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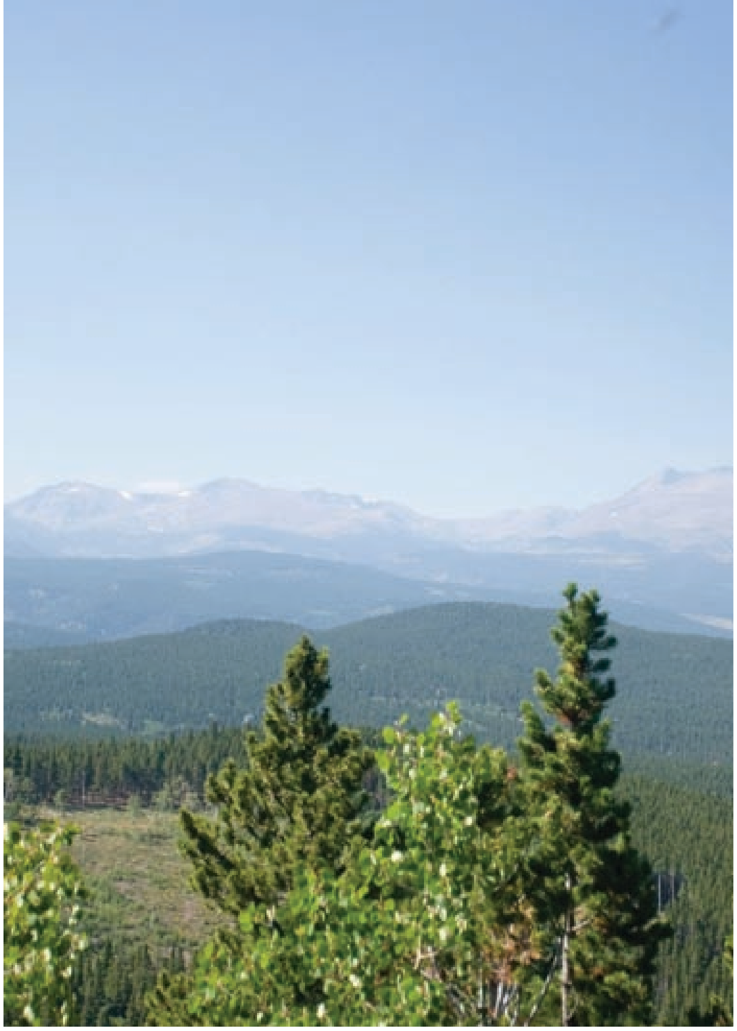
CONSERVATION & NATURAL RESOURCE ASSESSMENT



CONSERVATION & NATURAL RESOURCE ASSESSMENT

Coal Creek Canyon Park and Recreation District (CCCPRD or the District) lies within the rich and diverse Southern Rocky Mountain foothills. The foothills especially contain a wide range of ecosystems, as this is where the plains meet the mountains and the natural environment changes from one ecosystem to another as it adapts to higher elevations. This diversity and uniqueness provides for not only significant natural resources with inherent conservation values, but also a wide variety of outdoor recreation opportunities.

The preservation of these natural resources and the rural, mountainous characteristics of the Canyon were identified as a strong community value through the Community and Stakeholder Input as well as through the Community Survey. Therefore, this analysis along with the natural resