingery 2016).

Ovenbirds were not detected on the 2015 survey but were detected two times in 2019 while the vegetation survey was being completed (Belmar 2019). An ovenbird was also sighted in Crescent Meadows in 2017 during breeding bird surveys conducted by volunteers (Swigart & Jamison 2017). In 2019, the surveyor noted an ovenbird singing on May 29, 2019 in the Inner Canyon Parcel in a Douglas-fir woodland area and another time on July 3, 2019 while driving to the Jefferson County Parcel outside of the Park in ponderosa pine and Gambel oak habitat.

**Figure 3.34.** A prairie falcon (left) was documented during the 2015 breeding bird surveys and ovenbird (right) was documented in 2019 incidentally during another survey. Both are species of special concern in Colorado.



Source: Cornell Lab of Ornithology

## Prairie Falcon

Prairie falcon year-round range overlaps with the Park. Individuals may make small migrations to nesting, post-nesting, and wintering areas, but some individuals in Colorado have been documented to winter near breeding or natal areas. The majority of individuals arrive at wintering grounds from September through November, with most arriving in Colorado in November. Before March, individuals leave wintering grounds in Colorado. Much variation exists in this species migration patterns across the western U.S. Nesting begins in late February through March and egg-laying occurs in March. Nests are primarily located on cliffs, but may also be found in trees, powerlines, buildings, inside caves, and on other man-made structures. Prairie falcon do not typically build nests but scrape debris away from nest



site to form a small depression but may also reuse stick nests previously built by ravens or golden eagles (Steenhof 2013).

Prairie falcon is a Tier 2 species under the Colorado State Wildlife Action Plan (CPW 2015b). Colorado populations of the species seem to be stable or even increasing. However, population growth, habitat degradation, and development threaten the species survival. Nest failures have been documented due to rock climbing and hiking disturbances (Jones 2016).

A pair of prairie falcons was observed during the 2015 survey (Jones 2015). Prairie Falcons nested in Eldorado Canyon State Park from 1985-2009, fledging a total of at least 38 young during those years. Habitat for the species exists throughout the Park along large cliff faces that are prominent throughout the Inner Canyon and Jefferson County Parcels. The Crescent Meadows parcel does not have as much habitat for the species, but it could provide foraging grounds. The CPW SAM data maps all three parcels as breeding range for the species (CPW 2019c).

### **Virginia's Warbler**

In Colorado, Virginia's warblers (*Leiothlypis virginiae*) prefer shrublands and scrub forests along the slopes of mesas, ravines, and mountain valleys (Dexter 2016). Typical breeding habitat is pinon-juniper, oak woodlands, mountain mahogany, and serviceberry (*Amelanchier arborea*) (Olson & Martin 1999; Dexter 2016). Nest sites are located in fairly open habitat with drought-tolerant deciduous shrubs. Migrants arrive in Colorado in the last third of April and depart on fall migration by mid-August to early October (Olson & Martin 1999). Virginia's warblers breed in Colorado from May through June (Dexter 2016).

Virginia's warblers are listed as a Tier 2 species in the State Wildlife Action Plan due to habitat degradation and predation (CPW 2015b). Nationwide, populations were documented as declining from 1966 to 2012, but are apparently stable in Colorado. Predicted increased drought is likely to affect the species in the future. The Colorado Breeding Bird Atlas documented brown-headed cowbird parasitism affecting some pairs in Colorado (Dexter 2016).

Virginia's warbler was documented as being territorial during the 2015 survey in ponderosa pine habitat. A Virginia's warbler was also sighted in Crescent Meadows in 2012 during breeding bird surveys conducted by volunteers (Swigart & Jamison 2017). Habitat for the species exists in montane shrublands and pine forests with shrubby understory in the Park. The shrub thickets adjacent to Fowler Trail between the Bastille rock formation and the eastern Park boundary support a diverse assemblage of breeding birds, including this species. The CPW SAM data maps all three parcels as breeding range for the species (CPW 2019c).

## **Mammals**

### **Abert's Squirrel**

The CPW Species Activity Mapping data shows that Abert's squirrel range overlaps with the majority of all three Park parcels. Abert's squirrel is listed as Tier 2 species in the State Wildlife Action Plan mostly due to habitat loss from beetle killed tree removal. This species is also an indicator species of ecosystem health (CPW 2015b). The Park provides ample habitat for the species in the ponderosa pine forests and pine-juniper woodlands found throughout the Park. This species is common in the Park and sighted often by Park staff and visitors.

### **Bat Species**

The CPW Species Activity Mapping data shows several rare bat species' ranges as overlapping with the Park. Townsend's big-eared bat, eastern red bat, hoary bat, little brown myotis, fringed myotis, and tricolored bat all overlap with the Park. A historic point exists in the Park for Townsend's big-eared bat from 1972 taken from distribution of mammals developed from the Museum of Natural History, Kansas

(CPW 2002). No documentation of the other species occurring in the Park exists and future surveys should be conducted.

### **Black-tailed Prairie Dog**

The CPW Species Activity Mapping data shows that black-tailed prairie dog (*Cynomys ludovicianus*) range overlaps with the Inner Canyon Parcel of the Park. Black-tailed prairie dog is listed as Tier 2 species in the State Wildlife Action Plan mostly due to habitat loss and encroachment (CPW 2015b). The Park provides some habitat for the species, primarily in the Crescent Meadows parcel in the shortgrass prairie areas. This species has not been documented in the Park in previous surveys.

### **Canada Lynx**

The Canada lynx (*Lynx canadensis*) is a large, bob-tailed cat, three feet long with a black-tipped tail only about one-eighth the total length, and only about half the length of its huge hind foot. The coat is grayish, with obscure spots. The large ear tufts may be nearly as long as the actual ears. The lynx is easily confused with its more common and more widespread relative, the bobcat. The lynx is found in dense subalpine forest and willow-choked corridors along mountain streams and avalanche chutes, the home of its favored prey species, the snowshoe hare (CPW 2016).

Canada lynx is listed as federally threatened, State endangered, and is a Tier 1 species in the State Wildlife Action Plan (CPW 2015b). The CPW Species Activity Mapping data shows that Canada lynx range overlaps with the Crescent Meadows and parts of the Jefferson County Parcel of the Park (Figure 3.31). The Park provides some habitat for the species, in coniferous forests and along riparian corridors. However, this species has not been previously documented in the Park.

### **Preble's Meadow Jumping Mouse**

Preble's Meadow Jumping Mouse (PMJM) is a small jumping mouse with a long tail, large hind feet, and long hind legs. The species is native to the Front Range of Colorado, with its range extending from the Rocky Mountain foothills in southeastern Wyoming south to Colorado Springs. PMJM has been found to live within riparian corridors along streams and rivers in Larimer County. The species typically is found around 7,600 feet in elevation. PMJM prefers dense riparian zones with willows, near large perennial rivers to small drainages with an adjacent upland grassland (Bakeman 1997; USFWS 2013; USFWS & FEMA 2014).

PMJM was listed as federally threatened in 1998 and in 2003 and 2010, USFWS designated Critical Habitat in Colorado and Wyoming for PMJM. The entire Inner Canyon and Crescent Meadows parcels and the Jefferson County parcel's northern half lies within the overall range defined by CPW for Preble's meadow jumping mouse (CPW 2019c). The Park is not within USFWS defined Critical Habitat for the species, but it exists downstream from the Park near the town of Eldorado Springs along South Boulder Creek and Spring Brook traveling South (USFWS 2018).

PMJM was trapped and found in 1993 in the Doudy Draw site and at the Denver Water Gross Rese site in 1998, both of which are east of the Park outside of the Inner Canyon downstream on Boulder Creek (CPW 2002). Crescent Meadow contains the greatest extent of suitable habitat due to the healthy stands of willows along drainages combined with upland mixed grass prairie and shrublands. Inner Canyon is very limited in habitat due to the drainages characterized by steep cliffs with narrow canyon areas and lack of suitable vegetation. The full extent of South Boulder Creek could provide an important

**Figure 3.35.** Preble's meadow jumping mouse is a rare mammal species that was historically documented near the Park.



Source: CNHP

travel corridor between the Crescent Meadows and downstream occupied habitat. A drainage at the southern end (Rattlesnake Gulch) was determined to not provide habitat due to lack of suitable topography and vegetation. The Jefferson County parcel was not evaluated for PMJM habitat (CPW et al. 2010).

### **Invertebrates**

CNHP surveyed the Park in 1998 for elements of rarity and found both the hops feeding azure and mottled duskywing butterflies (CNHP 1998). A study of butterflies in Crescent Meadows occurred from 2007 - 2013 and provides a good analysis of butterfly diversity in this area of the Park. This volunteer-based survey also found the presence of the rare species Moss' elfin present in 2008 and 2009 (Swigart & Jamison 2017).

Hops feeding azure was found by CNHP. The hops feeding azure is endemic to the Front Range, occurring nowhere else but along the Front Range between Larimer and El Paso counties. The butterfly requires canyon/gulch habitat and is associated with two host plants, wild hops (*Humulus lupulus*) and lupine (CPW 2002).

Mottled duskywing was by CNHP in 1998. This species requires open brushy fields and hillsides or woodlands. The host plant for this species is Fendler's buckbrush (*Ceanothus fendleri*), which is found throughout the Park, especially in the Crescent Meadows parcel (Colorado Front Range Butterflies 2019a).

**Figure 3.36.** Mottled duskywing (left) and hops feeding azure butterfly resting on wild hops (right) are both rare invertebrates previously documented in the Park.



Source: Christian Nunes, CNHP

Moss's elfin was previously documented during butterfly surveys conducted by volunteers in 2008 and 2009. CNHP also documented this species in 1970 near the Inner Canyon Parcel. This species prefers gullies, washes, canyons, rocky outcrops, and foothills. The species larval foodplant are plants in the stonecrop family, which is present in the Park (Colorado Front Range Butterflies 2019b).

Additionally, Ottoe skipper and cross-line skipper all have previous occurrence records nearby that are documented by the CNHP element occurrence data. Cross-line skipper was last noted near or in the Park in 1972 and 1975 and Ottoe skipper was last noted near or in the Park in 1961 and 1973.

## **Resource Trajectory**

Current management practices have allowed for the conservation of natural resources, and thus habitat availability in Eldorado Canyon State Park. However, factors detrimental to rare animals may escalate in the future and management practices need to evolve to meet these challenges. Eldorado Canyon State Park is a popular recreational destination for the Front Range and continues to grow.

Recreational opportunities include climbing, hiking, fishing, and biking. Eldorado Canyon reaches visitor capacity, as defined by the number of parking spaces, during most weekends in the summer. High visitation leads to more social trails, more occurrences and higher densities of noxious weeds, higher impacts to riparian areas, and increased disturbance to wildlife. Increasing capacity will be at the cost of natural resources in the Park. The recreational and land uses, both at the Park and in the surrounding area, will change overtime, making it necessary to revisit the threats to the ecosystem at Eldorado Canyon State Park and to reevaluate and modify the management recommendations as needed.

Consistent monitoring and management programs for rare animals and their habitats will afford a greater understanding of habitat use and shortcomings in the Park. Several surveys have been conducted since the last stewardship plan and continuing such surveys and regular monitoring is important to identify rare animal population and occurrence changes over time. Some changes to Park resources have been documented already due to increased human presence, including noxious weed occurrence, degradation of sensitive habitats, and habitat fragmentation.

A noxious weed plan is essential to maintain proper natural resource management and one was created in 2019 for Eldorado Canyon State Park. Implementation and aggressive management of noxious weeds is critical, especially to ensure the sustained quality of rare animal habitat. Increased Park visitation and water-related activities could lead to degradation of sensitive wetland habitats and a subsequent decline in rare animal populations, among many other potential outcomes.

Prescribed thinning and burning to promote healthy, vigorous forest stands are the best protection against insect epidemics and mistletoe. In recent years, the Park has developed and implemented forestry management efforts and the positive impacts of such management activities are beginning to be observed. Continued management in other areas of the Park and monitoring in already treated areas will be important information to document in order to fully understand the positive impacts to wildlife of techniques implemented.

Finally, as development continues around and within the Park, it could become isolated from surrounding wildlife habitats. Habitat fragmentation that creates “habitat islands” may prevent large mammals requiring large tracts of contiguous habitat from accessing parklands. Future Park planning efforts should consider the “big picture” of land connections with the Park and how CPW and other land management agencies can create migration corridors for species that require them.

## **Desired Future**

The objective is to maintain and enhance populations of rare or sensitive species and to restore healthy populations of species that may have lost habitat due to human disturbance and land modification. In order to protect biodiversity, Park management should strive for continued high habitat quality to encourage raptor, small mammal, reptile, and amphibian breeding. This may mean seasonal trail closures and/or curtailing visitation at certain times of the year to assure this happens. Further, regular monitoring should take place for all sensitive species present in the Park, in addition to consistent communication with the Park Manager to share information regarding wildlife management and sightings. More specific future goals include:

- Controlling and reducing the spread of noxious weed species should continue to maintain and improve rare animal habitat quality.



- Habitat for the hops feeding azure, mottled duskywing, Moss' elfin, and other rare butterflies is protected. Surveys and monitoring for invertebrate species begins and is consistently implemented in future years.
- Golden eagles and other cliff-dwelling species will continue to use the Park for breeding, nesting, and foraging habitat without being disturbed by rock climbing.
- All of the rare bird species that currently use the Park for nesting, breeding, foraging, or roosting continue to do so. Increased citizen scientists in the Park is likely to occur and could assist in better documenting bird populations in the future.
- Connection corridors in the Inner Canyon and potential habitat in Crescent Meadows for Preble's meadow jumping mouse remain and improve in years to come.
- Habitat restoration efforts restore suitable habitat in Crescent Meadows wetlands for the rare amphibian species, northern leopard frog.
- Future surveys are conducted for bat species in the Park in order to confirm whether any rare species are using available habitat in the Park.
- Protocol-level surveys for the federally-listed species, Mexican spotted owl, are conducted again to document whether this species is present in the Park.

## Resource Element Description: Wetlands and Water Resources

### Resource Summary

#### **Significant features**

- South Boulder Creek supports several fish species, as well as species of macroinvertebrates, which improve water quality and are an important link in the food chain. Additionally, the rich riparian soils along South Boulder Creek have high water storage potential, which can reduce the risk of detrimental flooding downstream.
- Water, wetland, and riparian areas provide important habitat for wildlife as well as game fish species (see Wildlife and Rare Animals).

#### **Threats**

- Erosion – Drainages that are incised negatively impact the aesthetics of the Park and also encourage erosion of soils into waterways, decreasing water quality.
- Noxious weeds - Weed infestations threaten diversity, viability, and functionality of wetlands and riparian areas through the displacement of native species.
- Visitation and Development - Visitor numbers are increasing and associated off-trail use threatens to expand erosion effects in wetland areas. Nearby development is increasing and could threaten the long-term health of wetland and water resources through withdrawals, polluted runoff, and disruption of natural flow patterns. These disturbances could also potentially harm local fish populations. Run-off, sediment, and erosion impacts from the Inner Canyon road (Eldorado Springs Drive) may also impact Park resources.

### Description

#### **Waters**

Eldorado Canyon State Park lies within the St. Vrain subbasin (Hydrologic Unit Map [HUC] 10190005) and within the South Boulder Creek watershed (HUC 1019000505). South Boulder Creek is the most prominent hydrologic feature and was responsible for cutting the sheer cliffs of Eldorado Canyon during the Front Range uplift. South Boulder Creek originates on the Continental Divide to the west and flows through the Park in a northeasterly direction to Boulder Creek and eventually to the South Platte River. It flows outside the northern boundary of the Crescent Meadows portion, receiving water from intermittent drainages, seeps, and springs. South Boulder Creek forms the northern boundary of Crescent Meadows and also bisects the Inner Canyon zone. It flows through the south-central portion of the Inner Canyon for approximately one mile.

Riparian communities exist in narrow bands along South Boulder Creek and in several intermittent tributaries. These include Rattlesnake Gulch, South Draw, Johnson Gulch, and an unnamed drainage just north of Johnson Gulch. Though not extensive, these areas support diverse plant assemblages and provide important sources of food, water, and cover for much of the Park's resident wildlife. Riparian communities are dominated by cottonwood, willow, alder, river birch, red-osier dogwood, *Prunus* spp., and Woods' rose.

**Figure 3.37** The fast-flowing waters in South Boulder Creek in June 2019.



Source: Collective Ecological Consulting, 2019.

Creek flows are controlled by Gross Dam, constructed by the Denver Water Board, approximately one mile west of Crescent Meadows. Creek flows are further affected by diversion of water via the South Boulder Diversion Canal, located midway between the two ECSP parcels, and on the eastern Park boundary where the cities of Lafayette and Louisville, and the Farmers Reservoir and Irrigation Company divert water (CDNR 1995a).

The Colorado Water Conservation Board owns instream flow (ISF) rights on South Boulder Creek below Gross Reservoir. These rights are intended to protect fish habitat and to "...preserve the natural environment to a reasonable degree." The instream flow rights through the Inner Canyon were appropriated on December 2, 1980 and are listed below in Table 3.3.

**Table 3.3.** South Boulder Creek instream flow rights.

Date	Instream Flow Rights
May 1 – September 30	15 c.f.s
October 1 – April 30	2 c.f.s
<i>Source:</i> (CPW 2002)	

The ISF means that these flows must be met after all senior water right holders on South Boulder Creek receive their water. These flows cannot be met 100 percent of the time but do help with protecting the water resources within the Inner Canyon portion of the Park.

Water levels on South Boulder Creek naturally peak in June, due to snowmelt, and are lowest in December. The US Geological Survey (USGS) stream gauge on South Boulder Creek in the Park was deactivated in 1995, but still has historical data records (USGS 2019). Average annual flow varies, but is generally around 76 c.f.s. The highest flow on record was 7,390 c.f.s. and occurred on September 2, 1938. The lowest flow measured was a no flow recorded October 15, 1932 (CPW 2000). A peak flow

estimate for the stream gauge measured at 2,120 cubic feet per second (c.f.s). This was determined to be a 50 year flooding event for the area, which has about a 2 percent chance of occurring any given year (Yochum 2015).

South Boulder Creek receives water from South Draw, North Draw, Rattlesnake, and Johnson gulches and acquires a nominal amount of water from several seeps and springs located throughout the Park. There are several water diversions on South Boulder Creek that are located within the Park. The South Boulder Creek Diversion Canal, which is located between Crescent Meadows and the Inner Canyon, diverts water for municipal purposes in the Denver area. Three other diversion structures are located in the Inner Canyon. These diversions are owned by the cities of Lafayette and Louisville and by the Farmers Reservoir and Irrigation Company.

## **Wetlands**

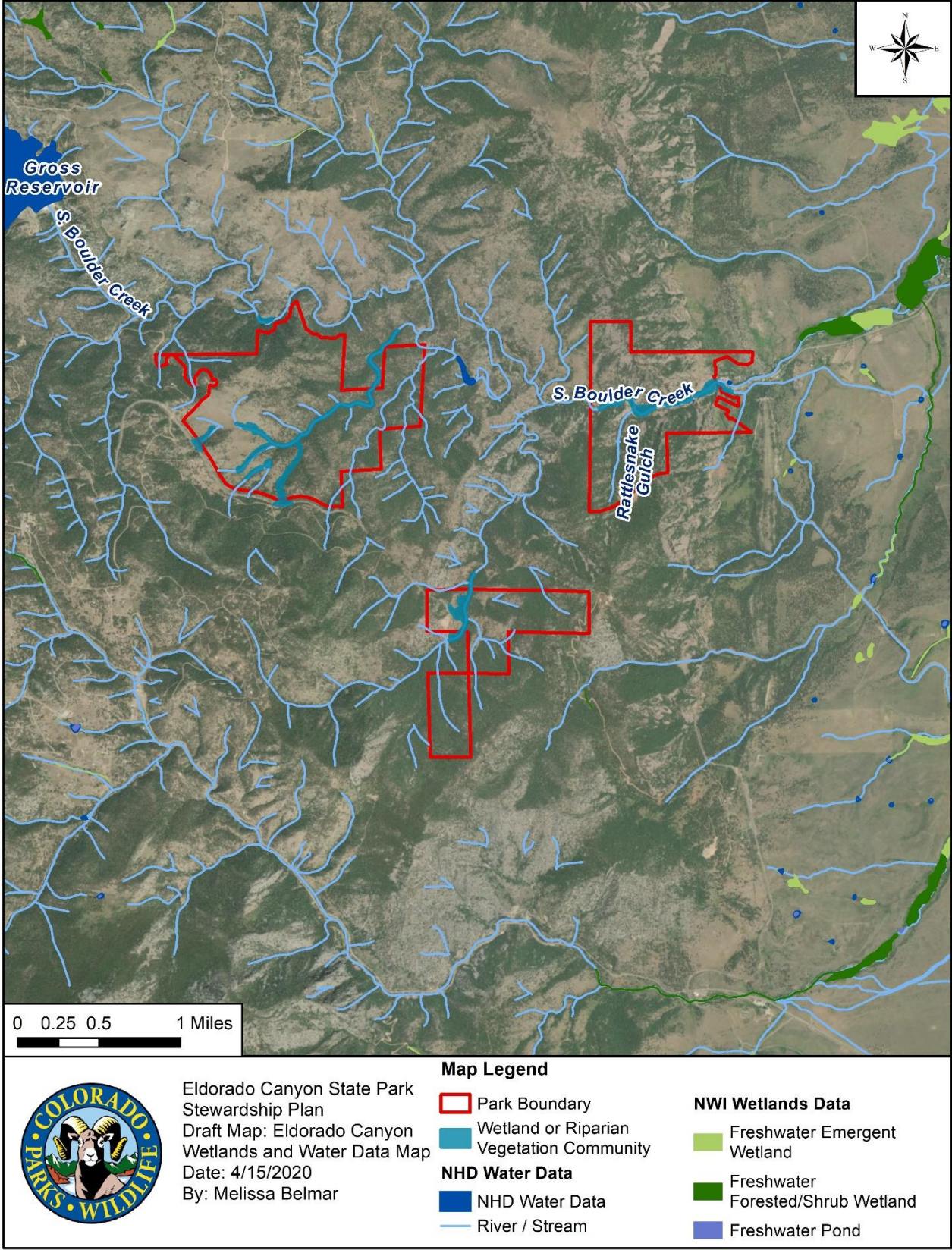
Wetlands are critical components of the landscape as they serve several very important functions. These include water quality improvement by trapping nutrients, sediments, and pollutants, decreased erosion, and protection of downstream communities by anchoring shorelines and absorbing floodwaters, exportation of organic matter to downstream communities, recharge and discharge of groundwater, and providing wildlife habitat, forage, and thermal cover.

Wetlands within Eldorado Canyon State Park were last inventoried in 1995, in the Inner Canyon and Crescent Meadows parcels. National Wetlands Inventory (NWI) data is available for the Park and was more recently updated in 2012 by the US Fish and Wildlife Service (USFWS) and is displayed on Figure 3.38.

Results from the 1995 survey indicate that wetlands are rare in Eldorado Canyon State Park but are present. Wetlands were categorized as emergent and shrub-scrub based on the dominant species. South Boulder Creek soils are saturated sediments and silty sand deposited over gravel and cobble. Water from the creek and associated hydrology regimes support wetlands on the periphery of the creek. Emergent wetlands were also found to occur in narrow, saturated bands along seeps and springs and in intermittent drainages mainly in the Crescent Meadows area. A very small wetland associated with Climber's Cave was also noted in the report. This seep supports watercress and waterleaf on soils that are inundated and/or saturated. There are probably other similar small seeps within the Inner Canyon. Shrub-scrub communities were distributed along the banks of intermittent drainages. Riparian communities were located adjacent to wetland communities in slightly drier sites or in sites elevated above ground water from two to five feet.



Figure 3.38. Wetland and Water Resources within Eldorado Canyon State Park.



## **Current Conditions: Water**

Water quality within the Park is generally considered good, however the Park is located just eight miles from Boulder, an area of rapid growth. Development around the Park and increasing demand for water could put added stress on the hydrologic features of this area in the future.

Previous studies conducted in 1999 showed water quality in the area to be excellent. However, there is heavy visitor use along South Boulder Creek in the Inner Canyon near the visitor center. This area is severely eroded and is releasing sediments into the stream. No studies have been conducted to determine whether this is degrading water quality downstream, or if sedimentation has damaged macroinvertebrate populations in the area, which would in turn lead to decreased water quality.

Impaired water bodies are listed on the state of Colorado's 303(d) list. Waters on this list include Water-Quality Limited Segments Requiring Total Maximum Daily Loads ("TMDLs"), impaired waters that do not require a TMDL, and Colorado's Monitoring and Evaluation (M&E) List. All of South Boulder Creek within the Park is listed on the 303(d) list because of Copper (dissolved) and arsenic (total) levels found in the waters (CDPHE 2018).

## **Resource Trajectory**

The waters in the Park are locally and regionally significant and are important for plants and wildlife, maintenance of high water quality, and recreational opportunities.

- **Water quality** – South Boulder Creek's water quality has declined as more development has occurred in areas surrounding the Park. The creek is currently on the CDPHE's list of impaired waters. Aside from contaminants, the creek experiences sedimentation from bank erosion due to loss of vegetation. Continued erosion will continue to contribute to a decline in water quality. Erosion along incised drainages in Crescent Meadows will continue to worsen, creating additional erosion and sedimentation problems downstream. Additionally, groundwater may be depleted to meet human needs.
- **Recreational use** – Visitation to the Park has increased dramatically over the last five years, and many visitors recreate near water features, such as South Boulder Creek. Fishing, hiking, and rock climbing all attract visitors to riparian areas along waterways, and therefore pose a risk to the health of water systems.
- **Decline in macroinvertebrate and wildlife diversity** - If water quality decreases and sediment loading increases, the macroinvertebrate population in Cherry Creek could suffer. When macroinvertebrate species decline, populations of fish are forced to find food elsewhere. In addition, wildlife dependent on such food sources also need to find other food supplies. Therefore, resident and migrating wildlife populations could decline in the Park.

## **Desired Future**

The desired for water resources involves ensuring an adequate supply of water, maintaining water quality, and reducing shoreline erosion. More specifically:

- Water quality in South Boulder Creek improves with monitoring programs in place and management of issues that contribute to poor water quality, such as erosion and sedimentation. Private and public development is completed in a sensitive manner to prevent degradation of the Park's water resources.
- Riparian areas surrounding South Boulder Creek will be properly vegetated to reduce erosion and subsequent sedimentation of water, which can negatively impact plants and wildlife dependent upon the aquatic resources.
- Water and wetland resources on the Jefferson County parcels are identified and protected and those on the Inner Canyon and Crescent Meadows parcels are revisited and updated with a new inventory.

- Eldorado continues to be managed to preserve the beauty and integrity of its water resources, as they are a unique feature of the eastern slope of the Continental Divide.

## **Current Conditions: Wetlands**

Wetland resources at Eldorado Canyon State Park were last inventoried in 1995. At that time, the report documented that the quality of wetlands varied greatly. The Inner Canyon parcel receives very heavy use, and its wetland areas have been impacted accordingly. Trampling, erosion, and noxious weed infestations are all factors currently being addressed by the Park manager. Crescent Meadows has a long history of ranching, farming, and homestead use, which included minor development of water resources. Current recreational use is passive, and most wetland areas have recovered to a more natural state. Natural revegetation and soil stabilization have occurred in the drainages present, but the 2013 flooding made some locations deeper and wider and re-evaluation may be required. Additionally, weed infestations still remain in many of the wetlands and drainages. The Jefferson County parcels have received little use, except for minor road and railroad building. Wetlands in this area are of high quality and show little evidence of disturbance. As a whole, the Park is aggressively managed to protect natural values, including wetlands. An update to the wetland inventory must be conducted in order to fully understand the condition, function, and extent of wetland areas at the Park.

Vegetation was assessed throughout the Park in 2019, including wetland areas. Wetlands were generally healthy, but contained a high abundance of non-native species, including Canada thistle, curly dock, and smooth brome (Belmar 2019). Noxious weed invasions are increasing and pose a serious threat to the long-term health of this resource. Many noxious weed species thrive in wetland areas and can easily take over and crowd out native vegetation. Riparian areas along South Boulder Creek are essential for wildlife and plant habitat but are disturbed from recreational activities.

Sensitive wildlife species depend on Eldorado Canyon State Park's wetlands for water, food, cover, and reproduction. Wetlands also support healthy and diverse plant and animal communities by filtering contaminants and anchoring shorelines.

## **Resource Trajectory**

The wetlands in the Park are locally and regionally significant and are important for plants and wildlife, maintenance of high water quality, and recreational opportunities.

- **Noxious weeds** - Due to the abundance of water and nutrients wetland areas provide, they are very susceptible to noxious weed invasion. Left uncontrolled, noxious weeds will seriously degrade wetland communities and can even alter natural hydrology. Most weed species thrive in disturbed areas and off-trail use contributes dramatically to this problem. Implementation of the 2019 Eldorado Canyon State Park Noxious Weed Management Plan will be essential in maintaining the health and condition of wetlands.
- **Hiking trails** - Future demand for a new trail linking Crescent Meadows and the Inner Canyon with the newly acquired Jefferson County parcel is likely to occur, and such development has the potential to create wetland impacts and sedimentation problems.
- **Water use** - Water sources and natural hydrologic patterns are still largely intact, but without adequate protection from surrounding development, particularly increases in groundwater pumping, the quality of this resource could be seriously affected.

## **Desired Future**

The Park's beauty and natural diversity are greatly enhanced by its wetland resources and their preservation or loss will have a direct impact on the overall quality of the Park.

- Current levels of both native plant and animal diversity in wetland areas should be documented and maintained, especially in areas supporting rare species.
- Wetlands were last delineated and assessed for condition and health in 1995. Water and wetland resources on the Jefferson County parcels should be identified and protected and resources in the other two parcels should be revisited. An updated wetland delineation and condition assessment should be conducted in the future to ensure the continuous health and monitoring of the diverse areas that are essential for biological diversity.
- Weed control, restoration projects, wetland monitoring, and visitor education programs are expanded to protect the Park from serious habitat degradation.



# Resource Element Description: Geology, Paleontology, and Soils

## Resource Summary

### **Significant Features**

- The sheer walls of Eldorado Canyon expose a variety of geological units, inviting study by the public and scientists alike and provide world-class rock climbing routes. This is due to the significant relief and the presence of natural fractures that expose near-vertical rock faces. The combination of the deep canyon formed by South Boulder Creek and the steeply dipping reddish sandstones of the Fountain and Lyons formations makes for spectacular scenery.
- A variety of soils provides, in concert with different local geologic units, a variety of substrates for upland and wetland plant communities and therefore associated wildlife species.
- Wetland soils act as a filter between surface and groundwater and these soils play a key role in trapping sediments that would otherwise enter South Boulder Creek and other drainages in the Park.

### **Threats**

- Susceptibility to erosion – Erosion is occurring along Park roads, parking areas, and trails. This is due to the poor cohesiveness of soil materials and extreme topography of the Park. Roads, trails, and parking lots are prime sources of sediment that can be washed into streams, reducing water quality. Gullying can result along embankments and fill.
- Rockfalls – Falling rock commonly occurs in steep topography commonly due to natural erosion processes. Rockfalls are most common during heavy rains and in the morning as the sun warms rocks that were fractured by water infiltrating into cracks and freezing during the night. Rockfall caused by climbing or other human activity is particularly dangerous in some areas of the canyon.

## Description

### **Geology**

The canyons and mountains of Eldorado Canyon State Park record a remarkable portion of the Earth's geologic history. The cliffs and slopes provide excellent exposures of rocks that enable us to unravel the complicated geology of the area.

Sometime before 1,700 million years ago, a sea covered the area, and layers of sand and mud were laid down. The sediments were later deeply buried and transformed by heat and pressure into rocks called quartzite, gneiss (pronounced nice), and schist. Supremacy Rock and Quartzite Ridge are made up of the hard, erosion-resistant quartzite. About 1,700 million years ago, molten rock (called magma) from even greater depths in the Earth's crust rose up and engulfed the quartzite and gneiss, further changing it. The magma is now called Boulder Creek granodiorite and Twin Spruce quartz monzonite. Both types of rocks are commonly called granite. The knobby boulders in Crescent Meadows are made up of Boulder Creek granodiorite. Later, faults developed in response to forces in the Earth's crust. The faults broke up the rocks and formed areas of crushed rock called shear zones. Two shear zones are present on the west side of Eldorado Peak in the Jefferson County parcel. Finally, another episode of heat and pressure occurred about 1,440 million years ago.

There is no direct record of the next 920 million years of Earth history at Eldorado Canyon. We know from rock units preserved elsewhere in Colorado that shallow seas periodically covered the area from about 520 to 300 million years ago. The rock record left by these seas in the vicinity of Eldorado Canyon was removed by erosion during uplift of the Ancestral Rocky Mountains, about 300 million years ago. The Ancestral Rocky Mountains developed throughout present-day New Mexico, Colorado, and Wyoming. The eastern edge of the range was a few tens of miles west of where Eldorado Canyon is today. Large amounts of sand, gravel, and boulders were eroded from the highlands of the ancient mountains by streams and rivers. The sediments were deposited in large alluvial fans, much like you see today on the eastern side of the San Luis Valley in southern Colorado. These are the red rocks of the Fountain Formation. If you look closely, you can see pebbles and cobbles of quartzite and granite that were eroded from the older, underlying rocks and included in the Fountain Formation. The spectacular cliffs of The Bastille, Wind Tower, Redgarden Wall, West Ridge, Peanuts, and Rincon Wall were all carved from the Fountain Formation. Eventually, the Ancestral Rocky Mountains were worn down and only sand was deposited in a desert environment with sand dunes and shallow, sandy streams. These sediments were preserved as the reddish-pink sandstones of the Lyons Formation. The Rotwand Wall is made up of Lyons Sandstone.

East of the Park a great thickness of younger rocks are preserved. When these rocks were being deposited, the underlying Fountain and Lyons formations were buried, compacted, and cemented into the rocks we see today.

About 65 million years ago, the event geologists call the Laramide orogeny began to uplift the present day Rocky Mountains. At this time the previously flat-lying rocks of the Fountain, Lyons, and younger formations were tilted up on end, much like if you were to lift up one edge of a stack of books. We can see similarly tilted rocks all along the east edge of the Front Range at places like Garden of the Gods, Roxborough State Park, and Red Rocks Park.

By about 45 million years ago, the Rocky Mountains were eroded down to gently rolling hills, much like their ancestors 250 million years earlier. Vast amounts of sand and gravel eroded from the mountains were washed out to the east, forming the High Plains we see today. Ancestral South Boulder Creek meandered off to the east at this time.

About 20 million years ago all of the Rocky Mountains began to be uplifted. Streams cut down into older and older rocks. By about 5 million years ago, South Boulder Creek had cut its present day course. The wetter climate and higher runoff during glacial periods of the past few hundred thousand years resulted in the deep canyon we see today. Glaciers did not extend as far as Eldorado Canyon. The large boulder field (or talus slope) just south of The Bastille was probably formed by freezing and thawing of Fountain Formation sandstones during glacial periods.

Today, Denver Water's Gross Dam controls the flow of South Boulder Creek, four miles to the west. The amount of erosion caused by the creek's waters is now significantly diminished.

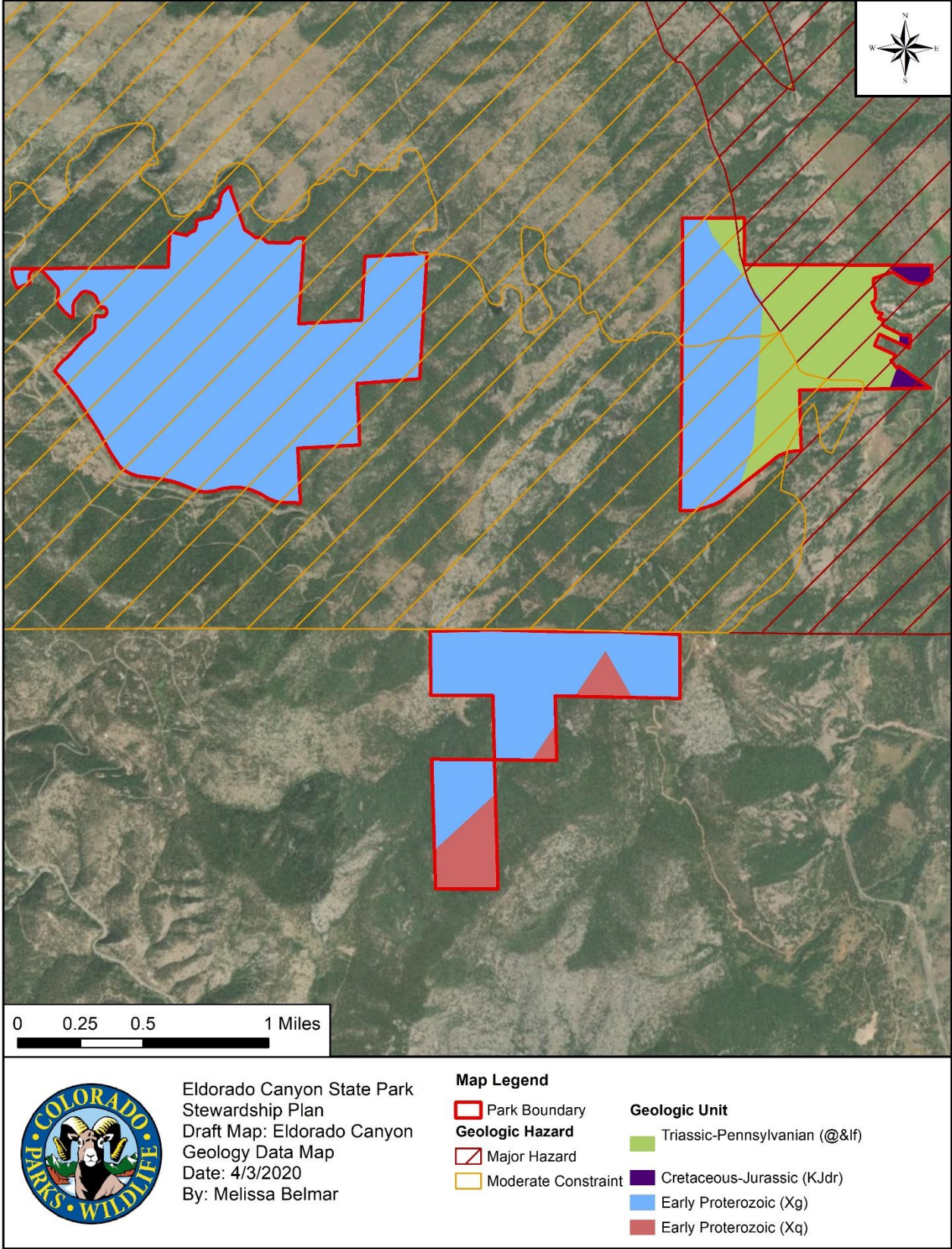
**Table 3.4.** Geologic units present at Eldorado Canyon State Park.

Sym	Unit Name	Rock Type	General Location
KJdr	Cretaceous-Jurassic	Sandstone	Eastern edge of Inner Canyon Parcel
Xq	Early Proterozoic	Granite	All 3 parcels
Xp	Early Proterozoic	Quartzite	South side of Jefferson County Parcel

@&f Triassic-Pennsylvanian Siltstone Eastern half of Inner Canyon Parcel

Source:

**Figure 3.39.** Geologic Resources within Eldorado Canyon State Park.





## Paleontology

Paleontological surveys were completed in the Fall of 2019 and findings will be documented in a report by the Summer of 2020. Initial findings will be considered in planning efforts, and the finalized report will be included as an appendix to this plan. This section will be updated as information is available.

## Soils

According to the custom soil survey report for the Park (NRCS 2019), there are 13 soil types at Eldorado Canyon State Park (Figure 3.40, Table 3.5). As to be expected, soil types are highly variable in the Park. Soils are generally thin and poorly developed on the steep slopes. In most areas of the Park, soils are sandy, sandy loams, or loams that have a severe erosion hazard. Crescent Meadows contains alluvium material (PgE) where the land slopes into a valley and seasonal waterways form.

**Table 3.5.** Characteristics of soil complexes present at Eldorado Canyon State Park.

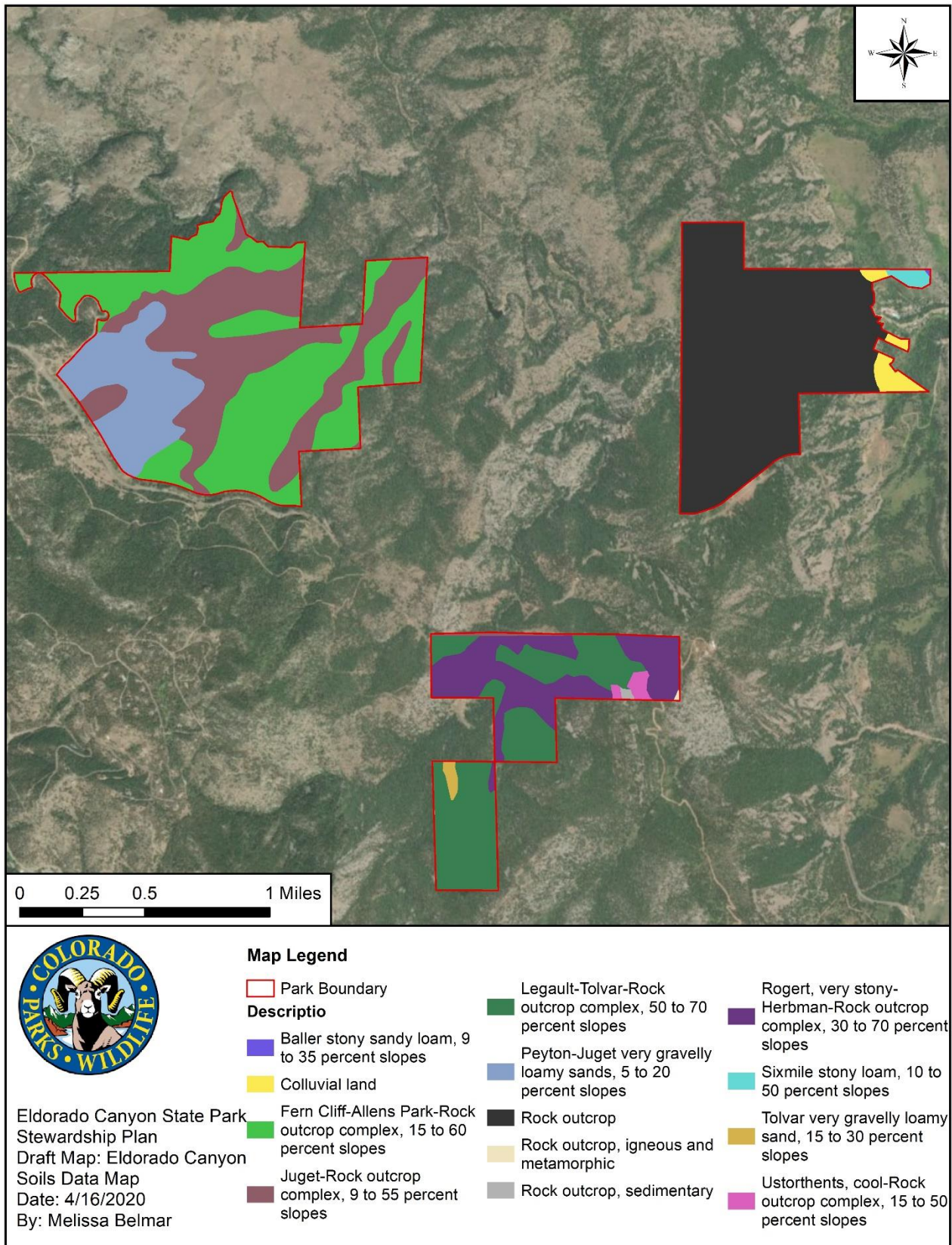
MUSYM	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard <sup>1</sup>
BaF	Baller stony sandy loam, 9 to 35 percent slopes	Ridges	Loamy residuum weathered from sandstone	Severe
Cu	Colluvial land	Valleys	Colluvium	Severe
FcF	Fern Cliff-Allens Park-Rock outcrop complex, 15 to 60 percent slopes	Mountain slopes, fans, ridges	Mixed loamy alluvium, loamy colluvium and/or residuum weathered from granite	Severe
JrF	Juget-Rock outcrop complex, 9 to 55 percent slopes	Ridges, mountain slopes	Sandy residuum weathered from granite	Severe
PgE	Peyton-Juget very gravelly loamy sands, 5 to 20 percent slopes	Mountain slopes, valleys, ridges	Locally transported loamy and/or sandy slope alluvium, sandy residuum weathered from granite	Moderate
Ro	Rock outcrop	Mountain slopes, cliffs	Mixed	Not Rated
SmF	Sixmile stony loam, 10 to 50 percent slopes	Ridges, hills	Loamy residuum weathered from calcareous shale,	Severe
78	Legault-Tolvar-Rock outcrop complex, 50 to 70 percent slopes	Ridges, mountain slopes	Acidic, gravelly, stony, and sandy residuum weathered from igneous and metamorphic rock, and stony, gravelly, and loamy alluvium derived from igneous and metamorphic rock	Severe
138	Rock outcrop, igneous and metamorphic	Mountain slopes	Exposed bedrock, talus, and large boulders of igneous and metamorphic rock	Not Rated
139	Rock outcrop, sedimentary	Terraces, hogbacks, mountains, hillslopes	Exposed bedrock, talus, and large boulders of sandstone and/or mudstone and/or shale and/or conglomerate	Not Rated

141	Rogert, very stony-Herbman-Rock outcrop complex, 30 to 70 percent slopes	Ridges, mountain slopes	Colluvium over residuum weathered from igneous and metamorphic rock	Severe
150	Tolvar very gravelly loamy sand, 15 to 30 percent slopes	Ridges, mountain slopes	Stony, gravelly, and loamy alluvium derived from igneous and metamorphic rock	Severe
167	Ustorthents, cool-Rock outcrop complex, 15 to 50 percent slopes	Ridges, mountain slopes	Noncalcareous, stony, gravelly, and sandy to loamy colluvium and/or residuum weathered from sandstone and exposures of rock outcrop, talus, and large boulders of sedimentary rock	Severe

Source: (NRCS 2019)

<sup>1</sup>Erosion hazard given for Roads, Trails

**Figure 3.40.** Soil types within Eldorado Canyon State Park.



## **Current Conditions: Geology, Paleontology, and Soils**

Throughout modern times, the geology and soils of the Park have been influenced by activities that can explain the current conditions of these features in the Park. Overall, the most significant impact on the geology and soils of Eldorado Canyon took place during the period of intensive development from 1880 to 1920. A variety of activities took place during this time throughout all parcels of the Park.

In the Inner Canyon, the railroad roadbed that today is the Fowler trail was constructed. During construction, a cut was made through the south side of the Bastille rock formation. Heavy recreational use of the Inner Canyon occurred during the prime of the Eldorado Springs Resort, an example of which was the construction of a large wooden staircase on the Bastille. The Crags Hotel was built in 1908 overlooking the Inner Canyon. A funicular railway was constructed from what is now the South Picnic area to the hotel in 1908 and a wagon road was constructed up Rattlesnake Gulch to provide access to the hotel. The funicular was abandoned, and the wagon road fell into disuse due to destruction of the hotel in 1912. Construction of the Crags Hotel and associated buildings caused moderate disruption of soils in the vicinity.

During this time, three water diversion structures were built on South Boulder Creek with associated pipelines. These supply water to the cities of Louisville and Lafayette, as well as for the Farmer's Reservoir and Irrigation Company. Construction of these facilities significantly altered the soils and plant life of riparian areas along the creek near the eastern boundary of the Park.

Construction of the Moffat Tunnel Collection system by the Denver Water Board in the early 1920's significantly affected the Park. Temporary housing was constructed in Crescent Meadows for workers building Gross Dam. Six foundation terraces are present adjacent to the Crescent Meadows parking lot. It is possible that some of the old, disused roads in Crescent Meadows may date from this period. Eldorado Canyon Drive was extended up the canyon to the diversion structure on South Boulder Creek west of the Park. This structure diverts water into a tunnel that intersects the surface in South Draw and Rattlesnake Gulch, where two siphons (large pipes) cross the streams. Spoil dumped during tunneling operations is present at these locations.

In the Jefferson County parcel, The Denver, Northwestern & Pacific Railroad (formerly the Denver & Rio Grande Western Railroad, now owned by the Union Pacific Railroad) right of way cuts across the northern part of the Jefferson County parcel. The railroad was built through the area in 1903. Three tunnels are present in the parcel (two are completely within the parcel, one is partially within the parcel). Tunnel construction, along with cut and fill for the roadbed, caused significant disruption of soils in the South Draw area. Poor-quality roads were built into the area for access to the tunnels and right of way. These also are focal points for erosion. Public Service Company of Colorado (now operating as Western Gas Supply) constructed a 10-inch diameter natural gas pipeline from near Denver to Fraser up Eldorado Canyon. Signage in the canyon indicates that the pipeline is largely buried beneath Eldorado Canyon Drive. Trenching during laying the pipeline probably dumped rock and soil into South Boulder Creek, contributing to degradation of the riparian environment.

Ranching and logging activities in Crescent Meadows led to development of roads. Erosion resulting from these activities has largely been stabilized. A small mining prospect pit in the middle of Crescent Meadows is of historical interest, and only disrupts a small area of soil.

Climbing activities are intensely concentrated in the Inner Canyon. In the past, placement of fixed protection hardware (pitons and pins) has been a significant problem. Locally, slings were also left on climbing routes. Climbing practices have moved away from permanent, fixed protection in recent years towards removable protection such as nuts and chocks. Climbers can disrupt vegetation and cause soil erosion if they create social trails for access to the beginning of climbing routes.

Disruption due to earlier activities is not particularly apparent to the casual Park user due to the amount of time that has passed since construction took place (generally greater than 60 years). In general,



sufficient time has passed for disturbed areas to return to a fairly natural state (with the exception of the Union Pacific railroad right of way).

## **Resource Trajectory**

Trail use and road maintenance are the most significant impacts of Park activities on the soils and geology. Development of trails in the Jefferson County parcel will require use of construction practices suited for steep terrain. For existing trails, switchback cutting and damage to adjacent vegetation by foot traffic are the most significant impacts. Given that roads in the Park are not paved, continued maintenance by grading and addition of gravel will probably contribute to erosion and soil runoff into South Boulder Creek. Intensive use by mountain bikes can be more damaging than foot traffic due to bike tires greater disturbance of the trail surface. The greater disturbance leads to more erosion. Additional automobile traffic can lead to dust problems during dry periods, which are unsightly and a nuisance.

Climbing activities disturb rock surfaces due to placement of fixed protection devices and chalk use. Chalk on rock surfaces is apparent to casual Park visitors, as well as climbers, and impairs the natural appearance of the rock formations. Climbing hardware damages the rock, widening fractures (cracks) and visually impairing the natural appearance as well.

Potential non-recreational activities within the Park that may cause significant disruption to soils and geology of the Park, particularly enhancing erosion, are maintenance of cuts and fills along the Union Pacific Railroad right of way. Should repairs be necessary to Denver Water facilities, the diversion facilities on South Boulder Creek, or the natural gas pipeline, disruption of soils and bedrock could be significant due to excavations and general construction activity.

## **Desired Future**

The desired future for geology and soils is to reduce erosion caused by recreational activities and protect geologic resources from degradation, particularly:

- Sediment-laden runoff from Park roads and parking lots is minimized. This will decrease sedimentation into South Boulder Creek and other Park drainages and reduce damage to road surfaces and embankments.
- Trails are constructed and maintained to prevent erosion. Soil types and slope and aspect of terrain are carefully considered during construction of trails and facilities. Trails that will support visitation for at least 50 years with limited impact to geology, wildlife, and vegetation
- Climbing hardware and chalk use impact the integrity of rock surfaces as little as practicable. The use of non-permanent hardware in recent years has minimized damage to rock faces.
- Reduced soil loss into South Boulder Creek from high pedestrian traffic

## **Resource Element Description: Cultural Resources**

### **Resource Summary**

#### **Significant Features**

Previous archaeological investigations have located numerous important cultural resources in Eldorado Canyon State Park. These fragile resources help us paint a picture of the history of the park and the peoples who have lived here, and, as a result, offer a number of interpretive and educational opportunities for park visitors.

Some of the significant cultural sites can be viewed in the following maps (Figures 1-2).

- List of Significant Features
- Historic Homestead
- Historic Craggs Mountain Resort
- Historic Eldorado Springs Resort Gazebo
- Crescent Meadows Terracing
- Fowler Trail "Ghost Railroad"
- Craggs Hotel Funicular

#### **Threats**

- Structures - All historic structures on the park are fragile and hazardous to visitors. Weathering, the age of the resources and visitor activity are potential threats. Human activity in and around these locations should be restricted until the structures can be properly stabilized. These sites are suitable for viewing, but not for any other activity.
- Collection of Artifacts - The collection of artifacts significantly alters a site's integrity making it difficult to determine significance without time consuming and costly excavations.
- Disturbance of Undiscovered Sites - All development and use within the park has the potential to adversely affect sites that have not yet been identified. Zoning maps should be referenced prior to any ground disturbing projects. Resource Stewardship is also available to help with these efforts.

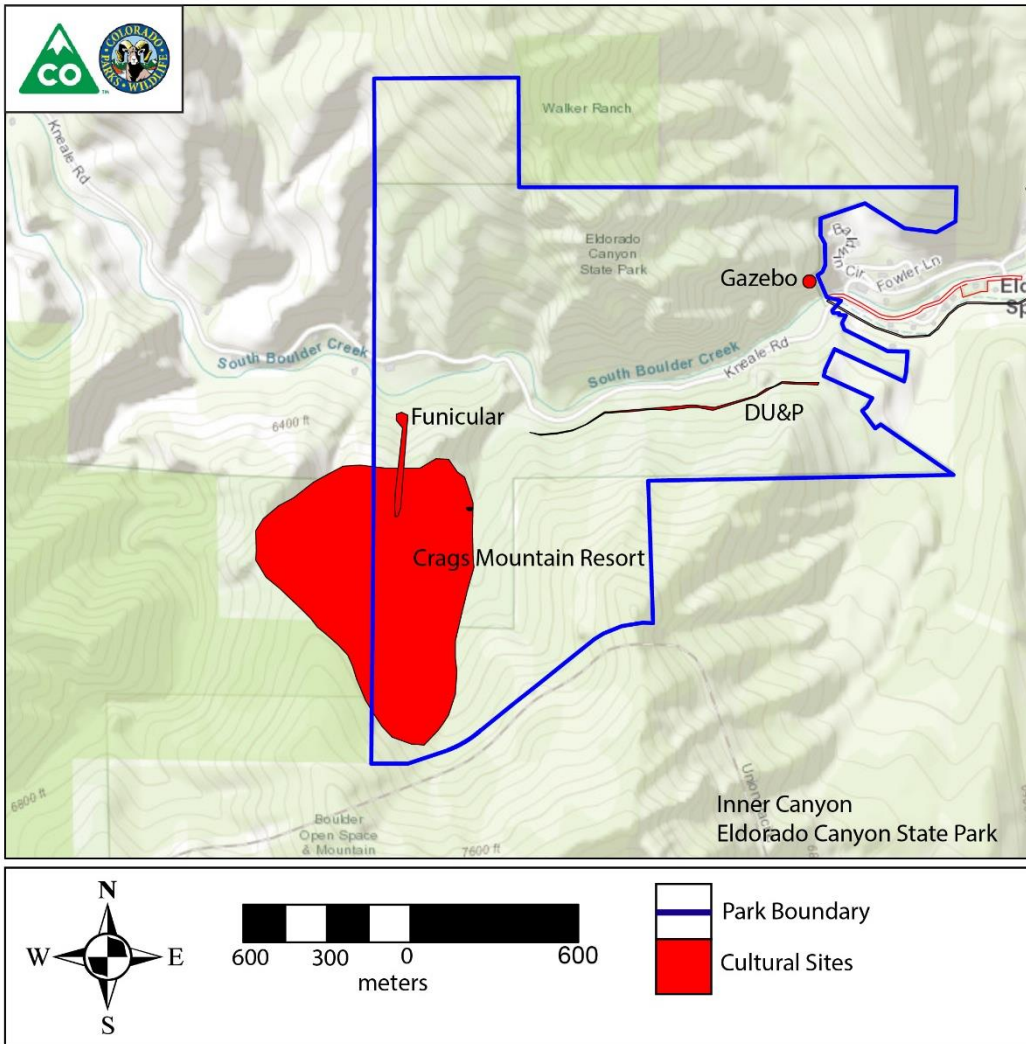


Figure 3.41: Cultural Resources in the Inner Canyon of Eldorado Canyon State Park.

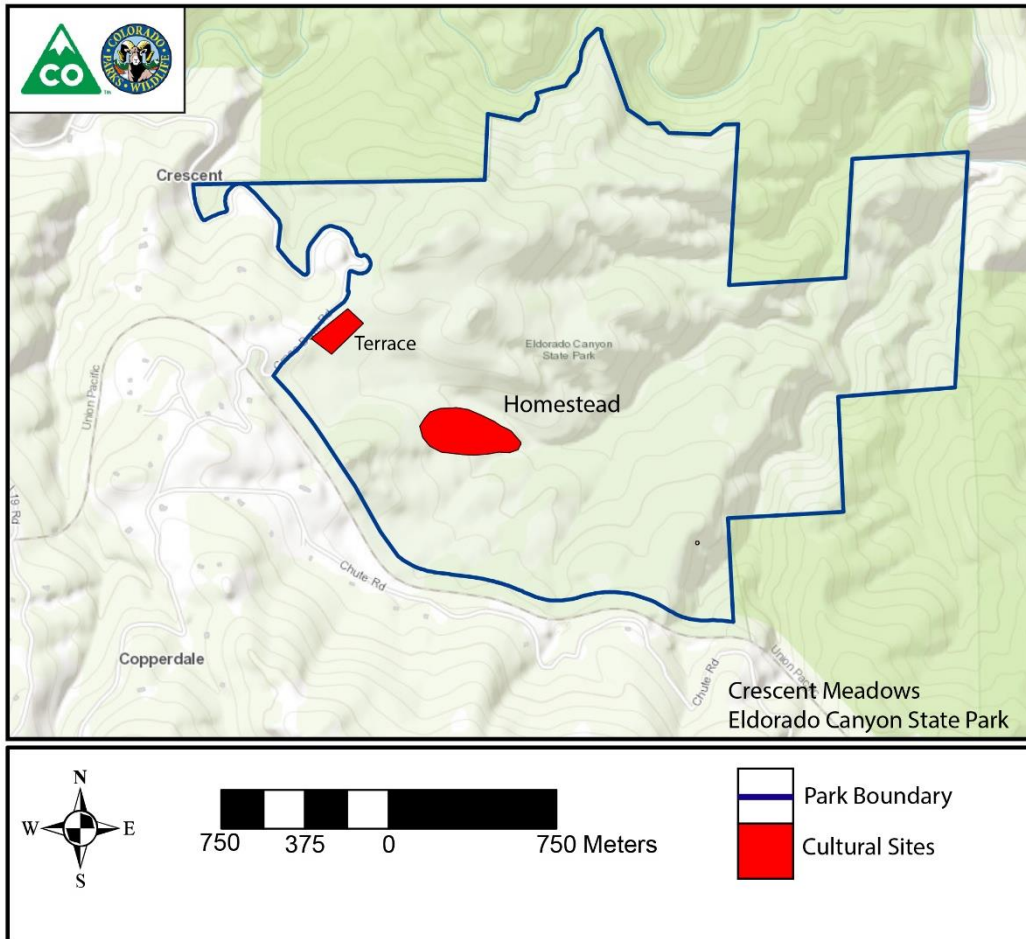


Figure 3.42: Cultural Resources in the Crescent Meadows parcel of Eldorado Canyon State Park.



## **Description**

Located just south of present-day Boulder, Colorado, Eldorado Canyon State Park has a rich history of human use. These uses changed over time, and each phase of the canyon's history altered the landscape. Some of these changes faded almost completely over time, some lingered in subtle ways, and others left indelible marks that visitors can easily observe today. From the heaps of rock tailings that testify to historic mining activity in Crescent Meadows to the imposing rock cuts that mark the path of the "ghost railway" on what is now Fowler Trail, these remnants of earlier land uses are quiet narrators of the land's history. Overall, the trajectory of the canyon's past documents a larger shift at work in the places that became Colorado's public lands as well as that of many other places in the American West. With the caveat that labor and leisure were never totally disentangled, the canyon's history documents a shift from a landscape of subsistence and labor to one devoted primarily to leisure and recreation.

This history begins with the occupation and use of Eldorado Canyon by Native Americans. The Mouache Band of the Ute, and, by the early nineteenth century, the Cheyenne and Arapaho, were drawn to the canyon as part of a pattern of seasonal land use. During winter months, they descended from summer camps in higher elevations to the canyon. For the Ute, Cheyenne, and Arapaho the warm springs were politically significant as a neutral meeting ground. Natural resources abounded in the canyon, including the water of South Boulder Creek, timber, plants, and wildlife. Native peoples not only used the land and its resources for subsistence activities like hunting and gathering, and possibly agriculture as well, but also integrated the canyon into their lifeways and worldviews.

The discovery of gold in the area triggered a surge of Euro-American encroachment into Eldorado Canyon in the 1850s and 1860s. In the wake of the U.S. government failing to uphold treaty agreements, a series of violent clashes between the Euro-American newcomers and the Ute, Cheyenne and Arapaho led to their forcible removal to reservations located throughout the West. Mining in this area never yielded the riches would-be prospectors hoped, but some prospective miners and their families remained near the canyon and turned to homesteading. By the late 1800s, several families dotted Eldorado Canyon and Crescent Meadows. These families pursued a variety of means of making a living from the land. Their activities included ranching, agriculture, and milling grain. Some also developed significant timbering operations, including sawmills. Homesteaders not only extracted the resources they needed to subsist, but also to profit.

In the early 1900s, the canyon saw increased tourist activity—the result of rising incomes and leisure time among upper and upper middle-class Americans and the expansion of passenger rail networks. While the canyon had seen an unsuccessful attempt to lay track by the Denver and Rio Grande, the Denver, Northwest and Pacific developed a passing line that allowed unprecedented access to Eldorado Canyon. Entrepreneur A.D. Stencel saw the potential for tourist development rail connectivity represented. He built the Craggs Resort and Hotel at the top of the canyon in 1908, and contracted for the Craggs Hotel Funicular, a gravity-powered inclined railroad, built in 1912. The Craggs Hotel burned down later that year, and the funicular was removed soon after.

Luckily for tourists, the Craggs Hotel was not the only option visitors had to spend leisure time near the canyon. In 1905, Frank Fowler and the Moffat Lakes Resort Company had opened The Eldorado Springs Resort (briefly known as the Moffat Lakes Resort) between the town of Eldorado Springs and the mouth of the canyon. By 1908, one of its major attractions was easy access by rail from Denver via the Denver & Interurban electric car line. Other selling points were the canyon's dramatic natural setting, the purported health benefits of the warm springs and a variety of entertainment options, most famously performer Ivy Baldwin's daring tightrope walks across the canyon.

The resort declined after the 1910s, weathering fires and floods in the late 1920s and 1930s while still continuing operations until the 1960s. During that time, the resort passed through the hands of *Denver*

Post owner, Fred Bonfils, and his associates before Frank Fowler's son, Jack Fowler. Together, they purchased it in the 1940s. Under Jack Fowler, the resort operated alongside his new venture: the Eldorado Springs Water Company. Fowler founded the company in 1942 to bottle and sell water from South Boulder Creek. It continues to operate today.

Perched at the mouth of the canyon, the fading Eldorado Springs Resort also overlooked the emergence of technical rock climbing in the canyon. Starting with a climbing club called "The Marmots" in the 1950s, groups of climbers began to push the boundaries of their sport at Eldorado Canyon, developing new and more difficult routes and pioneering climbing techniques. As the sport expanded and gained participation throughout the 1960s and 1970s, climbers nationwide heard about the rose and white sandstone climbing mecca hidden in the foothills above Boulder.

The canyon's rising profile as an unparalleled place for technical rock climbing and outdoor recreation brought the public's concern and attention to plans to turn the area into a rock quarry. To protect the canyon and its recreational riches, the State of Colorado purchased 400 acres of land from the Fowler family in 1978. A year later, the State purchased Crescent Meadows from a private holding company and combined the two tracts to form Eldorado Canyon State Park. The land's popularity with recreationists of all kinds was immediate. The new state park was so popular, in fact, that high visitation posed significant management challenges during its early years of operation and into the present.

The history of Eldorado Canyon State Park is documented through archaeological surveys and historical documents. Remains of historic structures and the residual presence of early land-use are still visible in areas of the park today. These resources provide an opportunity to enhance Eldorado Canyon State Park's guest experience through interpretive/educational information about these cultural resources.

## **Past Conditions: Cultural Resources**

### **Prehistoric and Historic Native American Land-use: 13,000 Before Present (BP)-1869 CE**

Situated southwest of Boulder, the canyon lies adjacent to the Flatirons, the iconic landmarks formed by vertical sheets of red rock that rear dramatically out of the foothills west of the city. Eldorado Canyon is most closely associated with the hamlet of Eldorado Springs, located at the mouth of the canyon. The canyon itself extends into the mountains almost due west from its mouth. The South Boulder Creek runs along the canyon floor, carving its high, nearly vertical walls. To the north and south of the canyon lie open lands that have been set aside for public open space (Boulder County, 2020). To the west of the canyon lies more mountainous terrain that leads into the Rocky Mountains. It is here that our story begins, with the arrival of the first people to enter with the canyon.

As with the rest of the American West, Eldorado Canyon's first inhabitants were Native Americans. Although we do not know what they called themselves, for at least thirteen thousand years, human beings have inhabited the zone where plains meet mountains, ranging widely for trade and access to the resources of grassland, foothill, montane, alpine, and riparian ecosystems. Undoubtedly, they visited well-wooded, well-watered places like Eldorado Canyon in their seasonal movements. Along thirty to forty-mile east-west corridors, people could acquire the natural resources that would require several thousand miles of travel along a north-south axis. Thus, began an enduring pattern of seasonal movement that led people from plains to peaks and back again annually in order to acquire what they needed. When coupled with continental trade routes, these earliest humans in the region not only survived, but flourished.

From roughly the fourteenth century until the nineteenth century, Utes, specifically the Mouache band of Ute, lived and thrived along the front range of the Rockies (Southern Indian Ute Tribe 2020; Colorado Encyclopedia 2020). During this part of the tribe's history, Utes spent the summer months living,

hunting, and foraging in the mountains before descending into the protection of lower-elevation canyons such as Eldorado Canyon in the winter. Archaeologists have recovered evidence of their occupation in the park, including open camps where people lived and a smattering of isolated finds. There is likely more evidence of prehistoric occupation within the park; however, time, use, and the small size of the artifacts, has inhibited its identification.

In the early nineteenth century, expanding Euroamerican settlement set off a chain reaction of indigenous migration west. In response, Arapaho and Cheyenne peoples moved from their homelands in the Midwest into Ute territory along the Platte River basin and into the Front Range. Though socially and politically distinct tribes, Arapahos and Cheyennes had linguistic similarities that helped the tribes to coexist and often cooperate (Gruber 2015). However, this encroachment created tension between Utes and the two tribes which resulted in bouts of violence from 1820 through 1860 (Mehls 1984:15; Andrews 2015; West 1998).

Despite tensions, Ute, Arapaho, and Cheyenne peoples made regular pilgrimages to Eldorado canyon. The natural warm springs there are thought to have served as a neutral territory (Sampson 2004: 3). According to Joanna Sampson, who was a local historian, all three groups believed in the healing properties of the waters and considered the springs sacred places that brought them good luck<sup>1</sup>(Sampson 2004:3). Aside from the spiritual significance of the water in the canyon, each tribe used the area for subsistence. Although little is known about their actions within the canyon specifically, across the region, they hunted game, gathered plants, and set fires to promote growth of desirable plant species, illustrating a profound ecological understanding of the region.

In addition to practices associated with their beliefs and wellbeing, there is some evidence the Native groups used the canyon for agricultural purposes. After acquiring horses from Spanish colonizers in the mid-seventeenth century, Utes used the canyon for grazing (Colorado Encyclopedia 2020). Prior to being pushed out of the western Great Lakes region in the seventeenth century, both the Arapaho and Cheyenne had been agricultural peoples. Like many American Indians, they cultivated maize, which had been grown by people in what is now the United States for some four-thousand years. Although she did not provide footnotes for follow-up research to provide more detail, historian Joanna Sampson indicated that early white settlers saw Arapaho and Cheyenne maize gardens near the springs at the base of the Eldorado Canyon during the nineteenth century (Sampson 2004:3). For Indigenous peoples, the canyon provided needed resources as well as functioned as a location for everyday activities and gatherings. Rich story-telling that persists to the present testifies to the lively social life and an appreciation for history and tradition among the canyon's indigenous people. Like all peoples, then, the Utes, Arapahos and Cheyennes transformed the land through their use of its resources, and it transformed them.

In 1851, the Arapahos secured their access to the Boulder Creek area through the Treaty of Fort Laramie (Colorado Encyclopedia 2020). Given their alliance with the Cheyennes, both tribes enjoyed protections in this area and the greater Platte River Basin (Colorado Encyclopedia 2020). Prior to this, in 1849, the Calhoun Treaty recognized Ute lands in western Colorado and secured "customary" use of the area's mountains for the tribe (Mehls 1984:15). Despite these treaties, Euroamerican mining prospectors and settlers encroached on treaty lands as they searched for gold in the Boulder Creek Drainage throughout the 1850s and 1860s. For Ute peoples, the Evans Treaty in 1868 marked the beginning of a pattern of broken promises and land cessions to the United States. Tensions reached a boiling point with the Meeker Incident in 1879. After enduring years of receding territory and attempted erasure of the Ute way of life at the hands of Euroamerican settlers, Ute peoples on the White River Agency in northwestern Colorado revolted against Indian agent Nathan Meeker and his white employees. The incident provoked an uproar from Euroamerican settlers and forced the White River and Tabeguache Utes further west onto a smaller reservation in eastern Utah by 1880 (Colorado

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<sup>1</sup> This is not proven and should be taken a possibility.

Encyclopedia 2020). Today, Ute peoples retain this reservation in eastern Utah, the White Mesa community in southern Utah, and the Ute Mountain Ute and Southern Ute reservations in southwestern Colorado. The Ute are the only tribe to retain land in Colorado today.

For Arapaho's and Cheyenne's, the timeframe between the Treaty of Fort Laramie and the Medicine Lodge Treaty of 1867, which ceded land in central Kansas to the Cheyenne, marked another period of forced removal, broken treaties, and genocide in Colorado (National Park Service 2018). After years of violent encroachment by white settlers in the Boulder and South Boulder Creek drainages, Arapaho peoples, led by Niwot, meaning "Left Hand" in English, relocated to the Sand Creek camp in present-day Kiowa county in the early 1860s (Colorado Encyclopedia 2020). This camp, home to Arapahos and Cheyenne's peoples displaced from land throughout the Platte River basin, became the site of the Sand Creek Massacre. At Sand Creek, Colonel John Chivington and 550 volunteers brutally slaughtered and mutilated the bodies of 150-200 women, children, and elders in 1864 (Colorado Encyclopedia 2020). Shortly after, in 1869, Southern Arapahos and Southern Cheyenne's relocated from Colorado to occupy a reservation in Indian Territory (Oklahoma), where the tribe is seated today (Ubbelohde et al 2001:109). Northern Arapahos remained in Colorado almost a decade longer, until they were relocated by the U.S. army to the Wind River Reservation in central Wyoming in 1878 (The Wyoming State Historical Society 2018). Along with Eastern Shoshone peoples, the Northern Arapaho tribe still occupies this reservation today.

While no Native Americans have tribal lands in Eldorado Canyon today, it is worth noting that many still feel a connection to this place and recognize it as part of their homelands. It is important to recognize and honor these connections.

### **Early Euroamerican Land-use and Homesteading: 1857 CE-1904 CE**

After the forced removal of Arapaho and Cheyenne peoples from Eldorado Canyon and surrounding lands along the Front Range, Euroamerican settlers used the area intensively and transformed it dramatically. Lured west by the prospect of striking it rich from precious metal mining in the mountains of Colorado during the mid to late 1800s, European settlers came to the American West in droves. As part of a larger process of westward expansion across the continent throughout the 1800s, Eldorado Canyon's rich natural resources made it particularly attractive to early settlers. While the Doudy family was the first to settle there, the canyon also became home to a number of other families including the Kneales, Prudens, Purcells, De Backers, and Barbers (Sampson 2004:6). Where Native American groups had used the canyon's resources primarily for subsistence, the earliest white settlers came to Eldorado Canyon intending to extract more than they needed and sell the surplus in capitalist markets.

#### **Nineteenth-century sites associated with mining and homesteading**

- Crescent Meadows Terracing complex
- Crescent Meadows Homestead complex

The Doudys serve as an excellent example of how settlers transformed the canyon. Arriving in either the fall of 1857 or the spring of 1858, Andrew Doudy and his family constructed a sawmill and gristmill to produce flour in 1861. Although they accessed and used the canyon, the Doudy homestead lay slightly northeast of the canyon itself, along South Boulder Creek. While lumber production was not extremely successful for this family, the high price of flour in the remote canyon made the gristmill profitable (Sampson 2004:6). Like other settlers who migrated west, Doudy brought along some livestock in the hopes of ranching. However, Colorado's winter storms and perilous snows dashed his hopes of building a successful cattle ranch.



Another example of a laboring family is the Kneale family. After establishing himself in Denver in 1872, Thomas Kneale began prospecting for gold in the foothills of the Front Range (Boulder County Miner, 27 February 1913). Instead of subsurface resources, however, Thomas and his brother, Charles, found what the Doudys before them had: that Eldorado Canyon's above-ground resources of timber, wheat, and wild hay provided greater returns on investment than minerals. Thus, the Kneales began homesteading on roughly one thousand acres abutting South Boulder Creek in 1880 (Boulder Carnegie Library [BCL] 2017). Also, like the Doudy family, the Kneales established a sawmill in the canyon to process the abundance of timber there. Through these practices, they further illustrated the hard work required to homestead in Eldorado Canyon.



Figure 2.43: "Res of C. M. Pruden, South Boulder." View of the Prudens posed in front of their log cabin, looking west toward Eldorado springs. Circa 1890. Eldorado Springs: Pruden family, 1890, photograph, 701-1-13, Carnegie Library for Local History, Boulder, CO. <https://localhistory.boulderlibrary.org/islandora/object/islandora%3A39>

In 1885, Thomas Kneale married Georganna Hatfield of Denver. Charles followed suit and married Mary Hatfield in 1889 (Helen and Mona Kneale, family narrative, Kneale Family Documents, Eldorado Springs Historical Society Collection [ESHSC], BCL, Boulder, Colorado). Together with their spouses, Thomas, Charles and their younger brother Phillip Kneale, along with their widowed mother Anne Kneale, they formed an extended family unit in Eldorado Canyon. At the time, homesteading in Colorado required the labor of all family members, regardless of age or gender, and both men and women typically contributed to family sustenance.

While Charles, Phillip, and Thomas Kneale made hay, tended to livestock, and harvested timber, it is likely that Mary, Georganna, and Anna managed the household gardens that produced much of the family's diet, raised chickens, prepared and preserved food for their families and any hired hands, produced goods such as candles, brooms, jams, and other items for sale at market, taught their children, and tended to any additional household tasks. Along with these obligations, homesteading women also served as midwives and physicians in their family and communities (Jefferson County Historic Commission 2013; Eddy 1992).<sup>2</sup> Today, visitors to the Crescent Meadows allotment of Eldorado Canyon State Park, formerly within the Kneale homestead, can see terracing adjacent to the trailhead parking lot. It is possible that this site may mark an old fruit tree orchard or evidence of other domestic gardening infrastructure. Though women often worked in and around the home, they engaged in hard physical toil, and their labor was essential to the regional economy.



Figure 3.43: The terracing complex by the Crescent Meadows Trailhead. Photograph by Rachel Egan, 2020.

The two pillars of Eldorado Canyon's landscape of labor were timber harvesting and agriculture. The Kneales grazed cattle and harvested hay on their upslope homestead, though it is unclear how long the family sustained this operation. The Doudys quickly learned the hardships of ranching during cold Colorado winters, however, land ownership records and a family timeline suggest that the Kneales may have been more fortunate. When Thomas and Charles moved on to greener pastures in Wyoming and Ward, Colorado, their younger brother, Phillip, married his wife, Cora, in 1911 and remained in the canyon. As the custodian of the family land, Phillip and Cora operated a "summer guest ranch" and

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<sup>2</sup> Examples of this include Dr. Rachel Staunton, of Pine, CO, who treated patients and delivered babies in her surrounding area during the early twentieth century, and Norine Holland, of Rio Blanco County, who was the first teacher in her area's newly established school in 1912. For more information on Dr. Rachel Staunton, see Bonnie E. Scubber, "Staunton State Park Saves Historical Ranch Lands," *Historically Jeffco*, 2013, <https://historicjeffco.files.wordpress.com/2014/10/2012staunton.pdf>. For additional information on Norine Holland and numerous other frontier healthcare providers and teachers, see Julie Jones-Eddy, *Homesteading Women: An Oral History of Colorado, 1890-1950* (New York: Twayne Publishers, 1992).

maintained the family sawmill near the mouth of the canyon (ESHSC, Kneale Family). Phillip spent the rest of his life there, and he passed away in 1946 (ESHSC, Kneale Family).

Where the Doudy family favored milling grain into flour, the extraction and processing of Eldorado Canyon timber emerged as an early moneymaker for the Kneale family. The family mill, established in 1878, produced lumber for house construction in Louisville, mining infrastructure at Louisville and Marshall, and, eventually, for railroad ties during the Denver, Utah and Pacific's unsuccessful grading near the floor of Eldorado canyon (ESHSC, Kneale Family; Helen Kneale, Oral History, 2007 audio recording, Maria Rogers Oral History Collection, ESHSC, 18:54). With the abundance of prime timber in and around the canyon, the Kneales set up a second mill in close proximity to the Moffat railroad tunnel, an extension of the Denver, Northwest & Pacific line that runs through instead of over the Continental Divide, to continue producing building supplies for a growing Colorado (ESHSC, Kneale Family). The Kneale mills were more than a family business, however. The first building the family erected in the canyon, just west of the diversion dam on South Boulder Creek, was a "rough lumber...building providing bunks and dining room for the men working at the mill" (ESHSC, Kneale Family) Along with creating a landscape of labor for themselves, the Kneales brought additional laborers to the woods of Eldorado Canyon to extract and transform the canyon's natural resources into salable goods.

Other early settlers, like Jonas and Vira Ann Barber, used the land in Eldorado Canyon similarly. When the couple arrived at the canyon, they knew that the warm springs of South Boulder Creek would make the harsh Colorado winters bearable. In addition, they recognized that the herds of elk and bighorn sheep would feed their family well in their new home. After building a log cabin, the Barbers farmed and logged the land, building a sawmill at the mouth of the canyon in 1868 (Eldorado Spring Barber Family, photo 1, historic photograph archive, ESHSC) to making their living and profiting from the canyon's natural bounty (Volunteer Naturalist Manual [VNM], History, park documents, Eldorado Canyon State Park Office [ECSPPO], Colorado). In addition to using the natural resources already available in the canyon, Jonas Barber and his family's labor transformed the land to suit their needs.

Another early settler that needs to be mentioned is William Eli Walker who held the original land patent (issued 1933) to the land near the Crescent Meadows Trailhead. While other land patents exist, including a Denver timber and stone entry (issued for timber and mining in land considered unfit for farming) issued in 1904 to Bertie A. Langridg, as well as patents issued to Samuel Flint (issued 1882 ), Joseph harper (issued 1882), and Pearl Edwards (issued 1902), the structures appear to date to the mid-20<sup>th</sup> century, suggesting they were associated with the Walker family who would eventually claim most of the surrounding land (US Patent Office).





Figure 3.44: Part of the Crescent Meadows Homestead Complex. Shown there are several large concrete and stone walls. Beyond the walls lies several types of raspberry bushes, suggesting they were grown here by homesteading families. The site was occupied during the earlier end of the 20<sup>th</sup> century.

It is likely that these families also prospected the area. Several fairly large prospecting pit and tailing piles have been located within park bounds. Because there is no record of gold, silver, or other commonly mined materials being recovered, it is likely that prospecting in the area was unsuccessful.

Broadly, Native Americans, the Doudy family and other settlers saw Eldorado Canyon as a place to produce goods and work for their livelihood. Eldorado Canyon's Native American groups and early settlers both worked hard to survive and flourish in the area, and also appreciated the area's aesthetic beauty. Unlike Native American groups before them, settler families sought not only sustenance but surpluses that could be converted into capital. The result was a greater impact on the landscape, in terms of the amounts of resources extracted, the scope of the activities that occurred on the land, and the population that labored in and moved throughout the canyon. At the turn of the twentieth century the canyon's function would change further still. Where the people who once settled in the canyon sought to use the landscape as a place of labor, others would soon seek to capitalize on the canyon's beauty and make it a place where leisure became the dominant activity.

### **Tourism and Recreational Development: 1904 CE-1978 CE**

At the turn of the twentieth century, the history of Eldorado Canyon shifted from a landscape of labor to a landscape of leisure. In a landscape of leisure, the primary driver of landscape change is people's desire to recreate. To be sure, people still labored to make this possible. They built roads and hotels. They served meals, washed linens, and cleaned bathrooms. Later, park staff developed interpretive exhibits, maintained trails, and provided law enforcement. In addition, far away from the canyon, workers laid track, drilled for oil, and made outdoor clothing, all of which facilitated visitors travel to and recreation in the canyon at different times in history. This labor and plenty more; however, was oriented toward enabling visitors to come to the canyon and enjoy sport, strolls, hot springs, beauty, and relaxation there. This transformation into a landscape of leisure places the canyon squarely within a broader story of American industrialization and the resulting rise of environmental tourism in the



American West. This part of the canyon's history begins with railroads, which connected the American West to the rest of the nation by circulating both people and goods. Railroads allowed for the rural West's natural resources to be shipped east, while people and processed goods were shipped west. Railroads made this exchange faster and less expensive than ever before.

#### **Sites associated with railway extension and recreational development**

- Fowler Trail/Denver, Union and Pacific Railroad Grade
- Crags Hotel Funicular & Mountain Resort
- The Gazebo (Eldorado Springs Resort)

In Colorado, the twin extractive industries of mining and ranching drew in railroad interests and expanded the possibilities of American travel. Precious metal deposits in the Rocky Mountains of Colorado drove railroad companies to push their grades into the mountains to extract gold, silver, and coal. Colorado ranchers herded their cattle, spread throughout the state's plains and mountains, to centralized locations where they were put on to large railcars and shipped to eastern meat manufacturing plants. As the railroads expanded to connect these massive industries to the East, it also shrank distances by allowing men and women to travel quickly and directly. Through this, many middle-class, white Americans experienced a boom in free time to partake in leisure activities during America's industrialization. Instead of growing food or crafting goods, the middle and upper classes could consume needed items mass produced in factories. This transformed not only time for leisure activities, but also the nature of those activities. Suddenly roughing it a bit by hiking, camping, hunting, and fishing were not chores that supported subsistence, but rather a form of recreation. Industrialization also created new kinds of white-collar jobs, with paid time off, allowing some middle-class workers to take vacations, previously the domain of the very wealthy. During this time, people worked for wages and, with their excess time and earnings, took train lines to recreate in the West.

Given time and income to travel, another byproduct of the expansion of the railroad system was an increase in tourism from people intrigued by the natural beauty of the West. It is here that the location of Eldorado Canyon enters the story of the railroad. While early settlers had used the canyon for industries that allowed them to create a product from the land, there was no significant bounty of one type or another that would have warranted a direct railway line to the canyon. However, a passing line created by the Denver, Northwest & Pacific made the canyon more accessible to western tourists than ever before.

The creation of this line above Eldorado Canyon, beginning in 1902, catalyzed the canyon's shift from labor to leisure. In Colorado, railroad companies pushed potential rail lines into the mountains toward the newest and richest gold, silver, and coal discoveries. But many of these routes were only speculative, as metals and minerals played out and new boomtowns evolved elsewhere. Along with access to these resources, Denver railroad developers, fretting about the city's lack of a direct rail link to the west, constantly proposed and even started construction of various routes to access Colorado's western slope and connect to Salt Lake City and the Pacific. One of those speculative railroads was the narrow-gauge Denver, Utah, & Pacific Railway. Construction began in 1881 and continued, in fits and starts, through 1887, progressing northwesterly from Denver to Eldorado Canyon. However, the railroad only laid rail on its new grade as far as Hallack Junction, on the northwest side of Denver, where the route diverted from the planned alignment and continued northward on a coal branch toward Broomfield and Mitchell. Ultimately the railroad reached Longmont and Lyons, becoming a local north-south route rather than an east-west, transmountain corridor. Eventually, the Denver, Northwestern and Pacific Railroad (later the Denver and Salt Lake Railroad and the Denver and Rio Grande Railroad) used some of the DU&P's undeveloped grade for its route to Rawlings Pass, later Moffat Tunnel, but the portion between Coal Creek Canyon and Eldorado Canyon State Park never received rails. The Fowler Trail follows the remnants of this pioneering, speculative railroad construction project. The

smooth, gradual incline of the trail, along with blasted rock cuts, provide evidence of the attempted railroad grade during Colorado's nineteenth-century railroad-building boom.

Where the Denver, Utah, & Pacific Railway failed, the Denver, Northwest & Pacific was successful. The company laid track high above the inner canyon on the south slope of the canyon itself as part of the Moffatt Road from Denver to Leadville. At the time, the silver boom made Leadville one of Colorado's largest cities (VNM, ECSP0). Passengers on the Moffatt Road line marveled at the canyon below on their way to the continental divide.

The canyon's splendor, along with easy access to viewsheds at the top of the canyon wall, was not lost on A.D. Stencel. In the early 1900s, Stencel purchased the northwest forty acres of Section 35 and incorporated his holdings as the Craggs Mountain Resort Company. In 1908, he built the Craggs Hotel on the parcel (Sampson 2004:22). Situated eight hundred feet above the southwestern terminus of the canyon floor, the Craggs Hotel provided unparalleled views of both the canyon below and vast alpine panorama to the west.

The Craggs Hotel provided the amenities and services that one would expect of a fine hotel at the time and rented furnished cabins and tents. In addition, individuals purchased the several lots adjacent to the hotel to build private cabins (Eldorado Springs The Craggs Hotel [ESCH], photo 1, historic photograph archive, ESHSC). Over time, there were several different ways that someone could arrive at the Craggs Hotel, although the most popular was to ride the Moffat Road railway line to the top of the canyon, get off at the whistle stop, and ride a horse and buggy to the hotel. Patrons could also hire a wagon or car and drive up the old railroad bed created by the Denver and Rio Grande to the Rattlesnake Gulch wagon road from Eldorado Springs. Visitors could also ride an inclined railway, or funicular, from the bottom of the canyon up the canyon wall to the Craggs Hotel (ESCH, photo 4, ESHSC).

The funicular was particularly unique. Built in 1912, the inclined railway easily transported people from the canyon floor up the eight hundred feet of canyon wall to the hotel. This operation was organized by Charles M. Pruden and the Cliffside and Boulder Railway Company. The funicular's two covered cars had ten rows of benches seated four people across. It transported people from the base of the canyon to the hotel, affording them a magnificent vista of the canyon (*Funicular*, park documents, ECSP0). The loading area was located right along a lull in South Boulder Creek's cascading flow and, once loaded, visitors diagonally traversed a ravine on the southern wall of the canyon. Once they arrived at the top, they simply had to ascend a flight of stairs and enter the hotel itself. Along with this dramatic climb up the canyon wall, the funicular was unique for another reason: it was gravity powered. It used a large water tank that was either filled or emptied to carry people up and down the canyon wall (ESCH, photo 4, ESHSC).

Unfortunately, the Craggs Hotel did not operate for long. In November 1912, a fire consumed the hotel, sending up flames that could be seen from miles away. While the origin of the fire was never discovered, newspapers speculated at the time that "tramps" may have started the blaze while squatting in the empty hotel during the off-season. Another theory held the owners burned it for insurance money (Daily Camera, 25 October 1913 newspaper article, *Craggs Resort Burned Supposed by Incendiary*, park documents, ECSP0; John Clark, personal communication 2020). Shortly thereafter, the defunct funicular was removed as well. Although the device's path is now covered by overgrowth and tumbling scree, visitors today can find an unloading platform and retaining wall adjacent to the hotel ruins. From there, an additional platform, presumably where the funicular water tank was located, becomes visible several yards below.



Figure 3.45: Undated view of a picnic area and portion of the Crazy Stairs on the north side of South Boulder Creek. This postcard was published by the Rocky Mountain View Company of Denver, CO. Eldorado Springs: Crazy Stairs, 1930-1949, photograph, 701-2-11, Carnegie Library for Local History, Boulder, CO. <https://localhistory.boulderlibrary.org/islandora/object/islandora%3A44744>

It is important to keep in mind that others continued to labor in the canyon while tourists enjoyed their leisure. Labor and leisure were often divided along racial lines. Tourists were most often white, and those who labored frequently were people of color. Records do not survive to indicate precisely who visited the canyon and who worked in the canyon, but by placing it in the broader story of Colorado and western history, we can make informed guesses. Throughout the nineteenth and early twentieth centuries, Chinese, African Americans, and immigrants from Mexico and Europe provided much of the sweat and muscle that laid track and ties across the West. The job was exhausting, poorly paid, and dangerous, but without it, the wealthier sort would not have come to places like Eldorado Canyon for fun—it simply would have been too much work to get there. Instead, in luxurious railcars, waiters, porters, and maids ensured travelers wealthy enough to purchase a ticket rode in comfort. When visitors arrived at resorts like the Craggs Hotel, they could expect similar attention. In both hotels and railcars, many of these servers were people of color, especially African Americans. In fact, being served by people of color was one of the very markers that signaled to the predominantly white vacationers that they were experiencing luxury. In contrast, the late nineteenth and early twentieth centuries were times of vagrancy laws, lynchings, Klan violence, and Jim Crow segregation in public places, not to mention constant struggle to scrape together a living, all of which made travel for most Black people difficult, if not impossible. America's white middle and upper classes, however, could ride trains with less fear of violence to their persons or arrest for vagrancy. Eldorado Canyon was becoming a landscape of leisure, but it was not one of universal access (Wei 2018; Andrews 2005).

Alongside the establishment of the Craggs Hotel at the top of Eldorado Canyon, the mouth of the canyon experienced considerable activity. In 1904, George Taylor purchased 480 acres from the Union Pacific Railroad Company for the benefit of his spiritual followers (Sampson 2004:17).<sup>3</sup> Sources available do not provide many specifics about this group, but it appears they attributed sacredness to the waters, perhaps not unlike indigenous peoples before them. Taylor and his followers held seances, dances, and religious services around the warm springs. In addition to his spiritual sensibilities, Taylor advanced the creation of the landscape of leisure through his pursuit of profit. He was the first to cordon the mouth of the canyon from the public. He charged people for entrance, thus turning the canyon into a privatized leasured space (Sampson 2004:17). After roughly a year of operation, Taylor sold his holdings to a group of men, headed by Frank Fowler (VHM, ECSP).

Fowler and the Moffat Lakes Resort Company established the Eldorado Springs Resort in 1905. Originally named the Moffat Lakes Resort, the doors of the resort opened on July 4, 1905. The resort's

<sup>3</sup> Sources available do not provide specifics about this spiritualist group. Sampson indicates that there were services and dances around the warm waters and that people attended seances related to the group. Taylor's group was the first to purchase the land from the railroads and cordon it off to the public. He charged people for entrance to the canyon and will eventually sell the land to the Fowler group. Sampson, 17.

main attraction were its warm springs and swimming areas. To indicate its location between the town of Eldorado Springs and the canyon, resort operators later changed its name to the Eldorado Springs Resort. At the turn of the century, thermal areas and hot springs were considered prime spots for resort development. Those that sought out the state's thermal areas believed that the waters could heal a variety of ailments, including tuberculosis, and Colorado's famed mineral waters attracted thousands of eastern consumptives.<sup>4</sup> A geologist who examined the warm spring at Eldorado Canyon in 1906 proclaimed the water to be among the finest on the continent (VNM, ECSP0).

Capitalizing on the proclamation, Fowler and the Moffat Lakes Resort company created two additional swimming pools, one in 1905 and the other in 1906. Given the popularity of the pools and of the nearby Craggs Hotel, Fowler and the Moffat Lakes Resort Company continued development at the canyon mouth with the creation of two sets of "Crazy Stairs" between 1906 and 1908. The "Crazy Stairs," or "Colorado Stairway," was a set of 1,350 steps that zig-zagged up the east face of the Bastille, the towering rock formation on the south rim of the canyon at its entrance. On the north side of the canyon the second set of "Crazy Stairs," also referred to as the "Observation Stairs," ascended the rock face. With strategically placed rest areas and viewing spots for tourists to see the canyon below and the expansive plains to the east, both sets of "Crazy Stairs" were a tremendous success for Fowler and the Moffat Lakes Resort Company (VNM, ECSP0). The "Observation Stairs" also led up to a series of overlooks, including a gazebo. The gazebo, built in 1906 by Horace McGrew, provided an overlook over the resort, as well as connected to the stairs leading up the canyon wall. Only part of the structure now remains (figure 6); however, it can be seen with a keen eye from the Fowler Trail and the entrance station, suggesting signage may be appropriate.



Figure 3.46: The Gazebo that was part of the Eldorado Springs Resort. Left: Current condition. Right: the condition in 1970 (Photo by CPW).

The early years of the Eldorado Resort were plagued by inaccessibility to the canyon. Where the Moffat Road Railway line allowed for people to easily enter the Craggs Hotel at the top of the canyon, the only way to travel to its mouth was via horse and buggy. This changed in 1908 with the completion of the Denver & Interurban electric car line that connected Denver and nearby Boulder.

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<sup>4</sup> It is possible that Eldorado Springs had a connection to Colorado's tubercular community, as many of the other springs in Colorado did, though the Kneale papers and other sources consulted do not indicate this one way or another. The Moffat Lakes Resort Company Papers at the Carnegie Library for Local History in Boulder may provide further information. At the time of the writing of this report, these papers are currently inaccessible because of the library's closure during the covid-19 pandemic.



The goal of the Denver & Interurban electric car line was to connect Denver and other cities on the Front Range, stretching all the way north to Fort Collins. While the line never achieved this goal, it did connect Denver, Boulder, and several other suburban locations along the way. The portion of the line that connected to Eldorado Springs was the “Kite Route.” Named for the kite-like outline it created on the map, the Kite Route ran from Denver north to Broomfield, with a split in the line just north of Broomfield called the Louisville Junction. One leg of this split ran northeast to Louisville before continuing northwest to Boulder. The second leg continued northwest from the junction to Superior, Marshall, and north to Boulder. The two legs met at Boulder, creating a loop at the top of the route (Superior Historical Commission 2005).



Figure 3.47: The M-152 of the Denver and Interurban at Standley Lake en route to Denver, photo by L.C. McClure dated 2 April 1909. Eldorado Springs: railroad, 2 April 1909 photograph, 701-1-1, Carnegie Library for Local History, Boulder, CO.  
<https://localhistory.boulderlibrary.org/islandora/object/islandora%3A36736>

The only portion of this route that deviated from the kite shaped loop was a small spur that took travelers west from Marshall to the town of Eldorado Springs. This spur improved access to Eldorado Springs, the resort associated with the town, and the canyon. No longer was the only access point to the resort and canyon a horse and buggy. Rather, patrons and visitors could easily board the car

line for a short ride to the resort.

Easier access translated into increased visitation and popularity for both the canyon and the resort, which quickly emerged as an iconic tourist destination for the greater Denver area. By some accounts, the resort hosted more than 60,000 visitors during the summer season (Eldorado Artesian Springs [EAS] 2020).

In 1908, the same year that the Crazy Stairs were built, the new Eldorado Hotel opened. The Eldorado Hotel was a world class resort for its day, with the finest rooms in the hotel commanding \$2.50 a night—a premium price.<sup>5</sup> Aside from the canyon and pools, the new resort boasted dancing pavilions, a midway with carnival games, roller skating, fishing, and other amenities. If one did not want to stay in the main hotel, there were several other accommodations around the resort including tents, dormitories, and private cottages (EAS 2020). Known as the “Coney Island of the West,” the Eldorado Springs Resort and the Eldorado Hotel were renowned for the entertainments it offered western tourists, all made possible by the labor of those employed in Colorado’s burgeoning tourist industry.

<sup>5</sup> See Appendix, Figure 4 for a photo of The New Eldorado Hotel.

In its heyday, from the 1910s to the early 1930s, the Eldorado Springs Resort was a mecca for tourism. Not only was the resort easily accessible by rail, it also benefited from a considerable marketing and press materials that raised its profile. Postcards, newspaper advertisements, posters, brochures, and photographs extolled the virtues and beauty of the Eldorado Springs Resort. Advertisements pointed to three major attractions to visitors: the health benefits of the springs, the ease of access from nearby Denver, and the abundance of leisure to be had. These elements speak to larger trends in western tourism.



Figure 3.48: New Eldorado Hotel, circa late 1930s. Eldorado Springs: New Eldorado Hotel, photograph, 701-1-6, Carnegie Library for Local History, Boulder, CO. <https://localhistory.boulderlibrary.org/islandora/object/islandora%3A37638>

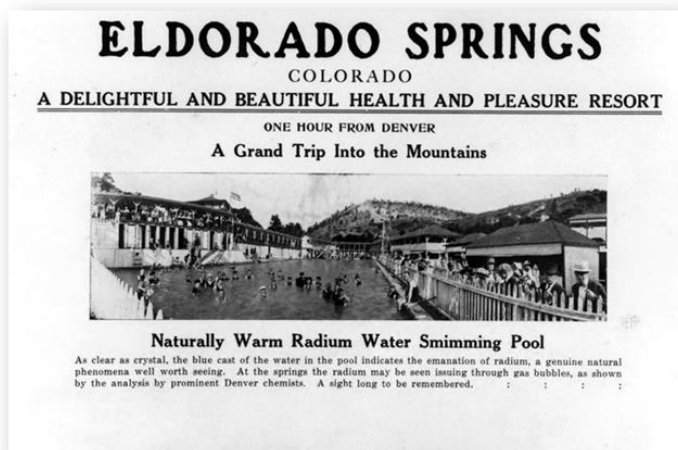
It is important to note that resort culture during this time, much like the rest of American society, was racially segregated. While Eldorado Springs Resort highlighted its ease of access from Denver, it may not have been accessible by all. The resort's heyday coincided with the Jim Crow era of the United States, during which Black Americans were excluded from "white" public spaces through a series of court decisions, laws, and regulations. Even where segregation was not enshrined in law, space was often segregated by custom, and white people enforced their informal claims to white space with threatened and actual violence (Schumaker 2009). Despite this, some Americans recognized the need for Black recreation and leisure spaces to accommodate the growing Black middle class and created private resorts for people of color around the nation.

In 1925, E.C. Regnier and Roger E. Ewalt founded Lincoln Hills Resort several miles up South Boulder Creek from Eldorado Springs to provide a safe, relaxing space for Black families to recreate in Colorado (National Register of Historic Places Form, Winks Panorama [WP]:15, National Park Service [NPS]). The location, along a stretch of South Boulder Creek notable for its exceptional trout fishing, offered easy, inexpensive transportation from the city by railroad or automobile. Small (twenty-five by 100 foot) mountain lots cost only \$50, and the company offered simple financing at \$5 down and \$5 per month (WP, NPS). Regnier and Ewalt advertised Lincoln Hills throughout the country. Property owners were mostly from Colorado, but also hailed from other states including Nebraska, Kansas, Wyoming, Missouri, Illinois, and Oklahoma, among others (Colorado Encyclopedia 2020; WP, NPS; Lincoln Hills Warranty Deed List, ARL39, Lincoln Hills Company, Lincoln Hills records [LHR], box 1, folder 13, Denver Public Library [DPL], Colorado). As the sole Black resort in the Mountain West, Lincoln Hills attracted entrepreneurs, pastors, doctors, and other professionals interested in securing a Black space among a predominantly white leisure culture.

Lincoln Hills provided Black people with treasured memories of the Colorado Mountains. O.W. Hamlet wrote of visiting his mountain cabin: "It's the keenest pleasure I have ever known. It thrills and fills me with love for the out-of-doors and I am finding more genuine fun, health, and happiness for both my friends and myself..." (O.W. Hamlet to Lincoln Hills, Inc., letters, 24 January 1928, ARL39, Lincoln Hills records, box 1, folder 8, DPL) Hamlet, also known as "Winks," founded Winks Lodge in Lincoln Hills in 1928, building the handsome, three-story, six-bedroom building himself out of local materials, and operated the lodge until his death in 1965 (Colorado Experience 2013). Hamlet was a self-made man

and an entrepreneur many times over. Described by his family as “a character,” he would personally collect his guests from the train station and drive them to the lodge (Colorado Experience 2013). Winks wanted to share his passion for Colorado’s natural environment and give others the opportunity to experience it for themselves, particularly Black youth (Colorado Experience 2013). Linda Tucker Kai Kai, Winks’ great-grandniece and Gary Jackson, Winks’ grandson, recalled the bustling lodge as “our own private kingdom,” and “a safe haven.” (Colorado Experience 2013) Winks advertised the lodge in the vacation section of the Negro Motorists’ Green Book from 1953 to 1957 and also placed ads in *Ebony* (New York Public Library 2020; WP, NPS). The lodge became the social heart of Lincoln Hills, boasting exceptional food cooked by Melba Hamlet, Winks’ second wife, and parties that stretched into the wee hours. Winks Lodge also hosted literary salons in the style of the Harlem Renaissance. According to oral tradition, the lodge also attracted black literary and musical luminaries including Langston Hughes, Zora Neale Hurston, Count Basie, and Duke Ellington, among others (Colorado Encyclopedia 2020).

While Lincoln Hills provided the resort experience for Black Americans on South Boulder Creek, advertisements of the Eldorado Springs Resort praised the health benefits of the resort and the attendant warm springs downstream. Ads assured visitors of “A Delightful and Beautiful Health and Pleasure Resort,” and included a panoramic picture of the resort’s grand swimming pool. The same



advertisement highlighted the resort’s desirable “Naturally Warm Radium Water Swimming Pool.” During this period, many people in the health and wellness community believed that radium, a naturally occurring element in many of Colorado’s geothermal hot springs, had health benefits and rejuvenated bathers’ skin. The ad elaborated that the pool’s radium could be seen infusing into the water from gas bubbles at the mouth of the spring and had been analyzed by a Denver chemist (Eldorado Springs Colorado, photo of advertisement, park docs, ECSPO). Another advertisement in the *Chicago Tribune* claimed, “Radium Makes Old Age a Joy and Prolongs Human Life.” Ironically, despite the claims of the times for the healthfulness of the spring water, scientists later

Figure 3.50: Eldorado Springs: advertising, photograph, 701-1-20, Carnegie Library for Local History, Boulder, CO. <https://localhistory.boulderlibrary.org/islandora/object/islandora%3A4078>

determined that radium is toxic and causes cancer.

Aside from the apparent health virtues of the springs, one of the other major selling points of Eldorado Canyon and the resort in the early 1900s was its proximity to Denver. “One Hour’s Ride from Denver,” became the hallmark of advertisements and brochures for the canyon.<sup>6</sup> Travel by road and rail had put resort life in the canyon “Within Reach of Everybody” (ESP, Denver’s Mountain Playground, copy of brochure, park docs, ECSPO). Travel by automobile eventually surpassed getting to the canyon by rail, making Eldorado Canyon part of a larger pattern of rising auto tourism throughout the West. The advent and popularity of the automobile transformed the once distant and isolated locations of the West into an interconnected web of leisure sites. Several sites across the country became democratized and people of different social classes were able to travel easily to sites of beauty and intrigue.

<sup>6</sup> See Appendix, Figure 5 for an advertisement for Eldorado Springs.

Along with natural beauty, accessibility, amenities and (purported) health benefits, the resort also sought to astonish visitors with the flash and spectacle of an impressive athletic feat that used the canyon as its stage. Ivy Baldwin provided just that spectacle in his tightrope act at Eldorado Canyon. The act symbolized the intensity of the canyon's new association with leisure activity. No longer were most people residing in the canyon to work the land to support their livelihoods. Most now came to the land for what they could see and experience, and Ivy Baldwin's death-defying traverse across the canyon was the most impressive sight of all.

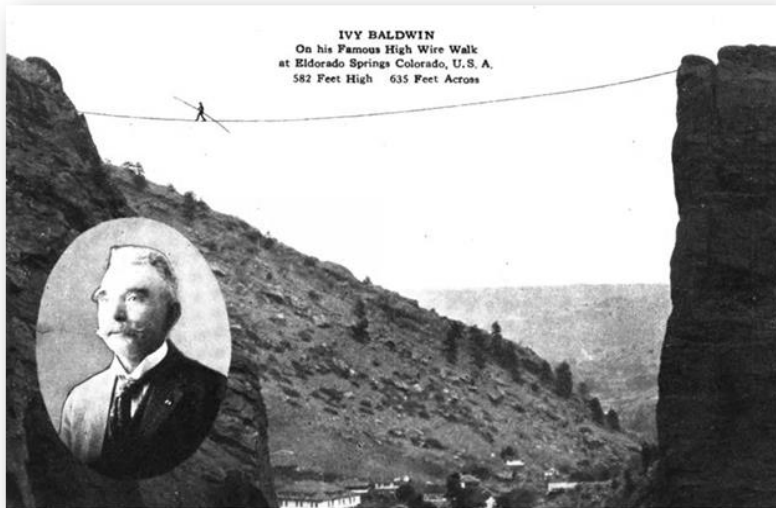


Figure 3.51: A picture of an early postcard featuring Ivy Baldwin on his Famous High Wire Walk, including photo inset of Baldwin that was taken at a later date. Eldorado Springs Ivy Baldwin: Photo 1, 1906, photograph, 701-1-10, Carnegie Library of Local History, Boulder, CO. <https://localhistory.boulderlibrary.org/islandora/object/islandora%3A3943>

Baldwin was an incredible man who lived an incredible life. Born in Houston, Texas, on July 31, 1866, Baldwin began working as a high-wire aerialist in 1877 for the Thayer dollar circus, which would later be purchased by noted showman P.T. Barnum. Originally named William Ivy, he formally changed his name to Ivy Baldwin to join the "Baldwin Brothers," a duo that performed balloon ascensions for the circus. He came to use that name for the rest of his life. As a performer, Baldwin traveled extensively. It is believed that he made over 2,700 balloon flights and 1,200 descents via parachute in Canada, Peru, China, and India, among other countries (Airport Journals 2003). In 1893, Ivy Baldwin broke up the Baldwin Brothers and moved to Denver where he lived for the next 60 years of his life.

In the same year, he was inducted into the U.S. Army Signal Corps as a sergeant in charge of piloting and maintaining a balloon. During his time as a sergeant, Baldwin was credited with developing new methods that improved the longevity and ease of operation of these balloons. In 1898, the Spanish American War broke out and the army deployed Baldwin and his balloon to New York to watch for the Spanish fleet. He was then sent to Tampa, Florida, to keep watch for shipments to Cuba. Baldwin made the first ascent in his balloon as part of a combat operation on June 30, 1898. The tethered balloon was used for observation, specifically to see if the Spanish fleet was near the Santiago Harbor. Over the next several days Baldwin and his counterparts would make further ascents in the balloon to observe the enemy. Eventually Baldwin and one of his compatriots were shot down by the Spanish. Both survived. Baldwin completed his enlistment in 1900 and devoted the remainder of his life to daredevil performances that tested his mental and physical prowess (Airport Journals 2003).

Baldwin began his long association with the Eldorado Springs Resort in 1906. In that year, Fowler, partial owner of the resort, and Baldwin concocted the idea of walking a wire that stretched across Eldorado Canyon. On June 27, 1907, Baldwin made his first walk across the canyon from the Bastille to Wind Tower on the northern wall. The wire stretched 635 feet across the canyon, 582 feet off the ground. For the next twenty years, Baldwin was the resort's prime attraction. On one journey across the canyon, Baldwin was blinded by the reflection of the sun off the sheer, reflective rock of the canyon wall, but managed to complete the walk by listening to Fowler's instructions (Airport Journals 2003). Baldwin walked the tightrope across the canyon a total of eighty-nine times. He made his final journey



in 1948 at the age of eighty-two. For his final journey, he traversed a special wire 125 feet high and 300 feet long strung between the canyon walls. In 1953, Baldwin died from a heart attack at the age of 87 in his home in Eldorado Springs (Ivy Baldwin, park docs, ECSP0). Ivy Baldwin's tremendous popularity made the Eldorado Springs Resort famous, and his longevity as a performer illustrated the centrality of tourism and leisure at Eldorado Canyon during the first half of the twentieth century.

During its heyday, the resort attracted various celebrities and socialites. Walter Winchell, Damon Runyan, John Barrymore, Jack Dempsey, Jimmy Durante, Mary Pickford and W.C. Fields were among the luminaries who came to the Eldorado Springs Resort and enjoyed the beauty of the canyon. Most famously, however, were two honeymooners who stayed near the resort. In 1916, Dwight Eisenhower and his new bride Mamie Eisenhower spent their honeymoon at one of the cottages near the entrance of the canyon (VNM, ECSP0).

In the late 1920s a different interest in the resort began to shift the use of the location once again. In 1927 a group of businessmen headed by Fred Bonfils, the owner of the *Denver Post*, purchased a controlling interest in the town of Eldorado Springs and the adjacent resort. Rather than running the resort, Bonfils and his associates wanted to capitalize on the South Boulder Creek by placing a dam near the headwaters, thereby acquiring controlling interest in the water. At the time of their purchase, Bonfils and his associates constructed a road up the canyon that they believed would help increase real estate values. This is the existing road that runs through the canyon in the present day. Despite the purchase of a controlling interest in Eldorado Springs and the newly constructed road, the dam was never built. Other feasibility studies resulted in a series of other dams, such as the Gross dam, Ralston dam, and South Boulder Creek diversion dam, along with siphons and tunnels to help manage and control the water (VNM, ECSP0).

Natural disasters also foiled Bonfils's plans to dam the site. Three fires, in 1929, 1933 and 1936 (Sampson 2004:20), alongside a 100-year flood in 1938, would prove destructive to the resort and the town of Eldorado Springs. While the fires were somewhat manageable, the flood of 1938 was brutal. From the 31<sup>st</sup> of August to the 4<sup>th</sup> of September Eldorado Springs had 4.42 inches of rainfall. Of that rainfall, 80% fell in the late afternoon and evening of September 2<sup>nd</sup>. The canyon filled with water and the flood wrecked almost everything in its path. Bridges and structures inside the canyon were destroyed and their foundations eroded as a result of the rushing water. The town of Eldorado Springs did not fare much better. Several buildings were destroyed including parts of the swimming pool and portions of the dance pavilion (Flood of 1938 Eldorado Springs flood damage, photo 1, History, BCL).



Figure 3.52: Photograph of Eldorado Springs Resort's destroyed dance pavilion after the 1938 flood. "Eldorado Springs Flood, 1938," Denver Public Library, <https://history.denverlibrary.org/gallery/pool-party-eldorado-canyon#PhotoSwipe1598896032534>.

The flood of 1938 and the resultant creation of dams elsewhere on the South Boulder Creek weakened Bonfils's resolve and he abandoned the original plan. In 1938, Frank Fowler's son, Jack Fowler, gained outright ownership of the Eldorado Springs Resort by buying out Bonfils and his associates (EAS

2020). Although the ownership of the resort would return to the Fowler family and the resort itself would recover in the 1940s, its prime years had passed.

Eldorado Canyon, from the creation of the resort to the flood of 1938, represents much about the story of tourism in the American West. The canyon had changed in response to sweeping historic trends: improvements in transportation technologies, rising standards of living, the democratization of leisure, and a widespread cultural desire for renewed connections to nature in an increasingly urban and industrialized nation. Eldorado Canyon's shift from a landscape of labor to one of leisure illustrates how the public's perception of parts of the American West were changing as well. At the turn of the century, the West shifted from a boundless region of untold natural resources to America's natural playground. Eldorado Canyon reflects this larger process. The emergence of recreational rock climbing in the 1950s brought yet more changes to Eldorado Canyon and brought a new group of land users into the landscape.

In the 1940s, as Ivy Baldwin was making his last high wire walks and the Eldorado Canyon Resort's popularity was dwindling, a few people began to climb around the canyon walls in tennis shoes. This evolved into the first technical rock climbing in the canyon, started by a group called the Marmots in the 1950s. The new sport marked a new period in the canyon's history as visitors began pursuing recreation, rather than leisure. Although linked, leisure and recreation differ in important ways. While leisure is denoted using free time for relaxation and the cessation of activity, recreation is defined by activity, often physical exertion. During this time, Eldorado Canyon became a site dominated by recreation, specifically climbing. Although the faded resort community survived through the 1960s, Eldorado Canyon eventually became a Colorado State Park and world-renowned site for rock climbing. The transition from privately owned resort community to publicly owned state park reflects several national trends that occurred at the same time, including a rise in popularity of the sport of rock climbing and an expanding culture of consumerism after World War II.

For the rest of the 1940s and 1950s, Eldorado Canyon remained under the ownership of Jack Fowler and the Fowler family. Along with rebuilding the resort, Fowler resumed the longstanding practice of extracting natural resources from the canyon for profit and undertook the bottling and distribution of water from South Boulder Creek in Eldorado Springs. In 1942, he began to bottle water in two, four, six, and ten-quart size packages. In 1958, he began selling the water in two-and-a-half-gallon bag-in-a-box containers. Today, the Eldorado Springs Water Company continues to bottle and distribute water from Eldorado Springs (EAS 2020). The company and the bottled water industry reflect several patterns that have underlain the American leisure and consumer cultures since World War II. Among these are cheap oil that goes into making plastic bottles and transporting the water to consumers far from the source, the existence of a population with enough excess income to purchase a luxury item not materially different from what comes out of their taps, and a consumer society willing to throw away single-use containers for the sake of convenience.

Rehabilitating the resort during the 1940s and 1950s was both extremely costly and labor intensive for the Fowler family. In 1960 the Eldorado Resort became the private Eldorado Canyon Club.<sup>7</sup> The club continued many of the same functions as the resort, including ice skating, dining, dancing, swim lessons, and holiday dinners. Privatization was short lived. The resort reopened to the public in 1964 with campers and now climbers as the resort's main clientele (VNM, ECSPO).

Climbing grew significantly during the late 1960s and 1970s, with its heart and cutting edge in California's Yosemite Valley. While the sport rose to national prominence throughout the latter half of the twentieth century, Yosemite was where climbers pushed the boundaries of their sport (Taylor 2010). Though it provided the most real estate for adventure, this pursuit of endorphins was not exclusive to California, and climbers began taking to the hills throughout the nation in the years following World War

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<sup>7</sup> Additional research in the Carnegie Library for Local History might elucidate more information on this topic.

II. In Colorado, local climbers in Eldorado Canyon began scaling the canyon's walls in the late 1940s and throughout the 1950s. Like Yosemite, this movement took off in the 1960s and 1970s, causing the sport of rock climbing to shift the landscape of the canyon again; this time into a premier destination for climbers. Beginning in the 1950s, climbers established routes up the canyon's walls that would become world-renowned. In 1956, one climb in particular shifted the view of climbing in Eldorado Canyon and the state of Colorado. That year, four Colorado climbers, Chuck Murley, Cary Huston, Dick Bird and Dallas Jackson attempted to do what had not been done before. The challenge before them was the Redgarden Wall, the face opposing the Bastille in Eldorado Canyon. Not previously attempted because of the height of the climb and the steepness of the rock face, the first successful ascent by these Colorado climbers marked an important turning point. With their success, they proved to other climbers that the Redgarden Wall could be completed and inspired others to push the boundaries on other once-impossible routes. On a much broader scale, this ascent along with one other, the ascent of the north face of Rocky Mountain National Park's Hallet Peak, "opened the doors to the most intensive period of technical rock climbing that Colorado had ever seen" (Achey et. al 2002:84).



Figure 3.53: Layton Kor climbing in Eldorado Canyon, date unknown. Pat Ament, "Layton Kor, 1938-2013," American Alpine Club, 2014, <http://publications.americanalpineclub.org/articles/13201212390/Layton-Kor-19382013>

The 1960s were the golden age of technical rock climbing in Colorado. At Eldorado Canyon, climbers advanced the sport by testing themselves on more difficult and technical climbs. One of the men who helped in this way, especially within Eldorado Canyon, was Layton Kor. Throughout the late 1950s and 1960s, Kor established 55 routes up the steep walls of Eldorado Canyon (Burns 2020). With no formal training in climbing or mountaineering, Kor began scaling cliffs around the Front Range, rope-free and by himself, throughout the fifties (Achey et. al 2002:86). Kor's unorthodox and daring exploits made his name synonymous with Colorado climbing. Kor's height and unique style meant he disregarded what others in the climbing community perceived as the limits of their sport, which allowed him to establish numerous routes in Eldorado Canyon. Today, one can hardly find a climbing guidebook in the Southwest that does not include a route with a first ascent accredited to Kor and one of his partners.

Though the most proficient, Kor was but one of several Colorado climbers pushing the limits in Eldorado Canyon. Following Kor's remarkable ascent of T2, the second tower of the Redgarden

Wall, Ray Northcutt, also in 1959, challenged himself with climbing a crack that extended the length of the Bastille. Northcutt was successful, and his route was graded the first 5.10 climb in the Boulder area.<sup>8</sup> Established in Yosemite and common among rock climbers, the Yosemite Decimal System denotes a route difficulty through a grade of 5.X, with higher X values signifying greater difficulty. No other climb would receive a 5.10 grade until well into the 1960s (Achey et al 2002:90).

<sup>8</sup> Sport and Trad rock climbing routes are rated on a scale from 5.1 to 5.15 with 5.1 being easy to climb and 5.15 being extremely difficult. A 6.0 rating can be established, but this is considered to be a climb that cannot be done through free climbing. Boulder routes use the V0-V17 scale.

Throughout the 1960s, Eldorado Canyon continued to be at the forefront of rock-climbing sites. Interviews with park rangers indicate that new methods used in the sport of rock climbing were used in Eldorado, and the canyon itself attracted climbers from around the nation (Steve Muehlhauser, personal communication 2020). Many of these routes became famous for their difficulty and technicality. Some of these nationally famous routes include the Yellow Spur, the Grand Giraffe, the Rosy Crucifixion, the Naked Edge and Genesis (Achey et. al 2020:114). Accomplished climbers sought out the canyon as a vertical proving ground of layered white and gold sandstone.

The 1970s marked an important transition for technical rock climbing. Where climbing in the 1960s was dominated by aid climbing, the 1970s saw an embrace of free climbing on a global scale (Muehlhauser, personal communication 2020). Reasons for this shift included climbers' increasing skill, improvements in equipment that made it safe to climb with less, and a perception that free climbing was a purer form of the sport. The same was true of climbers in Eldorado Canyon. In the 1970s, climbers began contemplating anew the famous routes that climbers in the 1960s pioneered using direct aid, and wondered if it was possible to complete them with only a rope, protective gear, and athletic ability. Pat Ament, who had successfully ascended a route at Eldorado Canyon called the Naked Edge through direct aid, had said that he thought the route might one day be free climbed. On September 26, 1971, after several failed attempts to free climb the Naked Edge, a climber named Jim Erikson proved Ament correct. Erikson's success in free climbing such a difficult route ushered in a new wave of free climbing in the canyon in the 1970s (Achey et. al 200:186-87). Throughout the rest of the 1970s, rock climbers used Eldorado Canyon as a location to advance their sport. They established new routes, ascended established routes as free climbs, and filled the canyon filled with fellow climbers and spectators alike.

### **Eldorado Canyon State Park: 1978 CE - Present**

The people of Eldorado Canyon had once again successfully re-invented the place. After the Eldorado Springs Resort's decline, the canyon came into a new identity as a vertical playground for the emerging sport of rock climbing. In the 1960s and 1970s, several historic climbs were accomplished that advanced and redefined the sport of rock climbing. Once again, people around the world heard of the canyon's vast and beautiful rock faces, but rather than simply admiring them from a train, people now sought to conquer their impressive heights on their own steam. Since the creation of the state park, the land's main function has continued to be outdoor recreation, including, of course, rock climbing<sup>9</sup>.

This new use coincided with new ownership of the canyon as well. Following public concern about threats from Eldorado Canyon's owner to turn it into a rock quarry, the state of Colorado stepped in to preserve the recreational opportunities the canyon offered (Colorado Parks and Wildlife 2020). In 1978, the state purchased 400 acres of the canyon from the Fowlers. One year later, the state purchased the Crescent Meadows portion of the park from a private holding company, stitching the properties together to form Eldorado Canyon State Park (Boulder County 2020). The park itself was an artifact of the long-term rise of leisure activities in American history that had manifested in the canyon over the previous three-quarters of a century. In the 1990s, the mission of the state park system was "To provide a spectrum of safe, quality outdoor recreation experiences for visitors, while effectively managing the natural resources of the park" (Colorado State Parks 2000). During its first two decades, the park was spectacularly successful in contributing to this statewide goal. In some ways, it was too successful.

One of the immediate challenges park staff confronted was managing the canyon's popularity. Already a hit among climbers, the park also drew spectators to watch the daring adventurers scale the cliffs. The park also attracted visitors seeking opportunities to hike, picnic, fish, hunt, mountain bike, kayak, view wildlife, and go horseback riding (Colorado State Parks 2000). In the 1980s, during the summer months between Memorial Day and Labor Day, visitors came in droves. By the end of the century, a quarter of a million of them (and their 73,000 cars) visited annually (Colorado State Parks 2000). Without the infrastructure to facilitate masses of park visitors, park staff constantly struggled with traffic

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<sup>9</sup> As of 202, there are 1,197 climbs in Eldorado Canyon (Mountain Project).



and capacity issues (Muehlhauser, personal communication 2020). Early park staff note that they constantly had to turn visitors away at the entrance gate by Fowler Trail trailhead. With limited space to turn around in the canyon, lines of idling cars extended back through the town of Eldorado Springs. To avoid the nuisance of waiting in traffic, visitors parked on a private access road belonging to Eldorado Artesian Springs and walked into the park, creating additional management headaches for park staff and straining relationship between the park and locals (Muehlhauser, personal communication 2020). In response, park managers relocated the entrance gate to its current location at the mouth of the canyon, allowing park visitors ample space to loop around if the park reached capacity (Muehlhauser, personal communication 2020). Second, the park began working on a visitor management plan to address the trends and issues it had struggled with during the park's early years.<sup>10</sup> The plan even included an innovative, though never implemented, idea to establish a capacity cap around 60% and implement a shuttle system to bring additional visitors to the park from Boulder (Muehlhauser, personal communication 2020). The park also began charging entrance fees for pedestrian visitors to discourage them from parking in town and walking into the canyon (Colorado State Parks 2000). Finally, through the 1980s and 1990s, the park continued to acquire surround lands in parcels ranging from a handful of acres to more than a thousand. These acquisitions dispersed visitorship, improved access, preserved natural resources, and provided connections between the park and surrounding public lands. Together, these efforts addressed many issues caused by a growing number of motorized visitors accessing a finite space.

The park's popularity created several related management challenges. One of these was funding. The throngs of visitors wanted clean, well-maintained, modern infrastructure to serve them, requiring continuous updating of facilities. Parking was expanded, kiosks were built, visitor interpretation was developed, and a new visitor center was erected. Although the park's visitors and the entrance fees they paid made the park nearly self-sufficient (Colorado State Parks 2000), some of its revenue was diverted to support parks that had higher maintenance costs or generated less revenue. In addition, funding from the state lottery provided money to construct buildings but not to maintain them (John Clark, personal communication 2020). Under such fiscal pressures, park rangers had to be jacks of all trades, painting garages, repairing sewer lines, and undertaking other tasks to save the park the costs of hiring professional service providers. One early park manager pitched in by cleaning the bathrooms himself. On one occasion, John Clark recalled, he volunteered to scale a roof to fix the broken fan belt in a ventilation system, which would undoubtedly have unnerved the state's liability managers had they known about it. In any case, Clark's experience demonstrated that climbing in the park was not limited to the sheer cliff faces (John Clark, personal communication 2020). As the park turned to volunteers for activities such as trail maintenance, private contributions of labor and cash became essential to the state park. (John Clark, personal communication 2020; Colorado State Parks 2000). Through the continual work of park managers, rangers, and volunteers, Eldorado Canyon State Park remained a beautiful haven for an array of recreationists and has found ways to accommodate the needs of its neighbors as well. Surveys from the 1990s revealed extremely high rates of visitor satisfaction and repeat visitorship (Colorado State Parks).

## **Conclusion**

Eldorado Canyon is a magnificent place with a deep history. From subsistence uses that crafted a landscape of labor, to the shift toward a landscape of leisure dominated by a sprawling luxury resort, to a landscape characterized by outdoor recreation and rock climbing, Eldorado Canyon has been defined by the ways people interacted with the land. In the present day, the canyon has been set aside for public use as a state park. One of the early management goals of the park was to preserve the historic character of the canyon. This manifested not only in interpretive programs and signage but also in the layout of the park. Trails, for example, followed historic avenues of movement and/or connected sites of historic significance (Colorado State Parks 2000). In the future, the park would do well to help

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<sup>10</sup> This document was not consulted by researchers during this project. Additional research may yield solidified action plans for managerial issues.

visitors understand this more explicitly, to enable them to move through the park with a historical mindset. As visitors come to the park it is important for them to understand the history of the place that they are enjoying in order to see their connection to this place as only the most recent link in a longer chain of human activity—including Ute, Arapaho, and Cheyenne, Euroamerican homesteaders, resort visitors, service industry laborers, and adrenaline-seeking recreationists who came before them.

## **Current Conditions: Cultural**

### **Current Conditions**

The degree of past impact to the park's cultural resources is difficult to measure. Previous impacts can be placed into three categories.

**Vandalism** – Cultural resources are subject to a number of significant threats. Protecting cultural resources from the destructive activities of human vandals proves to be one of the most persistent and difficult threats to mitigate. The continuance of this issue is in part the result of a misinformed or uninformed public that may purposefully, inadvertently, or unknowingly cause damage to fragile nonrenewable cultural resources.

State and Federal Laws recognize looting (the collection of artifacts) as an act of vandalism and punishable by law (see Appendix 7.A for Laws and Regulations of Cultural Resources).

**Development** - The early development of the area, including farming, ranching, mining, road construction, the inundation of the reservoir and the development of some of the park's infrastructure significantly impacted the cultural resources within the park.

**Natural** – Environmental processes such as rain, snow, wind, sun, erosion and vegetation can significantly affect cultural resources. These environmental impacts are most concerning in regards to the preservation of historic structures.

### **Desired Future Conditions**

Through careful planning and stewardship, and by watching human and natural impacts to the known and recorded sites, it should be possible to maintain, and in some cases improve, the current condition of Eldorado Canyon State Park's cultural resources. The best possible future includes responsible stewardship, where impacts to significant sites will be avoided whenever possible and mitigated where avoidance is not possible. Some sites, like the Funicular loading site, can be actively maintained and possibly improved, while others can be protected from harm through appropriate trail and development locations, visitor management, and resource interpretation.

In order to preserve the historic integrity of these sites, some may require structural stabilization, including the maintenance of foundations, structures, and objects. It may also require ensuring that historic features of the landscape that do not appear significant to a casual observer, such as the tailing piles near Crescent Meadows, are not inadvertently demolished or destroyed.

Eldorado Canyon State Park can protect its cultural resources by utilizing visually appropriate fencing and signage that inform visitors of the safety issues associated with historic structures and promotes cultural resource appreciation within the park (see Appendix 7.A for Historic Preservation Laws and Regulations).

## **Identifying and Resolving Resource Impacts and Hazards**

### **Recreational**

All standing historic structures should be viewed from a distance in order to protect the resource as well as the safety of park visitors. Recreational impacts are mostly preventable through fencing, interpretation/signage, periodic monitoring by park volunteers or staff, and outreach to park visitors.

Because many of the sites at Eldorado Canyon State Park also contain associated clusters of small artifacts that may be easily disturbed or removed, visitor education should be a priority, as should periodic monitoring of sites to ensure that artifacts remain in place and features like tailing piles and

prospecting pits are undisturbed. Visitors should be alerted about the damage that artifact hunting and removal, as well as the disturbance of historic landscape features, does to these sites' historical integrity, as well as what they should do if they encounter historic artifacts.

Recreational threats are present at the following sites:

- Crescent Meadows Homestead Complex
- Crescent Meadows Terracing Complex
- Denver, Union and Pacific Railroad/Fowler Trail
- Craggs Hotel Funicular
- Gazebo



Figure 3.54: Crescent Meadows terracing with views of trails cross-cutting the feature.  
(Photo by CPW)





Figure 3.55: This railroad spike located near the Crags Hotel Funicular site is an example of the kinds of small artifacts associated with the park's cultural resources that may be vulnerable to looting. (Photo by PLHC)

Past looting of prehistoric sites is evident in some of the local prehistoric artifact collections. Publicizing sensitive park resources can often lead to an increase in resource vandalism, and greatly reduce the probability of inventorying new sites. As a result, the public should not be made aware of sensitive sites in the park that cannot be closely monitored.

### **Development**

Development and construction impacts can be prevented through collaboration with the Resource Stewardship Program, use of the archaeological sensitivity zoning (see Sensitivity and Zoning Management section), and through analysis of project locations in a Geographic Information System during project planning processes. Without consulting with Resource Stewardship, the State Historic Preservation Office (SHPO), or a qualified archaeologist prior to any ground disturbing projects will limit irreversible impacts on sites in or near the project area.

It is important to note that consultation is not a restrictive process for park development. In most cases consultation will lead to ways to minimize resource impacts including a survey and the assessment of potentially affected areas, or archaeological monitoring by a qualified professional will need to occur during ground disturbing activities.

If new sites are unearthed during a project and proper documentation does not take place, the likelihood of extracting information of scientific and historic value is greatly reduced, if not completely destroyed. It is for this reason that if unidentified artifacts are unearthed during any park ground disturbing project, all work should stop immediately until the site can be properly evaluated for significance.

### **Natural**

Natural impacts cannot be fully prevented. Where the effects of natural elements are impacting or may impact the structural integrity of a site, efforts towards limiting these effects through structural preservation and stabilization should take place. This should **not be done** without first contacting

Resource Stewardship which can mediate consultation with a professional historic architect/archaeologist to avoid unintentional and permanent damage to the resource.

Erosion and time are consistently acting upon historic sites. Rock fall, wind or water induced erosion, vegetation growth, and wildfires are all natural factors that can critically affect the permanence of cultural resources. In many cases, this natural deterioration is unavoidable. However, if conditions are favorable, stabilization and preservation methods are encouraged. These efforts can decrease the extent of future deterioration of historic resources. In cases where erosion threatens a sensitive site, efforts should be made to determine proper treatments by consulting an historic architect or archaeologist who can recommend mitigations of the effects. Through periodic maintenance, natural impacts on historic sites can be greatly reduced.

Natural threats are present at the following sites:

- All resources at Crescent Meadows are prone to damage by ongoing natural processes of soil and wind erosion
- Rock fall and vegetation encroachment along the path of the Craggs Hotel Funicular may further obscure the path of the inclined railway
- Natural erosion on a nearby scree field may alter the former route of the Denver, Union and Pacific railroad/Fowler trail over time
- All cultural resource sites located in the park are subject to vegetation encroachment. Vegetation growth not only obscures resources from observation, it also interferes with monitoring of damage. Where feasible, vegetation should be cut back to assess the condition of the resource and to determine if further removal is desirable.



Figure 3.56: Rocks from the nearby scree hill encroach on Fowler Trail. (Photo PLHC)





Figure 3.57: Vegetation screens the former route of the Craggs Hotel Funicular. (Photo PLHC)

### Hazards

Historic sites can pose a number of safety threats to park visitors. Historic structures were built before the existence of building, electrical, HVAC, and accessibility codes, and do not meet today's safety standards. Historic sites can have hazardous debris inside and out that could potentially cut, collapse on, and harm visitors. Additionally, unstable framework that is the result of years of unmitigated deterioration makes most historic structures unstable for any kind of public activity. Unless measures have been taken to stabilize the structure with intention of allowing visitation, "No Trespassing" signs should be utilized. Additionally, windows and entrances of historic structures should be boarded up; this will not only reduce the risk of people getting hurt within these structures, but it will also minimize the risk of people damaging the resource.

Historic and park trails around and near sites that have been flagged for visitation are not always discernible to park visitors, and the park should make every effort to clear these paths from hazardous materials including barbed wires, broken glass, ceramics, etc.. If contacted Resource Stewardship can be utilized to properly remove or displace this material.

## **Resource Management**

### **Cultural Resource Laws and Regulations**

Cultural resources on state lands are protected by federal (National Historic Preservation Act (NHPA); Public Law 89-665; 16 U.S.C. 470 et seq.) and state (CRS 24-80-401 et. seq) (see Appendix 7.A) laws giving the State of Colorado title to all historical, prehistorical, and archaeological resources.



*“To knowingly disturb a historical, prehistorical, and archaeological resource on public land”* is illegal under the National Historic Preservation Act, and the Colorado Historical, Prehistorical, and Archaeological Resources Act (see Appendix 7.B).

The Colorado Parks and Wildlife environmental/cultural review directive should be referenced prior to the commencement of any ground disturbing park projects in or near areas of high resource sensitivity. This directive is in place to assist park management and park development projects and to ensure legal compliance with statutes and to aid in the protection of these valuable *nonrenewable* resources.

In order to ensure compliance with federal law, state law, and CPW policies, it is recommended that prior to conducting any ground disturbing projects that appropriate consultation takes place. Resource Stewardship can assist in determining what level, if any, consultation needs to happen. If it is determined that there will be potential adverse effects, Resource Stewardship, along with the SHPO or a qualified archaeologist, can develop mitigation solutions to minimize or eliminate potential impacts.

A resource’s eligibility for inclusion to the National and State Registers of Historic Places should not be considered overly restrictive (see Appendix 7.C for National and State Register Benefits and Restrictions), in many cases in order to prevent damage to a significant cultural resource OAHP/SHPO, if contacted, can offer comment on how to minimize this impact. A simple file search to review the type and location of any previously recorded resources and to gather information concerning past surveys in the project area, can greatly reduce the potential impact on significant resources. This process is easier and clearer if all of the park’s cultural resources are appropriately surveyed and inventoried.

### **Interpretive Opportunities**

The history of the park is not currently a large part of the visitor experience. With increased interpretation this may change. The Public Lands History Center at Colorado State University has developed templates for the following interpretive brochures and signage, presented in Appendix 7.4:

- 1) A tri-fold brochure detailing the history of Crescent Meadows
- 2) Signage placed at the top and bottom of the Craggs Hotel Funicular site
- 3) Signage placed at any of the rock cuts along Fowler Trail
- 4) Signage placed near the Visitor Center connecting Ivy Baldwin, “Crazy Stairs” and development of technical rock climbing through the theme of thrill-seeking at the canyon

In addition to the specific cultural resource signs, it is strongly recommended that a signage be created for the purpose of promoting Cultural Resource Appreciation and encouraging public responsibility in the protection and preservation of cultural and natural resources in the park.

### **Public Education**

1. Each of the significant features displayed in Figures 1 and 2 all have unique interpretive potential that would enhance the park visitor experience, promote heritage tourism and, and encourage stewardship of the park’s cultural resources. These interpretive opportunities may include but are not limited to the following: Plaques and interpretive displays located around the sites that describe different aspects of historic use.
2. Homesteads do not retain much of their original configuration. A plaque with a picture or drawing depicting what the homestead may have originally looked like and explaining “a day in the life of the early settlers” would draw the interest of park visitors.
3. Organized hiking groups with a leader that can lecture on the use and historic context of the areas. Guided tours provide information while monitoring the public’s use of a resource. Depending on funding, these tours may be led by either volunteers or park personnel.
  - a. The information to be shared should be similar to that described on plaques and augmented with whatever information can be gathered about the specific sites.

4. Self-guided walking and/or driving tour pamphlets discussing the sites. This would be very similar to the information contained on the plaques, but significantly less expensive to implement. These pamphlets could establish a route and provide historic context and connection of each specific site encountered.

### **Sensitivity Zoning and Management**

The sensitivity zones have been established for the park in order to aid in planning and implementing future park activities. A careful and considered approach during future development can prevent problems from occurring due to accidental discoveries. The sensitivity model for Eldorado Canyon State Park splits the park into three types of sensitivity zones based on the need to manage cultural resources. Projects that are planned in the park should evaluate sites already present around the project area as well as the management implications of the area's sensitivity zones.

There are three types of sensitivity areas in the park: high, moderate and low. These zones were determined based on site density (number of sites in close proximity), site eligibility (inclusion into the National or State Registers), the date of last assessment and survey, the natural environment that would have influenced prehistoric and historic human activity such as slope, vegetation, and water. Lastly, these zones were determined based on the likelihood of further development.

The remainder of this chapter provides recommendations regarding how to manage these areas and the resources within them.

**High Sensitivity** – Prior to any ground disturbing projects taking place in high sensitivity areas, Resource Stewardship should be contacted. Any ground disturbing projects must be conducted at least 100ft away from significant sites; otherwise consultation with OAHP/SHPO is required.

It may be requested that additional surveys be conducted in the project area prior to the start of the project. It may also be requested that a qualified archaeological monitor be on site during ground disturbing work in high sensitivity zones (see the Resource Significance section for more information).

**Moderate Sensitivity** – Ground disturbing projects in moderate sensitivity areas should be evaluated by a qualified staff member to determine whether a monitor should be present. If an archaeological monitor is not present, work crews should be aware of the possibility of encountering cultural resources. If cultural resources are encountered, work should stop in the area until the materials can be evaluated by a qualified archaeologist.

**Low Sensitivity** – These areas have a very low density of resources, updated surveys and inventories, and no plan for future development. Ground disturbing activities in low sensitivity areas do not require that an archaeological monitor be present. Work crews should still remain aware of the possibility of encountering cultural resources. If cultural resources are discovered, work should cease in the area until a qualified archaeologist can be brought in to evaluate the materials.

### **Future Data Recommendations**

It is recommended that in order to effectively manage, preserve, and protect the cultural resources within Eldorado Canyon State Park additional data collection should take place.

- 1) **Survey and Inventory** -There are some areas in the park that should be surveyed prior to any park development in the area. In return these surveys and inventories will provide additional and valuable information regarding the best management practices for all of the park's cultural resources.
  - a. Ideally, all sites within Eldorado Canyon State Park should be properly surveyed, inventoried, assessed for their prehistoric and historic significance. Areas within

the park that have not been surveyed or inventoried should be treated as though they contain significant sites.

- b. In the State Preservation Plan (2020), resource statistics for each county has been calculated. Boulder County has 10,052 inventoried resources, 92 of which are designated. Eldorado Canyon State Park, with its potential contributing resources and eligible resource, contributes to the movement of statewide cultural resource inventory efforts.
- 2) **Archaeological Assessments** – The Denver, Union and Pacific Railroad Grade (Fowler Trail), the Crescent Meadows Terracing Complex and the Crescent Meadows Homestead Complex are recommended for archaeological assessment in order to provide more information about the resources, and to determine future adverse affects that could result from further development projects.
- a. The Denver, Union and Pacific Railroad Grade (Fowler Trail), the Crescent Meadows Terracing Complex and the Crescent Meadows Homestead Complex should have updated eligibility assessments. Resource Stewardship is actively updating eligibility assessments for park resources in an effort to help direct future development.
- 3) **Site Monitoring** – Impacts from vandalism can be minimized through stewardship activities. There are two types of site monitoring that park staff and/or volunteers can utilize.
- a. If there is a concern that a resource is being vandalized, regular site visits will not only provide an opportunity to monitor the activities taking place at the site, but also an opportunity to document the impact of these activities.
    - i. If there is a concern that a site is being significantly vandalized additional measures may be necessary, including contacting the Resource Stewardship Office.
  - b. Photographs often provide the useful and versatile documentation of a resource. They can illustrate the general setting and surrounding environment of a resource or capture an important detail. Taken over time, these photos can be a useful source of information regarding the degree to which a site is deteriorating and help determine appropriate preservation measures (see Appendix 7.2 for CPW Cultural Resource Photo Monitoring Form).

There are several resources at the park's disposal that can assist the preservation efforts by monitoring significant cultural resources that may be in danger of impacts from a variety of sources.

- 1) The Colorado Archaeological Society sponsors what is called the Program for Avocational Archaeological Certification (PAAC). This program facilitates avocational public service and assistance in education, governmental management of cultural resources, research, and the protection of archaeological resources in Colorado. This program produces volunteers that are formally trained by the Assistant State Archaeologist Rebecca Simon.
- 2) The Public Lands History Center may also be used to assist in monitoring sites and/or aid in developing educational programs for staff and visitors.

### **Best Management Practices**

The best management practices for preserving the historic legacy of Eldorado Canyon State Park for future generations to enjoy and learn about are the continued maintenance of the historic structures current conditions, and where appropriate, sanctioned improvements and/or modifications, particularly for National and State Registers of Historic Places listings or eligible sites. Due to their current condition, without intervention many of the park's historic structures will likely be lost within the next decade or two; some much sooner.

### **Resource Significance**

Colorado Parks and Wildlife considers a site's significance based on the eligibility assessments provided by qualified professionals as well as the resources contribution to the overall story of the park. Based on this information CPW has placed significance into three different categories, these categories are designed to direct management practices of significant and potentially significant resources within state park lands (see Table 7.1 for more details about resource significance).

**Significant Sites** - are "Eligible" or "Listed" sites that should be avoided at all times. Any ground disturbing projects must be conducted at least 100ft away from significant sites; otherwise consultation with OAHP/SHPO is required.

**Unknown Significance Sites** – are "Needs Data" or "No Assessment" sites that should be treated the same as significant sites unless the funding is available for proper testing to determine eligibility.

If sites without adequate documentation cannot be avoided by project activities, then they should undergo additional recording and evaluation through archaeological surveys prior to disturbance.

**Limited Significance Sites** – are sites that are "Not Eligible" – However, "Field Not Eligible" assessments can potentially be reversed depending on the reasoning of the previous assessment. If a site is "not eligible" but is a valued park resource, meaning visitors are interested in the resource, it is recommended that the park make at least some preservation efforts.



## **Site Barriers**

Many of the cultural resources at Eldorado Canyon State Park are fragile. Even a moderate amount of foot traffic can have a devastating effect on a resource. Securing the location (not publicizing) and/or restricting access, are the best ways to protect such resources. Periodic monitoring of these sites should be conducted as time and funding allows.

- 1) Additional site barriers, such as fencing, as well as interpretive-signage will also help mitigate further destruction from increased recreational activity, signs and possibly site barriers should be placed around the historical structures that visitors can easily access.
  - a. It is recommended that site barriers be in the form of the time period the site is associated with. In many cases historic fences were constructed from local materials, and it is recommended that when possible barriers around historic resources should be constructed in the same manner, this could easily be done by park staff or volunteers.

## **New Discoveries**

When new archaeological discoveries are made by park staff or visitors, they should not be disturbed or removed from where they are found. In order to properly document a new resource, it is necessary for an archaeologist to record and report it to the Colorado Office of Archaeology and Historic Preservation (OAHP). If for any reason staff feels as though a resource is in immediate danger, and intervention is required, every precaution should be taken to properly record the site and/or artifact to OAHP's standards. Resource Stewardship should be contacted immediately to aid in these efforts (see Appendix 7.3 CPW Cultural Resource Identification Form).

Each discovery should be evaluated for scientific merit and interpretive potential before they are allowed to be impacted. Until proper assessments can be made by an archaeologist, the location of where an artifact is or was located should not be disclosed to any other person other than the necessary park staff assigned to monitor the area. The Resource Stewardship Program has a relationship with the Colorado State Historic Preservation Office (SHPO) and can help to locate qualified personnel.

## **Work on Park Resources**

See Table 7.1 for management recommendations for each PLHC-surveyed resource.

Work on cultural resources that does not follow treatment plans produced by a qualified professional can cause irreversible damage and greatly affect if not reverse the NRHP and SRHP eligibility of a resource. Therefore, work should not be conducted on any cultural resources without first consulting the Office of Archaeology and Historic Preservation and the State Historic Preservation Office (OAHP). Through consultation, OAHP will be able to assess the potential adverse effects to the resource and prescribe proper treatments, ensuring that the historical integrity and characteristics of the structure will remain intact. Again, Resource Stewardship can help facilitate this effort.

Park staff must only conduct preservation work on cultural resources when immediate intervention is required. In the event of an emergency, limited and temporary intervention may occur to mitigate, prevent, or arrest deterioration of a cultural resource. Only qualified professionals are able to make permanent changes to stabilize the structure.

## **Vegetation Mitigation**

Encroaching and/or potentially destructive vegetation should also be monitored. While vegetation around cultural resources can be used to control access to sites and limit the impacts of increased pedestrian activity, vegetation can also impair the already fragile condition of the structures as well as increase their susceptibility to damage from wildfires. Vegetation around these structures should be monitored and mitigated to prevent damage to the site. Unstable and hazardous trees that could potentially damage the structure should be removed or stabilized.

## **Visitor Experience**

Although currently cultural resources are not a focal point for visitation to Eldorado Canyon State Park, with increased interpretation this may change. All the sites listed are significant and are interconnected in some way.

## **Heritage Tourism**

*“Cultural heritage tourism is traveling to experience the places, artifacts and activities that authentically represent the stories and people of the past and present. It includes cultural, historic, and natural resources.”*

(National Trust for Historic Preservation)

While many visitors come to Colorado to experience the beauty and abundance of activities in the Rocky Mountains, a significant portion of visitors can be considered “heritage tourists.” According to the 2008 Longwood Visitor Study, 11.8 million trips in and to Colorado involved heritage tourism activities that year. Heritage tourists spent \$190 million on cultural activities and \$54 million on historic activities. Eldorado Canyon State Park has an amazing story to tell; as a relatively close-knit community, the residence of this area once found camaraderie surviving off this land and as stewards of this legacy, it is the park’s duty to preserve their story by protecting its resources as well as educating and sharing them with the public.

Most counties in Colorado have their own heritage tourism plans, whether this is through the counties chamber of commerce, an art association, and any other organizations. It is recommended that the parks establish a relationship with these associations in order to be a part of the heritage tourism industry that works to bring preservation and economic development together.

According to the National Trust for Historic Preservation, “Heritage tourism helps make historic preservation economically viable by using historic structures and landscapes to attract and serve travelers. Heritage tourism can be an attractive economic revitalization strategy, especially as studies have consistently shown that heritage travelers stay longer and spend more money than other kinds of travelers. As an added bonus, a good heritage tourism program improves the quality of life for residents as well as serving visitors.”

## Impacts and Influences

This chapter highlights the influences affecting the condition of the natural resources at Eldorado Canyon State Park. The ability to balance the use and the conservation of Park resources is a central theme of this stewardship plan. The following information outlines the sources of the most significant influences to certain Park resources, and the subsequent impacts that may result, as well as recommendations to help stem negative impacts. The influences discussed here may originate inside or outside the Park, and may be independent of, or result from, human influence.

### Regional Influences

#### Climate and Topography

Climate and topography are fundamental components for habitat supporting a high diversity of plants and animals. The Park's climate is varied due to its location in the foothills of the Rocky Mountains. The weather can change in an instant. Severe thunderstorms, high winds, freezing temperatures, and snowstorms can sweep in without notice. Gross Reservoir, which is located adjacent to the Park, has an average annual precipitation of about 20.86 inches and an average snowfall of 108.6 inches (Table 4.1). The elevation of the Park ranges from 5,800 and 8,800 feet.

**Table 4.1.** Climate data for Gross Reservoir.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
Avg. Max Temp. (F)	40.5	39.4	48.8	53.8	62.3	74.1	80.7	77.9	71.0	58.0	49.2	39.1	57.9
Avg. Min Temp. (F)	17.6	16.0	23.5	28.0	35.7	43.9	50.5	48.1	40.0	31.6	24.5	16.5	31.3
Avg. Total Precip. (in.)	0.65	0.84	2.13	2.68	2.98	2.21	2.12	2.23	1.63	1.33	1.12	0.93	20.86
Avg. Total Snowfall (in.)	10.5	12.6	23.0	19.5	4.6	0.1	0.0	0.0	1.4	7.2	14.3	15.4	108.6

Length of record for all data is 1989 – 2016.

Source: (WRCC 2016)

#### Population Growth and Development

Colorado's population as of 2018 was estimated to be 5.694 million people, which increased almost 150,000 from 2016 (CDLA 2020a). Most of the population growth in the state from 2016-2018 was in the Front Range (88 percent), which includes the Eldorado Springs, and 49 percent was within the Denver Metro Area. Colorado's population is forecasted to grow, but at a slowing rate. The population was estimated to grow by 1.5 percent again in ten to 15 years (CDLA 2020b). The slowing growth rate is due to a predicted slowing economy, slowing birth rates, aging population, and slowing labor force growth. Although population growth is predicted to slow, Colorado's population growth forecast is still approximately twice the national growth rate (CDLA 2016).

Population trends and predictions are provided in Table 4.2 for Boulder County since the majority of the Park lies in Boulder County. As of 2018, Boulder County was the 8<sup>th</sup> fastest growing county in the State (CDLA 2019). The population of Boulder County increased by four percent, from 2014 (313,108) to 2018 (325,480) people (CDLA 2020b). Growth is expected to slow down in the near future. However, Colorado’s growth is still much faster than the rest of the country and Boulder County is part of the Front Range, which is the fastest growing region in the state.

**Table 4.2.** 2018 estimates of historical, current, and projected population of Boulder County, Colorado.

Year	2014	2015	2016	2017	2018	2020	2025	2030
Population	313,108	319,009	322,285	323,467	325,480	332,134	351,310	370,618

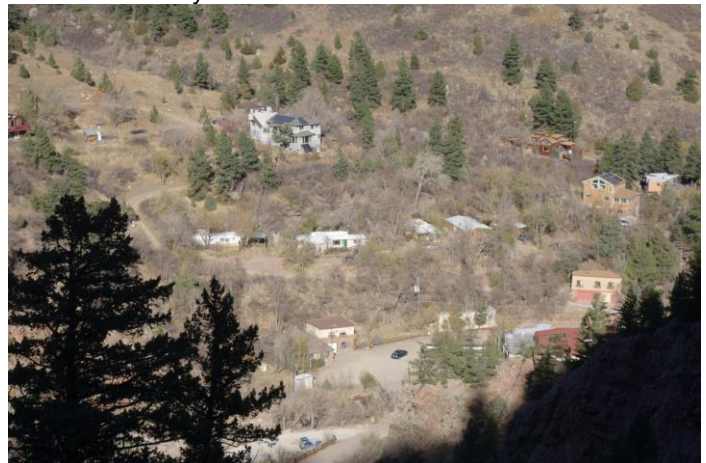
Source: (CDLA 2020a)

### Adjacent and Nearby Land Uses

Eldorado is located in south central Boulder and northern Jefferson counties. The small-unincorporated village of Eldorado Springs is located just outside the entrance to the Inner Canyon. A few small businesses, including art studios, a construction company, and a law office are found in Eldorado Springs. Because Eldorado Springs is downstream from the Park, pollution and sedimentation impacts from the village are minimal. The Park is primarily surrounded by public lands, including land owned by the City and County of Boulder. However, many private parcels also exist.

The only access to the Inner Canyon is to head west on State Highway 170 at the intersection with State Highway 93. Access to Crescent Meadows is along Gross Dam Road. Gross Dam Road can be accessed from State Highway 72 to the south and Flagstaff Road to the north. Currently there is no public road access to the Jefferson County property.

**Figure 4.1.** Private residences in the town of Eldorado Springs that border Eldorado Canyon State Park’s eastern boundary.



Source: Rocky Mountain Forestry, LLC, 2017

Development near the Park would interfere with animal migration corridors and fragment large blocks of open land into small areas of open land that cannot support animal species that require large blocks of habitat. The prospect of sustained population growth along the Front Range suggests that the Park should develop a strategy for protecting key tracts of land that, if developed, would greatly compromise the natural resources of the Park. Increasing visitor demands on the Park will continue to tax the resource base of the Park. Development should be directed toward areas already heavily impacted and enforce “carrying capacity” limits to control resource impacts.

## Natural Impacts and Influences

### Flooding

In September of 2013, large portions of the Colorado Front Range foothills received an unusual amount of rainfall, with up to 18 inches falling in 10 days in Boulder County. The highest measured rainfall depths were similar to the average annual rainfall for the areas affected. A peak flow estimate for the inactive stream gauge near Eldorado Springs measured at 2,120 cubic feet per second (c.f.s). This was



determined to be a 50 year flooding event for the area, which has about a two percent chance of occurring any given year (Yochum 2015).

The flood affected the Park in many ways. The main road near the Milton Boulder, the access road to the south picnic area near the vehicle bridge, and the picnic area were all severely damaged. The floods reduced the overall number of picnic sites available from 39 to ten. Fish habitat structures built in South Boulder Creek from 2008-2009 were destroyed or partially damaged, many of which still have not been replaced to this day. As a result of the floods, South Boulder Creek has required thousands of hours of debris hauling and riparian restoration. Most climbing access trails were damaged, and repair work on them is ongoing. The Fowler trail suffered a significant mudslide at its east end that was repaired in 2014. A section of the streamside trail was severely damaged and washed out. The access road to the Jefferson County Parcel sustained severe damage. Two bridges were installed to provide better access along Rattlesnake Trail and the in the Picnic Area following the flood event.

### **Fire, Disease, and Infestations**

Fire is a natural occurrence in healthy forests and grasslands. As part of a natural disturbance regime, these processes occur in cycles but do not have catastrophic effects on structure or species composition. The suppression of fire leads to denser forests where wildfire can have very dramatic impacts. Suppression also leads to change in species composition over time. In the past few decades, one wildfire spread onto the Crescent Meadows parcel (Walker Ranch Fire in 2000), and multiple wildfires have occurred in the region around Eldorado Canyon State Park (Cold Springs Fire (2015), Flagstaff Fire (2012), Miramonte Fire (1981), Gross Peninsula Fire (1978)), which adds to the importance of wildfire hazard reduction (Rocky Mountain Forestry, LLC. 2017). Wildfire risk determined by the COSFS identifies areas with the greatest potential impacts from a wildfire. The Park wildfire risk ranges from low to high, with most of the Park being categorized as high wildfire risk (COSFS 2019).

The Park saw minimal forest management prior to 1978. However, since 2005 the Crescent Meadows parcel has seen a substantial amount of thinning work completed by COSFS contractors. Over 190 acres of forest management treatments have occurred including both thinning with hand crews and mastication. Additionally, 82 acres of prescribed burning was completed in 2007 and 2008. Hazard trees along existing trails have been mitigated systematically when reported to Park staff along trail corridors, around structures, and along roads (Rocky Mountain Forestry, LLC. 2017).

**Figure 4.2.** Trees infected with Douglas-fir beetle may turn red all at once (left). Dwarf mistletoe is a common pest found in ponderosa pine trees present in all three of the Park's parcels (right).



Source: Rocky Mountain Forestry, LLC, 2017

The forested portions of the Park were inventoried in November 2016 using a combination of variable and fixed plot sampling. A total of 63 sample plots were established throughout the forested area of Eldorado Canyon State Park. Each plot was surveyed for species composition, tree density, tree regeneration, forest health, and other factors in order to gain insight on overall forest resources (Rocky Mountain Forestry, LLC. 2017).

The Park has had small sporadic pockets of insect and disease (I&D) activity over the past two decades including Douglas-fir beetle/pole beetle (*Dendroctonus pseudotsugae/Pseudohylesinus nebulosus*), pine engraver beetle (*Ips*) (*Scolytidae* family), mountain pine beetle (*Dendroctonus ponderosae*), and western spruce budworm (*Choristoneura freemani*). Douglas-fir tussock moth (*Orgyia pseudotsugata*) has not been found in the Park but could occur in the future. Mountain pine beetle has been found in pockets on the landscape, primarily at endemic levels in the past at Eldorado Canyon State Park. No trees on the Park were observed with mountain pine beetle infestations during the November 2016 forest inventory; however, new infestations would likely not be evident until June. Monitoring for future outbreaks should still be a priority given MPB's past presence on the Park and in Boulder County. Yearly monitoring in late spring/early summer for MPB infected trees is recommended in order to curb further infestations. *Ips* species is another tree beetle that has previously been found in on the Park and is likely to be found again at some point during the next decade given its general presence in Boulder County forested areas above 6,000 feet. More widespread is dwarf mistletoe in ponderosa pine, which can be found in all of the Park's three parcels and has been present for decades. Aerial flights conducted by Forest health personnel from the United States Forest Service and the COSFS identified limited I&D outbreaks in 2006, 2008, 2009, 2010 and 2011 within the Park (Rocky Mountain Forestry, LLC. 2017).

**Table 4.3.** Insect Pest Species with Potential to Occur at Eldorado Canyon State Park.

Common Name	Scientific Name	Target Tree	Signs of Infestation	Historically Present?
Mountain pine beetle	<i>Dendroctonus ponderosae</i>	Ponderosa pine, lodgepole pine	Trees that turn red all at once or pitch tubes.	Yes
Ips beetle	<i>Ips</i> sp.	Logging slash piles, pine, spruce	yellowish- or reddish-brown boring dust, presence of woodpeckers,	Yes
Douglas-fir beetle	<i>Dendroctonus pseudotsugae</i>	Large Douglas-firs	Trees >14" DBH, older than 120 years and turn red/brown all at once.	Yes
Douglas-fir pole beetle	<i>Pseudohylesinus nebulosus</i>	Small-diameter Douglas-fir trees	Mortality in smaller trees and top-kill or branch-kill in larger trees.	Yes
Douglas-fir tussock moth	<i>Orgyia pseudotsugata</i>	Douglas-fir	Defoliation in tops of Douglas-fir trees and outer branches which may move to lower and inner parts of the tree later in summer, egg mass in tree trunk.	No
Western spruce budworm	<i>Choristoneura freemani</i>	Douglas-fir, Engelmann spruce	Dieback in a tree's terminal branches, heavy concentrations of small moths (late-June through early-August) and caterpillars (mid-	Yes

			May through mid-July) on the trees	
Dwarf mistletoe	<i>Arceuthobium vaginatum</i>	Ponderosa pine	Swelling of branches and “witches brooms” (an abnormal abundance of foliage on a single branch), weakening the tree.	Yes
Source: (Cranshaw & Leatherman 2002; USFS 2011; Rocky Mountain Forestry, LLC. 2017)				

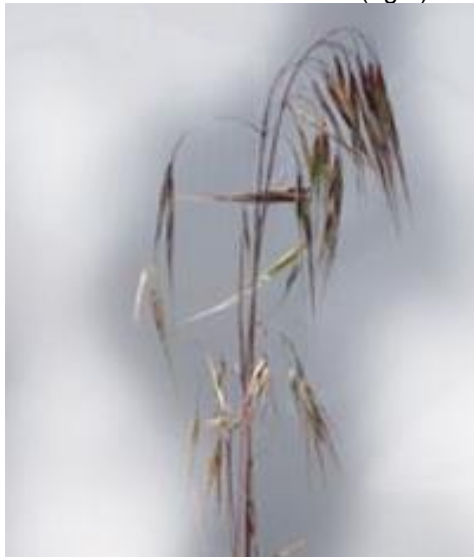
## Noxious Weeds

The replacement of one species of plant by another species that is more competitive is a natural process and is part of normal disturbance and succession that occurs in a healthy ecosystem. However, exotic species can move into disturbed areas, multiply, and can persist over time. Weed control is essential because exotics have few natural enemies. When weeds spread into native ecosystems, they reduce the diversity, destroy habitat by shading native plants, or eliminate natives with allelopathic chemicals. Aside from out-competing native plants, they can also host parasites or diseases that destroy native species or directly poison wildlife.

**Allelopathic chemicals:** natural toxins exuded from exotics that kill native plants.

As identified in the resource element description sections, noxious weeds are having significant negative impacts on riparian, wetland, and upland communities at Eldorado Canyon and have the potential for much greater impacts. Over time, with dedicated control efforts, it is possible to minimize the effects on wildlife and sensitive plant species. Efficient control should emphasize minimizing the spread of new weeds, attacking weed patches that are not yet well established, and eliminating them before they get out of control.

**Figure 4.4.** As of 2019, cheatgrass (left) covers the largest area within Eldorado Canyon State Park, totaling 145 acres and common mullein (right) is the second most abundant species totaling 68 acres.



Source: Jefferson County and State of Colorado

A noxious weed survey and management plan was completed in 2015 and again in 2019. All exotic plant species documented at the Park throughout the 2019 weed survey are compiled in Table 4.4 below. To ensure the protection of native plant communities and rare plants, weed control procedures

should continue to be implemented in a prioritized manner, as outlined in the most recent plan. The top priorities mentioned in the plan are:

- The top five species of concern are myrtle spurge, bouncingbet, leafy spurge, dalmatian toadflax, and diffuse knapweed. These species pose the most significant threat to the Park at this time. The populations of these species are relatively low and should be treated aggressively to prevent them from spreading rapidly and degrading the Park landscape.

While some weed species are still widespread in the Park, the efforts of Park staff are to be commended given that most weed patches are being kept small and low density. This shows excellent maintenance efforts by the staff. An opportunity exists to partner with the Colorado Department of Agriculture for a 50 percent funding match to install boot brushes at trail heads. Given the hikers and climbers which use the trails at Eldorado Canyon, the prevalence of weedy species such as cheatgrass and diffuse knapweed along these trails, and that boot brushes have already been installed at Walker Ranch, this would be a worthwhile project to pursue.

**Table 4.4** Exotic plant species documented at Eldorado Canyon State Park during the 2019 weed survey.

<b>Common Name</b>	<b>Scientific Name</b>
Bouncingbet*	<i>Saponaria officinalis</i>
Bull thistle*	<i>Cirsium vulgare</i> *
Canada thistle*	<i>Cirsium arvense</i> *
Chinese clematis*	<i>Clematis orientalis</i>
Common burdock*	<i>Arctium minus</i>
Dalmatian toadflax*	<i>Linaria dalmatica</i>
Diffuse knapweed*	<i>Centaurea diffusa</i> *
Downy brome (cheatgrass)*	<i>Bromus tectorum</i> *
Field bindweed*	<i>Convolvulus arvensis</i> *
Houndstongue*	<i>Cynoglossum officinale</i>
Leafy spurge*	<i>Euphorbia esula</i> *
Mullein*	<i>Verbascum thapsis</i> *
Musk thistle*	<i>Carduus nutans</i> *
Myrtle spurge*	<i>Euphorbia myrsinites</i>
Poison hemlock*	<i>Conium maculatum</i>
Poison ivy	<i>Toxicodendron radicans</i>
Prickly lettuce	<i>Lactuca serriola</i>
Sulfur cinquefoil*	<i>Potentilla recta</i>
Yellow sweetclover	<i>Melilotus officinalis</i>
*Indicates Colorado State Listed Noxious Weed	
Sources: (CPW 2019b)	



## **Human Impacts and Influences**

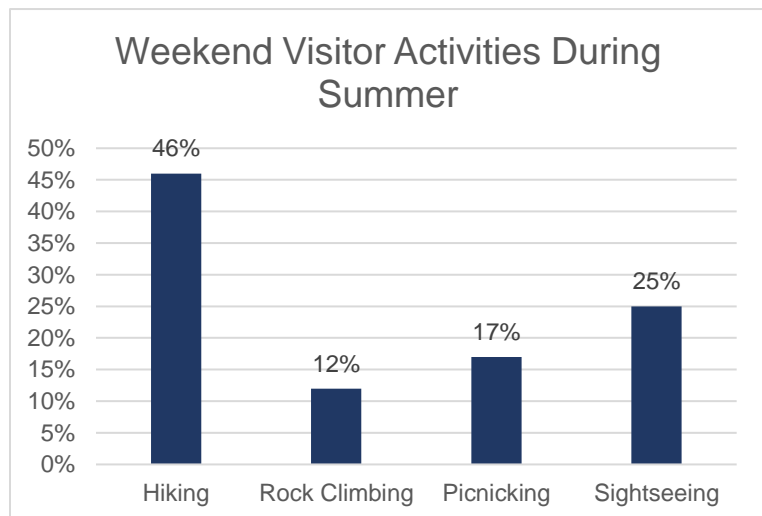
Human influences at Eldorado Canyon are pervasive and will increase over time. Increased visitation puts demands on the Park's natural resources and could create irreversible impacts.

### **Visitation**

Eldorado Canyon ranks as the 7th busiest Park in the state Park system. In 2018, the Park had a budget of \$160,000 with four full-time staff and served 524,000 visitors. With low relative overhead and minimal FTE staff, Eldorado is one of the most self-sufficient Parks in the system.

Regional population figures continue to increase dramatically, which puts the Park under considerable pressure due to its proximity to the metro area. The average annual visitation from 2005 to 2016 held steady around 244,000 but saw a dramatic increase in 2018 when 524,000 people visited the Park, a 115% increase. Eldorado Canyon almost always reaches vehicle capacity on weekends and holidays from May through September (CPW 2019b). When all parking spaces are full in the Inner Canyon, Park staff controls capacity by turning any additional vehicles away. As soon as a parking space opens up, the next vehicle in line is allowed to enter the Park. On each Saturday, Sunday, and Holiday during peak season up to 150 vehicles are turned away each day. Illegal parking on the road's shoulder in the community of Eldorado Springs and along the road back to Highway 93 is a common challenge for the public land managers and the community.

According to recent surveys conducted in the Park on a summer weekend, most visitors are at the Park to go hiking (46 percent). Sightseeing is the second-most popular activity, with 25 percent of people partaking. Picnicking draws 17 percent of weekend visitors. Finally, people present in the Park on the weekends to go climbing is the least abundant activity and only totals 12 percent of visitors.



As a result of this enormous increase in visitation, CPW is developing a Visitor Use Management Plan. The Visitor Use Management Plan will enhance user

experiences and protect Park resources by identifying effective strategies for managing visitor use and access, including improving traffic flow and parking (CPW 2019a). Concepts being investigated include a shuttle system, parking, Park entrance modifications, picnic area reservations, and infrastructure improvements.

Continued increased visitation will significantly affect vegetation, wildlife, and scenic values. For example, a continued increase in visitation would likely promote the establishment and spread of noxious weeds.

### **Carrying Capacity**

Visitation is expected to increase as the growth of Boulder and Jefferson Counties continues. These increases will likely stress the Park resources, and Park staff will have to determine at what level visitation and development endanger the goals and objectives for natural resource stewardship at the Park. Activities at Eldorado Canyon are relatively high impact uses, including high volume of people,

dogs, climbing, and biking. If the goals and objectives for natural resources are to be met, Park staff will have to consider and determine an acceptable carrying capacity for the Park.

Regular scientific monitoring of wildlife, plants, geology, and soils at Eldorado Canyon may help to establish a solid number of visitors that the Park can accommodate before resource degradation occurs. Short of rigorous monitoring statistics, staff will need to rely on observations and general trends. The Park manager must exercise judgement to determine at what point the resource degradation necessitates limitations on visitor use. The implementation of a simple monitoring process will help evaluate the condition of the natural resources at the Park and provide base-line information for the determination of a “carrying capacity”. A carrying capacity study for the Park is currently underway and being completed by CPW.

**Carrying Capacity** is the maximum number of visitors the Park can support without significantly degrading natural resource values, visitor experience or safety.

**The determination of carrying capacity should not be based solely on visitor safety issues nor on parking space available. Staff should consider resource impacts in the determination of carrying capacity or limits on visitation.**

## **Climate Change**

As a result of human development and increased greenhouse gas emissions, climate change has been documented to alter global temperatures, and that associated events, such as changes in precipitation, evapotranspiration rates, humidity are predicted to increase along with severe weather events like hurricanes, tornadoes, floods, and droughts (Hughes 2000; IPCC 2013). The effects of this changing climate are anticipated to be felt across all systems of the Earth. Consequences of climate change would affect natural resources both directly and indirectly and are expected to worsen over time (Hughes 2000; Williams et al. 2008). Although impacts are not fully understood, research suggests that changes are impacting plant and wildlife species’ physiology, phenology, and distributions (Hughes 2000). Climate change impacts to wildlife and plants is a global threat, and therefore will affect Eldorado Canyon State Park natural resources.

## **Climbing**

Eldorado Canyon is noted for multi-pitch, traditionally protected, sandstone rock climbs on cliffs up to seven hundred feet high. Routes typically involve intricate and devious face climbing, interspersed with dihedrals and discontinuous, irregular cracks, where traditional removable gear placement skills are mandatory (CPW 2019f). There are currently over 1,100 technical rock climbs in Eldorado Canyon State Park (CPW 2017a).

Fixed protection (bolts and pitons) has been used in the canyon since climbing’s inception there. Most routes were established by the mid-1980’s and did not have fixed protection. Around this time “sport” climbing came into vogue in the U.S. Under this practice, climbers install expansion bolts to protect climbs on sections of rock void of removable protection options (i.e., cracks). Although a few bolted “sport” climbs have been established in the canyon since the mid-1980’s, Eldorado is primarily a traditional climbing area. A standard rack consists of an array of nuts and cams, from small RP’s up to about four inch cams, along with a dozen or more quick draws and longer slings. Only a few bolted sport routes (starting at 5.11d) can be found in the canyon. Top roping opportunities exist but are somewhat limited and generally require gear to rig. Supremacy rock has the most accessible top roping and a few of the routes (5.0 – 5.5) have bolted anchors (CPW 2019f).

**Figure 4.5.** Trail closure signage due to a nesting raptor (left) and trail signage for a rock climbing route access trail (right).



Source: Collective Ecological Consulting, LLC., 2019

The following are some of the tools that are used to promote climbing safety and low-impact climbing:

- A permit is required to place or remove all fixed climbing hardware equipment.
- Trailhead signage to ensure recreationists stay on hiking and climbing access trails to minimize erosion
- Climber information signing at the main parking lot
- Climbing Guidelines brochure
- Presentations to climbing groups such as the Colorado Mountain Club
- Providing information to guidebook authors
- Dissemination of climbing accident summaries (Accidents in North American Mountaineering) and statistics
- Climbing access trails and staging areas are critical resource protection issues that may be further addressed when the Park updates its climbing management plan
- Continue to limit bolting and the use of fixed protection in an effort to reduce impacts on the rock resources at Eldorado Canyon
- If slings must be left in place to facilitate a rappel, require the use of slings with earth-toned colors
- Encourage packing out human and pet waste

A climbing management plan was created in 2003 in order to identify impacts resulting from climbing and to identify means to reduce or eliminate the impacts. The plan evaluated eight major climbing-related issues: new route hardware, hardware and bolt replacement, chalk, trails/erosion, wildlife, safety/education, commercial use, and bivouac (CPW 2003). Although the plan addressed several issues and communicated with the public well, an update to the plan is warranted due to the dramatic increase in visitation over the past few years.

### Raptor Monitoring and Closures

Climbers are not the only ones drawn to the sheer rock faces of Eldorado Canyon. The walls are also crucial breeding grounds for birds of prey, or raptors. Because of raptors’ sensitivity to human disturbance, climbs may be closed each year during the nesting and roosting period. Closures are often

implemented in an adaptive management approach as nesting behaviors are observed. The Park manages a volunteer raptor monitoring program to help locate active nest sites, post such areas as closed, and follow-up with monitoring closed areas for compliance and nesting activity. Raptor monitoring and seasonal closures should continue to be a way to protect this important resource at Eldorado Canyon.

## **Dogs and Domestic Pets**

The presence of dogs accompanying their owners while at the Park creates certain concerns. Most domestic dogs still retain instincts to hunt and/or chase other animals. Even if dogs are controlled and not allowed to chase wildlife, their very presence has been shown to be disruptive to many wildlife species. Especially during winter, harassment by dogs results in excessive energy expenditures by wildlife. During spring and summer, pregnant wildlife and newborns can be particularly vulnerable to harassment or attacks by domestic dogs. In addition, City of Boulder Open Space has documented that birds have a shorter flushing distance when approached by dogs than by human visitors. Dogs are frequently observed off-leash in the southern area of the Park.

Domestic dogs can potentially introduce diseases (distemper, parvovirus, and rabies) and transport parasites into wildlife habitats. Cumulative impacts of domestic dogs may have important implications for wildlife populations. Because of these factors, careful consideration of dog policies for the Park will be critical in controlling the profound effects possible. Dog droppings and marking areas with urination may impact sensitive wildlife species and create clean-up issues for Park staff.

**The Park regulations require dogs to be on leash and owners to clean up after their pets, and this is stated in the Park brochure. This could be posted on message boards in the campground.**

Humans are not the only residents to consider with increases in nearby housing development. Domestic pets have been shown to disturb wildlife, with noticeable impacts on sensitive species, particularly birds and rodents. Domestic cats kill millions of small mammals and birds every year. House cats and feral cats can disturb bird nests and prey upon young hatchlings.

## **Picnic Areas and Other Developed Facilities**

There is one picnic area containing 10 individual sites with one to four tables each, located throughout the Inner Canyon that was newly built in 2014. This is a reduction from the original number of sites prior to the 2013 flood event that destroyed the original picnic areas. All areas have access to a restroom facility and the north picnic area has water. Currently two sites are fully accessible with concrete parking spots. All sites have wildlife-proof trashcans. There are no picnic tables, grills, trashcans or potable water at Crescent Meadows or the Jefferson County property.

Picnic areas often increase the spread of noxious weeds by creating disturbed areas, can be a wildfire source, and attract wildlife by collecting trash. Picnic and camping areas may displace sections of habitat and be an unintended source of food for several species of wildlife including skunks and raccoons. Wildlife-proof trash facilities are present in the Park and help in avoiding human-wildlife conflicts.

**Explicitly instruct visitors to not feed the wildlife they encounter and properly store / dispose of food using the Park brochure, a leaflet, and signs.**



A new entrance station is planned for construction in the near future to accommodate both Park visitors and residents of houses that lie west of the Park. The entrance station would contain more lanes so that residents may pass through and emergency vehicles may enter the Park if necessary, instead of having to wait in the long lines resulting from weekend crowds. The new entrance station will better accommodate the Park's increasing visitation.

## **Roads**

The entrance of the Park is located about 2.5 miles west of State Highway 93 and just outside of the historic resort town of Eldorado Springs in Boulder and Jefferson Counties, Colorado. The Park owns and maintains 1.6 miles of roads in the Park. All roads are gravel and generally in fair to poor condition. The main road through the Inner Canyon receives a tremendous amount of use. Park use figures estimate 118,000 vehicles use this road annually. Dust control, erosion mitigation, and maintenance present continuing management issues. This road also averages a seven percent grade through the canyon.

Crescent Meadows contains 200 feet of road leading to a 25-car gravel parking lot. The Jefferson County property has 1,727 feet of road in good condition, which the public currently cannot access.

Although increased traffic and road widening are beyond the Park's control, Park staff should recognize the significant impacts these changes will have on wildlife and habitat fragmentation. Habitat fragmentation is thought to be one of the leading causes of loss of species diversity.

**Figure 4.6.** The main Park road that travels along South Boulder Creek is narrow and easily becomes congested on summer weekends.



Source: Collective Ecological Consulting, LLC, 2019

## **Road Hazards**

Roads pose barriers to wildlife and can result in numerous wildlife fatalities, significantly impacting animal populations if traffic volume is high. This may particularly affect amphibians, reptiles, birds, and small mammals. Noise pollution may also disturb sensitive wildlife species, and Park staff should monitor the effects on these species over time.

In addition to wildlife, many people use the main road in the Inner Canyon to walk along since parking is sparse and it is difficult usually to find a spot. Recreationists end up parking far from their hiking points and must walk on the road to get to trailheads. Fitting two vehicles alongside pedestrians is often difficult and cars must pull-off to the side of the road in order to pass one another.

## **Road Maintenance**

The Park staff currently uses magnesium chloride-treated sand on roads to melt snow. This practice is necessary for safety reasons but could increase salinity of the soils on the roadside will alter the vegetation and most likely favor non-native species. Additionally, salt on the roads could affect water bodies, including South Boulder Creek, which runs alongside the main Inner Canyon road.

## **Trail Use**

Eldorado Canyon State Park includes approximately 17.1 miles of multiple use and climbing access trails (CPW 2017g). These trails link to an additional eight miles of trails managed by Boulder County and the City of Boulder. The Fowler trail links to the very extensive City of Boulder Open Space and

Mountain Parks (OSMP) Dowdy Draw Trail System. Designated trails help focus and control recreation impacts in the Park.

Many non-designated “social trails” exist in the Park. These are often due to climbing activities or situations where visitors have been attracted off the trails by the stream or to interesting features. Generally, greater impacts and threats to resources are associated with social trails than designated trails. Social trails are noticeably impacting the area in terms of vegetation loss, erosion, and the spread of weeds. Additionally, many social trails are being developed by users and expand as more people use them.

**Social Trails** are non-designated trails formed by repeated visitor use. With no formal design or construction, social trails are prone to erosion and often impact sensitive areas.

The Park’s trails are rated from easy to difficult. They range in elevation from 5,800 feet at the edge of mountains and plains to 7,360 feet in the foothills. The trails vary in length from a 0.1-mile to a 14-mile hike that crosses four agencies’ jurisdictions. Accessible opportunities are provided on three trails that total 1.2 miles of crushed rock surface. The first of these trails is the main parking lot trail. This trail links the entry-bridge and parking and restroom facilities to the western end of the main parking lot. The other two trails are the Streamside and Fowler trails. The remaining trails are natural surface and provide hiking, mountain biking, and horseback riding opportunities. Two trails, the Fowler and Rattlesnake Gulch trails, also present interpretive information on Park wildlife and history.

Negative impacts from trails include disturbance to wildlife, spread of noxious weeds, trampling of vegetation, and soil erosion. Trail management helps to mitigate some impacts, but any new trail development should be considered very carefully. The riparian system can probably support some of these trails without serious degradation, but there can be visible impacts on the vegetation, water quality, and on stream bank erosion in these areas.

**Multiple-Use Trails**

The Inner Canyon has four multiple-use trails, totaling over 4.2 miles in length. These trails support over 255,000 annual visitors and provide accessible opportunities, as well as hiking, mountain biking, and horseback riding. Crescent Meadows has one multiple-use trail. This trail supports over 18,000 annual visitors and provide opportunities for hiking and mountain biking. See Table 4.5.

**Table 4.5** Inner Canyon and Crescent Meadows Trails Use Summary.

Trail	Length (miles)	Elevation Gain	Difficulty	Use	Visits / Year	Condition
Streamside Trail	0.50	100	Easy	Hike, Accessible	64,841	Good
Fowler Trail	0.90	100	Easy	Hike, Accessible	88,008	Good
Rattlesnake Gulch Trail	3.6	1,200	Moderate	Hike, Mtn. Bike	55,689	Good
Eldorado Canyon Trail	3.5	1,000	Difficult	Hike, Horse	43,946	Fair
Crescent Meadows	2.5	1,000	Moderate – Difficult	Hike, Mtn. Bike	18,081	Good
Total	11				252,484	

### Climbing Access Trails

The Park’s climbing access trails total over 2.5 miles in length and support an unknown number of visitors annually. These trails provide critical links over steep, loose, rocky terrain between the trailheads and rock climbs. The purpose of these trails is to provide sustainable access to climbing routes.

Trail management activities should target visitor safety issues and resource protection. New social trails can be identified and eliminated through proactive handling. Off-trail activities, such as rock climbing and fishing, often result in the formation of new social trails. Newly formed social trails are often easy to close off and eliminate. Social trails with heavy visitor use patterns may need to be stabilized and upgraded to access trail standard. Climbing access trails located in the Inner Canyon and their estimated use are listed in Table 4.6.

**Table 4.6** Climbing Access Trails Use Summary.

Trail	Length (miles)	Elevation Gain	Visits / Year	Condition
Wind Tower	0.15	250	No data available	Poor
East Slabs Descent	0.18	150	No data available	Good
Hawk Eagle Ridge	0.41	350	No data available	Poor
Bastille Descent	0.20	250	No data available	Good
Roof Routes	0.12	150	No data available	Fair
West Redgarden Wall	No data available	750	No data available	Good
Kloof Alcove	0.18	200	No data available	Fair
Peanuts Wall	0.27	300	No data available	Fair
West Ridge	0.60	700	No data available	Fair
Rincon	0.15	200	No data available	Good
Rincon Cut-off	0.26	200	No data available	Good
Shirt Tail Peak	No data available	No data available	No data available	Fair
Cadillac Crag	No data available	No data available	No data available	Fair
Total	2.52			

### Walker Ranch Connector Trail

For decades, recreationists and land management agencies have envisioned an east-west trail connection between Eldorado Canyon and Walker Ranch to improve access to the Walker Ranch Loop Trail, and to expand the range of trail-based recreation opportunities. An existing hiking trail currently makes this connection, but it is too steep and eroded to be safely and reasonably opened to bike access (BCPOS et al. 2018). According to the Eldorado Canyon – Walker Ranch Trail Feasibility Study Report (2018), the primary goals of the connection would be to:

- Improve access to the Walker Ranch Loop trail.
- Expand the range of trail-based recreation opportunities.
- Reasonably accommodate bicycles while maintaining the currently allowed activities of hiking, running, and horseback riding.

CPW intends to further analyze a potential multi-use connection as part of the Visitor Use Management Plan proposed for year 2020. The plan would analyze how the trail could allow mountain biking within the context of projected increases in visitation and other potential future uses of the Park (CPW 2019a).



## Stewardship Recommendations

### Stewardship Goals and Objectives

Based on the current natural resource assessment of Eldorado Canyon State Park, as well as likely staff and financial resources, we recommend the following goals to serve as the basis land management actions.

#### Preserve and protect vegetation and rare plant resources:

- Maintain the existing diversity and improve the condition of plant communities, including grassland, deciduous riparian forest, emergent wetlands, and coniferous forests by encouraging a high diversity of native species and minimizing disease and infestations.
- Enhance and protect habitat for rare plant species and communities by reducing non-native species cover.
- Keep Park development activities out of native plant communities to the extent possible. Preserve and protect the four rare plant communities identified in the Park.
- Prevent and monitor for disease and pest outbreaks in susceptible coniferous forest vegetation communities.
- Contain, suppress, or eradicate occurrences of other noxious weeds, as appropriate for each species and in compliance with the Noxious Weed Management Plan.
- Prevent the establishment of noxious weed species that are not already present in the Park.
- Protect vegetation in high traffic areas (and revegetate if necessary following approved seed mixes) to decrease bare areas susceptible to erosion and invasion by weeds.
- Restore an example of native prairie in disturbed grassland areas for interpretive purposes.

**Figure 5.1.** A turkey vulture was found to nest in the Park in 2019 and striving to meet the Park goals will ensure this species continues to return.



Source: Cornell Lab of Ornithology

#### Preserve and protect wildlife and rare animal resources:

- Protect and encourage the nesting of the wide-variety of raptor species within the Park.
- Maintain populations of all existing bird species that currently nest in the Park.
- Promote a healthy forest ecosystem exemplifying more characteristics of forests subject to natural thinning processes.
- Maintain, restore, and enhance habitat for wildlife and rare animal species present and that could occur in the Park. This includes birds, fish, invertebrates, mammals, and amphibians.
- Maintain use of the Park by rare or sensitive animal species currently present.

- Control and reduce the spread of noxious weed species to maintain and improve wildlife habitat quality.
- Protect wildlife corridors and large tracts of contiguous habitat through collaborative programs and decisions with open space management agencies adjacent to the Park.

**Preserve and protect wetland and water resources:**

- Improve the water quality of South Boulder Creek by implementing monitoring programs for erosion and sedimentation.
- Restore and maintain riparian vegetation along South Boulder Creek to reduce erosion and subsequent sedimentation of water by implementing a combination of actions such as appropriate structural measures and planting riparian vegetation.
- Reduce the spread of noxious weeds in wetlands and riparian areas.
- Identify and document water and wetland resources throughout the Park, especially on the Jefferson County Parcel.

**Preserve and protect geological and soil resources:**

- Maintain hydric soils (and associated wetlands and riparian areas) in their current undeveloped condition, with all new recreational facilities located out of wetlands and riparian areas.
- Maintain a sufficient cover of living plants and plant litter on upland areas to minimize soil erosion.
- Minimize soil erosion on or along Park trails.

**Preserve and protect the paleontological and cultural resources**

- Limit public access to cultural and paleontological resources within Park to preserve historic artifacts.
- Provide public education about history of the region and the Park.

**Implement a comprehensive natural resource monitoring plan**

- Identify new wildlife and/or geophysical monitoring points as needed and re-visit vegetation plots every 5 years.
- Conduct migratory and breeding bird surveys at established monitoring points every 5 years.
- Use GIS as a natural resource planning and monitoring tool.

**Prioritized Stewardship Actions**

After assessing current impacts, potential threats, and resource conditions, this plan has focused on making Stewardship Recommendations for protecting the resources at Eldorado Canyon State Park for future generations.

**Figure 5.2.** South Boulder Creek is the major waterway in the Park and will require continued management and protection in the future.



Action Item	Priority
Implement the recommendations of the <u>Eldorado Canyon State Park Noxious Weed Management Plan</u> .	High
Implement the recommendations of the <u>Eldorado Canyon State Park Forest Management Plan</u> , including monitoring efforts for insects and disease in coniferous forests.	High
Use <u>Best Management Practices</u> for all construction and management activities that may have a negative impact on the natural resources of the Park. These include trail work, revegetation, erosion control, grading, and weed control.	High
Implement <u>temporary trail closures for nesting raptors</u> as needed during nesting season.	High
<u>Enhance and restore Crescent Meadow wetlands</u> to provide habitat for the rare amphibian, northern leopard frog.	High
Install <u>boot brushes</u> in the Park to prevent the spread of noxious weed species. Use the 50 percent match program through the Colorado Department of Agriculture to fund the project.	High
Identify, close, and <u>revegetate inappropriate social trails</u> , while assessing potential needs for re-routes of current trails that have unacceptable levels of erosion.	Medium
Continue to work on <u>stabilizing the shoreline and monitor for shoreline erosion along South Boulder Creek</u> . Shoreline erosion has not been as big of a problem but remaining vigilant about this issue will result in less time and money spent on repairing issues.	Medium
<u>Enhance and restore Crescent Meadow grasslands to native prairie</u> and remove highly invasive species, such as cheatgrass. Use specified seed mixes in this plan.	Medium
<u>Restore and integrate new fish habitat structures</u> to help alleviate pressures on species present. Many structures were destroyed in the 2013 flood and have not been replaced.	Medium

Resource Management Plans and Inventories	Priority
Conduct a <u>survey for bat species</u> . Many rare bat species have the potential to occur and ample habitat exists in the Park. Use bat detectors to identify species composition and habitat use within the Park.	High
Develop a <u>climbing management plan</u> with the intention of identifying conflicts with aesthetics of the canyon and raptor nesting. Determine if some access trails need to become designated trails or if sensitive areas need to be closed.	High
Conduct a <u>survey for rare insect species</u> . Three rare butterflies (hops feeding azure, mottled duskywing, Moss' elfin) have been documented in the past, but not surveys have been conducted in several decades. Many other rare insect species have the potential to occur and ample habitat exists in the Park. Also develop a <u>butterfly monitoring program</u> that is run by volunteers.	High
Conduct a <u>trails survey and condition assessment</u> to evaluate the condition of existing trails and document the extent of social trails in the Park. Potentially recommend closure and revegetation of social trails.	High

Complete a <u>wetland and water resources inventory</u> . Wetlands and waters were last delineated and assessed in 1995 in Crescent Meadows and the Inner Canyon. The Jefferson County Parcel has never been assessed. A new assessment of wetlands and waters present in the Park and their condition should be conducted. Noxious weed infestations should also be documented within wetlands and water sensitive solutions should be prescribed for their management.	High
Conduct a <u>breeding bird survey</u> . Breeding bird surveys were conducted in the Park in 2015 and should be conducted every 5 years by a qualified biologist. Reports should continue to be submitted that have comparisons on bird populations from year to year.	Medium
Conduct a <u>survey for Mexican Spotted Owl</u> . Mexican spotted owl was last surveyed for in 2007, and although not found within the Park, the species could be present. The species is federally-listed under the Endangered Species Act and habitat is present within the Park and in surrounding areas.	Medium
Conduct a <u>survey for Preble's meadow jumping mouse</u> to document the presence or absence of the species. The species was last surveyed for in 2010. The species is federally-listed under the Endangered Species Act and habitat is present within the Park and in surrounding areas.	Medium
Develop a staff or volunteer-based <u>amphibian monitoring program</u> . Surveys were conducted in 2019, but annual monitoring could uncover more cryptic species and help to better manage this taxon. Additionally, the rare species, northern leopard frog, could occur with restoration of wetland areas in Crescent Meadows.	Medium

Protecting and preserving the natural resources within Eldorado Canyon State Park will be beneficial in providing visitors with a fulfilling outdoor experience, providing greater sustainability of Park assets, and making progress towards achieving the goals in the General Management Plan. It will be equally important to control damaging issues such as the increased amount of visitation due to populations increases in the Front Range, spreading weeds and eroding shorelines, protecting the grasslands, wetlands, and riparian areas, as well as their associated wildlife species. Success on this front requires clearly defined goals and the means to achieve them. This stewardship plan along with all the appendices should provide to Park management, a valuable tool to assist in maintaining, protecting, and enhancing the natural assets of their Park.

**Management Prescriptions**

The Stewardship Team has developed Management Prescriptions as an integral part of the stewardship process to assist Park management with carrying out the suggested resource recommendations. These Prescriptions address specific issues or action items. Management prescriptions also address issues present at multiple state Parks where there is a need for standardized actions and protocols.

The following prescriptions will be provided to help manage Park resources:



- Willow Staking – A guide for harvesting and installing willow and cottonwood cuttings for restoration projects.
- Boot Brushes – A guide for applying for the funding match program and how to install boot brushes to prevent noxious weed dispersal.
- Cheatgrass Management – Information on the spread of the invasive species cheatgrass and how to manage it.
- Wildlife Safe Fencing – Prescription authored by CPW that describes what fence structures to use in order to prevent injury and death to wildlife.
- Large Predator Stewardship Prescription – This prescription contains information on issues associated with potential conflicts between certain wildlife species and people.
- Wildlife and Trash Management Stewardship Protection - Prescription containing information about how to create a wildlife trash management plan and what trashcan and dumpster options are most effective.
- Rattlesnake Management - This prescription contains information on minimizing human – rattlesnake conflicts at the Park.
- Native Plant Revegetation – This prescription contains lists of plant species that would be appropriate for revegetating disturbed areas at the Park.
- Creating Wildfire Defensible Zones – This prescription outlines how to manage land to prevent wildfires from impacting development.
- Preble’s Meadow Jumping Mouse Prescription - Prescription was completed by Mark Gershman to provide Park manager with the latest information on Preble’s mouse.

**Figure 5.3.** Installing boot brushes would help prevent the spread of noxious weeds by removing seeds stuck to shoes.



Source: Colorado Department of Agriculture

## **Ecological Sensitivity Zones**

The concept of Ecological Sensitivity Zones can help define the biological vulnerability of each area to changes in land use and/or management. The demarcation of these different zones can provide useful information for the planning process for the Park. The procedure of delineating ecological sensitivity zones requires careful consideration of several biotic and abiotic characteristics of the landscape. These characteristics help determine the susceptibility of an area to possible changes to individual attributes of an ecosystem or to the ecosystem as a whole. The following list outlines attributes that should be considered in the delineation of ecological sensitivity zones, and the necessary scrutiny associated with each attribute:

- **Wildlife - presence, critical habitat, patterns, corridors, and breeding areas**
  - Are there threatened and/or endangered species present?
  - Are there areas within or adjacent to the Park mapped by US Fish and Wildlife Service or CDOW as important habitat?
  - Does the Park have areas that provide essential or critical habitats?
  - Are there areas that are used or provide habitats needed for essential life-cycle processes?

- **Acreeage and surrounding areas**
  - Is there large, high quality contiguous wildlife and vegetation habitat within and around the Park?
  - What is the condition and land use of the ecosystem surrounding the Park?
- **Vegetation community type and condition**
  - Are there threatened or endangered species present?
  - What vegetation community types are there?
  - How much of the vegetation is native?
  - What is the condition of the vegetation?
- **Soil types and geology**
  - Are the soils especially susceptible to erosion?
  - Are there geologically significant or interesting features that will likely draw attention from visitors?
  - Slope, gradient and aspect of the landscape and how it relates to function and potential use?
  - Are there areas of the Park that would be more suitable to development, or areas that would add cost and long-term management issues?
  - How does snow load and melt exist in the Park?

For example, the **High Sensitivity Zones** may include habitat for rare animal or plant species, incorporate an area known to be used for wildlife reproduction activities, and/or encompass intact areas of important wildlife habitat (critical winter range, nesting habitat or critical migratory routes). It could also have native vegetation that could be easily impacted (grottoes, cryptogammic soils), or soils or geology that make it susceptible to excessive erosion events. These areas are likely to be highly sensitive to habitat fragmentation and/or disturbance to wildlife.

The **Moderate Sensitivity Zones** would generally encompass areas that are less ecologically vulnerable, but still have high scenic and ecological values. These may have intact vegetation in good condition, but not be as large and contiguous habitat for large vertebrates or rare species. It may provide corridors for wildlife, but not critical migratory or other critical habitat. These areas also may have hydro-physical conditions that make it more sensitive to disturbance such as highly erosive soils.

The **Low Sensitivity Zones** are generally areas that are not habitat for rare species, have vegetation in fair to poor condition and/or is primarily non-native vegetation (weeds or non-native turf grass), and/or has hydro-physical conditions that make it less sensitive (such as soils that are not subject to excessive erosion with disturbance, no threats to water quality, etc.).

The **high sensitivity** zones in the Park would include:

1. Wetland and riparian vegetation communities with seasonal or permanent inundation.
2. Rock outcrops that can provide habitat for cliff-dwelling raptors and rare plants.
3. Rare invertebrate historical occurrences.
4. Rare vegetation community occurrences.
5. Vegetation in Excellent to Fair condition.
6. Aquatic habitat, including South Boulder Creek and associated streams.
7. Areas surrounding raptor nests.

The **moderate sensitivity** zones in the Park include:

1. Vegetation in good to fair condition.
2. Scree fields with little to no vegetation.

The **low sensitivity** zones in the Park include:

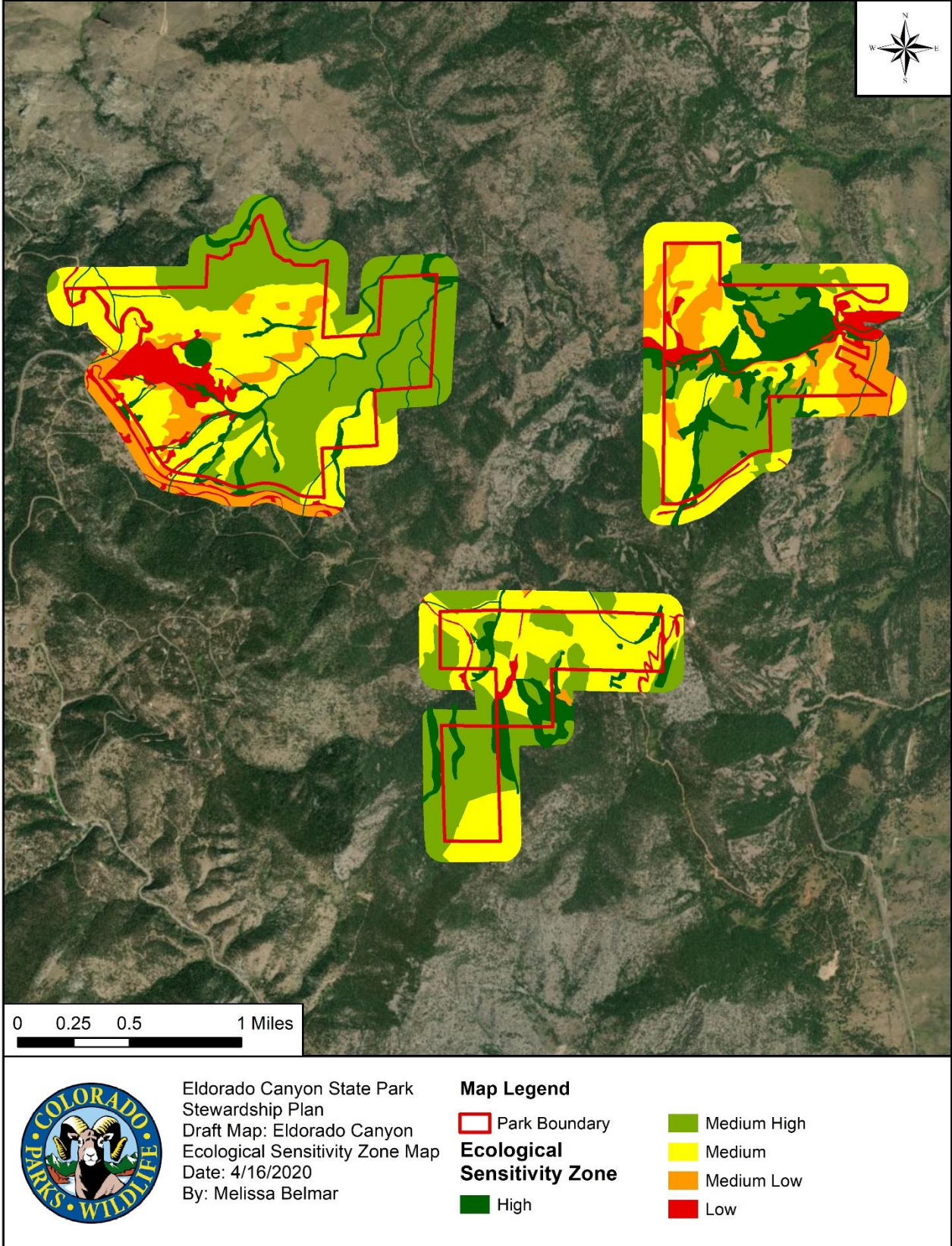
1. Developed areas such as roads, trails, and other Park infrastructure.

2. Areas dominated by non-native species.
3. Areas adjacent to heavily used Park infrastructure.

**Best Management Practices** in the next section provide guidelines as to sustainable activities in each of these ecological sensitivity zones.



Figure 5.4. Proposed Ecological Sensitivity Zones.





## **Best Management Practices**

Best Management Practices (BMPs) are proactive management techniques that limit impacts to resources. Park staff, contractors, and volunteers should utilize these techniques to limit or prevent impacts to resources.

- Trail Construction and Maintenance – Trails should be carefully planned and well-engineered prior to construction. After construction, regular ranger patrols should identify and close social trails as soon as they are discovered. Trail maintenance should be handled aggressively, with erosion-prone areas checked and maintained regularly. Rangers should discourage off-trail use by visitors as much as possible. For trails information and training opportunities see the Volunteers for Outdoor Colorado website ([www.voc.org](http://www.voc.org)) and the American Trails website ([www.americantrails.org](http://www.americantrails.org))
- Weed Identification - Park staff should become familiar with weeds found in the Park and from the local area. Park staff should always be on the lookout for weeds wherever they travel in the Park, and carefully note and report the information to the person responsible for weed control at the Park. A good reference is the small booklet, Noxious Weeds of Colorado, produced by the Colorado Weed Management Association. <https://cwma.org/weed-information/publications/>
- Weed-free construction practices – Construction at the Park will create a prime opportunity for new weeds to become established. However, diligence and foresight on the Park of the Park manager can significantly reduce the threat of these unwanted pests. The Park manager should request documents from the construction foreman that certify all construction materials including fill dirt, gravel, topsoil, cover crops, seed, and hay as being weed free. Construction vehicles should be inspected for weed and soil contamination prior to the commencement of work on-site and washed if necessary. The Park manager may also request that all construction equipment be thoroughly cleaned prior to arriving on site.
- Following construction, visitors will have the greatest potential of introducing new noxious weed infestations into the Park. Fortunately, this problem can be effectively controlled with a few simple guidelines that should be communicated clearly to all Park visitors. These include:
  - Restricting activity in weed-infested areas
  - Carefully cleaning clothing and equipment
  - Refraining from driving, hiking, or camping outside of designated areas.

For federal information and policy concerning noxious weeds, visit the USDA - APHIS website at: <http://www.aphis.usda.gov/ppq/weeds/weedhome.html>.

The Colorado Department of Agriculture has several helpful publications on the subject of noxious weed control. And can be found at:

<https://www.colorado.gov/pacific/agconservation/noxiousweeds>

The Larimer County website also has weed control information specific to the county in regards to policy and procedures at: <https://www.larimer.org/naturalresources/weeds>

- Educate visitors – Use the natural heritage of the Park in all respects (wildlife, water, wetlands noxious weeds, geology) to give Park visitors fun and educational experience to engender a conservation mindset.

- Refer to the Trails program book called "Planning Trails with Wildlife in Mind" during the trail planning process.
- Volunteers for Outdoor Colorado. 1992. Crew Leader Manual 4th Edition. 109 pages. Volunteers for Outdoor Colorado, 600 South Marion Parkway Denver, Colorado 80209 <http://www.voc.org/>
- Information about trail routing can be obtained from "Recreational forest trails: plan for success," North Carolina Cooperative Extension Service, North Carolina State University (1996), <https://content.ces.ncsu.edu/recreational-forest-trails-plan-for-success>
- A good source of information about erosion control practices that can be applied to all forms of construction is the Jefferson County Colorado Planning Department. <https://jeffco.us/planning-and-zoning/stormwater-management/contstruction-sites/>
- Alternative methods of short-term erosion control - The Army Corps of Engineers offers alternative methods to shoreline stabilization without the high cost of rip-rap installation [https://www.fema.gov/pdf/about/regions/regionx/Engineering\\_With\\_Nature\\_Web.pdf](https://www.fema.gov/pdf/about/regions/regionx/Engineering_With_Nature_Web.pdf) .
- Methods for reducing sedimentation in receiving water bodies during construction activities - Contact Larimer County for local guidelines on this issue.
- Concentrate Park development, buildings, and visitor activities near existing Park facilities - When possible, Park development, buildings, and visitor activities should be concentrated near existing Park facilities, in an effort to keep remaining tracts of contiguous wildlife habitat as unfragmented as possible. Trailer hook-ups could probably be placed nearer to the road than the more primitive campsites and walk-in tent sites without any ill road-noise effects.
- We strongly urge Park staff to incorporate BMPs into construction contracts and to inspect construction sites to ensure these practices are followed!

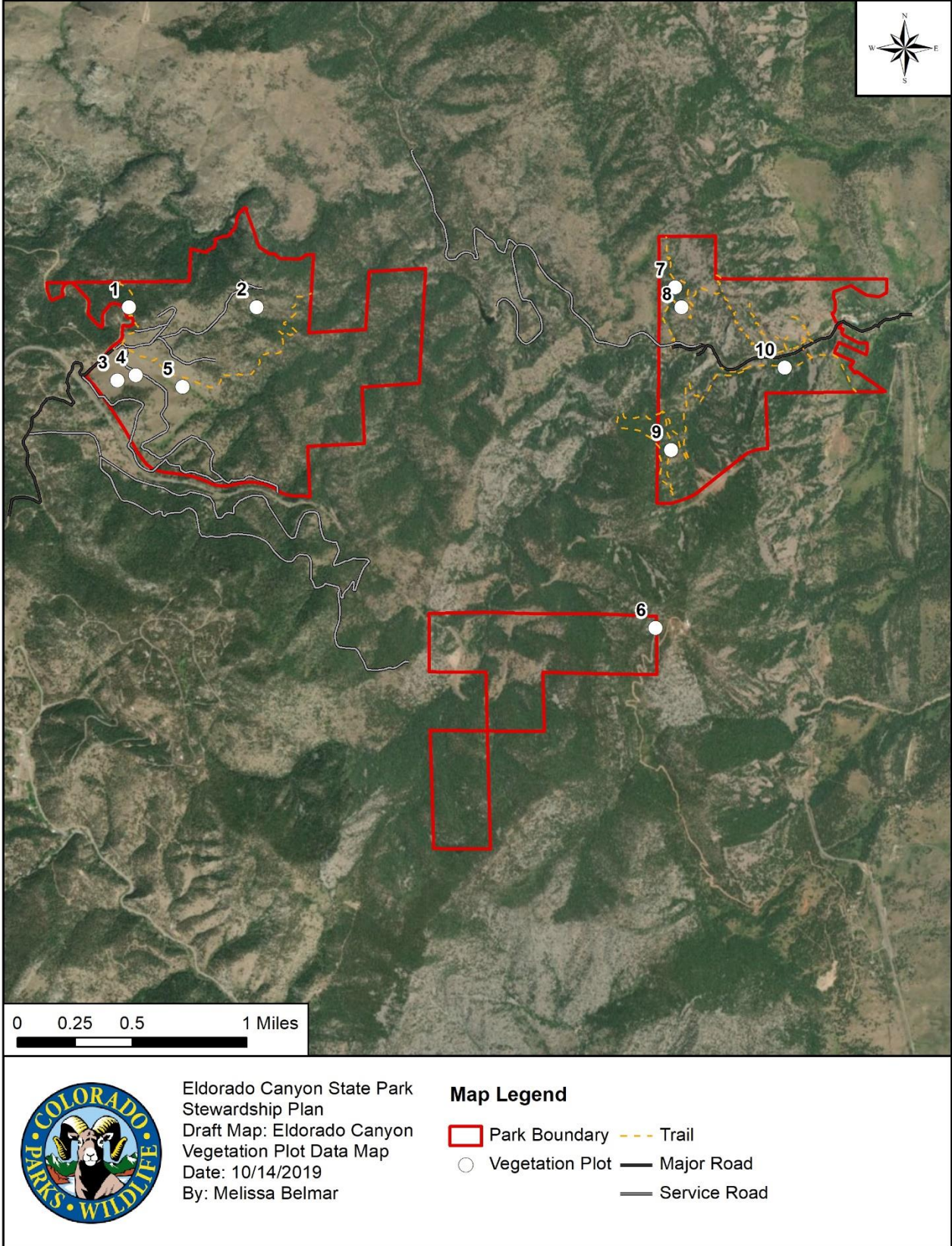
## Resource Monitoring

In order to verify that the stewardship goals and objectives in Chapter 5 are being met, a monitoring program should be put into effect. Monitoring is the most effective system for identifying impacts and influences, minimizing threats by proactive observation, and tracking conditions of a dynamic ecosystem.

### Vegetation Monitoring

Action Item	Priority	Suggested Contact
<b><u>Vegetation condition monitoring</u></b> – Plot locations established in 2019 should be repeated at least every five years in order to track changes in health and diversity of plant communities in the Park.	High	Stewardship Team
<b><u>Monitor weed populations</u></b> - Track weed patch size and distribution with photo monitoring and incorporate into GIS project. Volunteers may be utilized to assist Park staff in this effort. Put all information regarding control efforts into a database including date sprayed, name and rate of herbicide used and target species.	High	Park Staff, volunteers
<b><u>Tree pest monitoring</u></b> - Yearly monitoring in late spring/early summer for tree disease and insect pests is important for preventing a larger outbreak.	High	Stewardship Team

**Figure 6.1.** Vegetation Monitoring Plots at Eldorado Canyon State Park.





## **Wildlife Monitoring**

<b>Action Item</b>	<b>Time of Year</b>	<b>Priority</b>	<b>Suggested Contact</b>
<b><u>Butterfly monitoring</u></b> - The monitoring would be designed to locate any populations of the rare butterflies that could occur in the Park. Hops feeding azure, mottled duskywing, and Moss' elfin have been documented in the past.	Early spring to late summer	High	Invertebrate Expert or Stewardship Staff
<b><u>Raptor nest monitoring</u></b> – Beginning in early February, Park staff or volunteers should walk the trails looking for raptors, and especially raptor nesting sites. If found, trails, or parts of trails that are near the nesting sites should be closed to the public during the breeding season.	February 1 – July 31	High	Volunteers or Park Staff
<b><u>Reptile and amphibian monitoring</u></b> – Call-back monitoring, egg/tadpole monitoring, habitat photo monitoring, and artificial cover surveys may be used to survey for herptile species.	March – May, after rain, year-round (artificial cover surveys)	High	Volunteers or Stewardship Staff
<b><u>Northern leopard frog monitoring</u></b> – Once wetland restoration occurs, it is imperative that staff and volunteers monitor for northern leopard frogs at Crescent Meadows to assess population and individual health and contribute to statewide conservation efforts. Frog-call and egg/tadpole monitoring methods can be used for this species.	March - May	Medium	Volunteers or Stewardship Staff

## **Geophysical Monitoring**

Action Item	Priority	Suggested Contact
<b><u>Monitor and manage any erosion during any construction activities-</u></b> This is one of the potentially most threatening times for accelerated soil erosion. Monitoring should be done daily and thoroughly.	High	Park staff or Stewardship Team
<b><u>Monitor shoreline erosion</u></b> – Use established protocols to monitor erosion along South Boulder Creek’s shoreline annually. Although erosion is not a pressing issue at this time, it is important to continuously monitor so that it does not become a big issue in the future.	Medium	Volunteers or Stewardship Staff
<b><u>Monitor trail erosion and social trail creation</u></b> –Once trails are built, constant monitoring of water drainage patterns and trail condition can be performed monthly or bi-monthly with field observations and photo documentation, with an annual summary and analysis of climatic effects and other influences. The areas to be evaluated are susceptible areas (including steep gradient, poor vegetation cover, poor soils, etc.) and high use areas. Additionally, the creation of new social trails should be documented.	Medium	Stewardship Team or Volunteers for Outdoor Colorado (VOC)

## **Methodology**

Park staff should utilize the general Stewardship Monitoring Form for most monitoring, although several of the monitoring projects require more specialized protocols. Specialized protocols for amphibians and northern leopard frog, shoreline erosion, and raptors are available. Based on their expertise, appropriate experts, Park staff, or volunteers should design specialized forms and protocols for other resources requiring specialized monitoring. Monitoring should be done on an annual basis, unless otherwise stated. Park staff likely knows best as to specific locations to monitor for recreation and/or wildlife issues but monitoring points should choose these areas to suit their specific needs.

Park staff should utilize numbered stakes, monuments, flags, or carsonite posts in the field to mark monitoring sites in order to revisit the exact location every year. Photos are especially helpful in documenting changes over time. Digital photos should be linked to the GIS monitoring points theme. Monitoring is a fundamental component of the stewardship process and should be implemented each year. The approach recommended in this stewardship plan is basic yet comprehensive, focusing on the significant resources and impacts at Eldorado Canyon. Generally, monitoring is not time consuming, but if good records are written and kept, it will be immensely useful. Monitoring information will be invaluable in guiding the next resource evaluation when the stewardship plan is revisited in five years. The following are some suggestions:

### **Shoreline erosion**

- Use established protocol and datasheets.
- Establish several transects that run from the uplands directly to the water. The distance from the upland end of the transect to the water’s edge can be measured readily.

- Place temporary poles in the ground at regular intervals along the transects, then photographing the transects once annually. This will clearly show any retreat of the shoreline.
- Establish 1-2 permanent photo monitoring points that have good views of each transect. If erosion does not decline to acceptable levels within three years, we recommend assessing possible reasons for the continuing erosion. Possible reasons might be continued high water in the winter or a particularly severe storm.
- Determine what reasonable steps might be taken to stop the shoreline erosion from increasing. The photographs and the transect data may be helpful in making the case that shoreline erosion is a problem and that allocating scarce resources to fix the problem is worthwhile.

### **Amphibians**

- At minimum, routine photo-monitoring of habitats is recommended, and particularly those planned or undergoing specific treatments (e.g. grazing, fire, restoration, and pesticide use). Established photo-monitoring points may be best for this, and when properly set-up, offer easy to find destinations for repeatable and comparable monitoring over time.
- Conduct surveys using established protocols and datasheets from FrogWatch USA (<https://www.aza.org/frogwatch/>) or from the 2019 Herptile report (Triece et al. 2019).
- Northern leopard frog has not been documented in the Park but could be present. Monitoring of this species should occur in concurrence with general amphibian monitoring discussed above, and also following species-specific monitoring protocols.

### **Butterflies**

- Monitor butterfly populations in potential habitat areas and document any occurrence of rare species at the Park.
- Contact the Colorado Butterfly Monitoring Network to sign up for the program, obtain the statewide-used protocol, and submit observations.  
<https://www.thebutterflynetwork.org/program/colorado-butterfly-monitoring-network>

### **Disease and Pests**

- Refer to the Forest Management Plan for guidelines of when and how to monitor for disease and pests that may impact coniferous forests. Several pests have been documented in the past and mistletoe is still present in the Park.

### **Raptors**

- Monitor raptors according to the CPW Raptor Monitoring guidelines through the use of volunteers and seasonal stewardship staff.

### **iNaturalist Citizen Science**

- Encourage Park visitors to use iNaturalist (<http://www.inaturalist.org/home>) Create an invite-only Eldorado Canyon State Park project on iNaturalist where volunteers can upload observations of various wildlife occurring in the Park. Post signage and offer brochures to promote awareness of iNaturalist monitoring in the picnic areas, bathrooms, and other sites seeing high usage by visitors. Signage and brochures could be used to help identify species known to occur or likely to occur in the Park, with any birds falling outside these being reviewed from the iNaturalist app by the project curator for the project.
- iNaturalist training Conduct a training course on using iNaturalist for bird monitoring. In addition to demonstrating how to use the software, provide training on identifying and surveying the region's avian species. End the training with a "Field Lab Practical" that allows trainees to immediately test their newly acquired skills identifying species from photographs, preserved specimens, and call recordings. If hosting the event is not feasible, consider partnering with an

outdoor organization (e.g. Recreational Equipment, Inc. (REI)) to gain access to a classroom and a potentially wider audience.

## **Revisiting the Stewardship Plan**

This Stewardship Plan is expected to remain current for five years. After five years have elapsed, the plan should be rewritten to reflect changes that have taken place in the condition of the resources. A major monitoring effort should already be in effect as part of the update process. The *Resource Element Descriptions* should be revisited, and the condition statements updated. *Resource Trajectories* should be analyzed to determine if the Park resources are declining or responding favorably to management activities. This five-year plan update is critical to the effectiveness of the stewardship process.



## Conclusion

Protecting and preserving the natural resources within Eldorado Canyon State Park will be beneficial in providing visitors with a fulfilling outdoor experience, sustaining Park resources, making a positive effort towards area ecology, and progress towards the achievement of General Management Plan goals. The overall health of the natural resources found at the Park appears to be in good condition, though the impacts to these resources continue to intensify. These impacts to the ecological health of the Park include the following: increased visitation and population growth in surrounding areas, habitat fragmentation, and spreading weeds. Some priorities for resource management include riparian, wetland, and grassland restoration, maintaining connected landscapes with adjacent lands, and maintaining the vast amount of plant and wildlife diversity in the Park. The emphasis of this plan, and the additional documents, is provided to assist in maintaining and protecting all the natural resources present, as well as emphasizing the interdependency between the resources.

Successful stewardship requires an ongoing commitment to resource management. Investments in staff resources and funding for management planning are necessary if these stewardship recommendations are to be applied. Proper stewardship of the Park's natural resources will require a cooperative effort between Park managers, state and federal agencies, scientists, Park visitors and volunteers, as well as surrounding landowners.

Finally, the Stewardship Team has put a lot of effort into this project and we hope this plan, along with the numerous appendices, provides Park management with a useful tool to assist in protecting, maintaining, and enhancing the natural assets of their Park.

Thank you,

The Resource Stewardship Team

**Figure 7.1** Eldorado Canyon State Park in 2019.



Source: Collective Ecological Consulting, 2019.

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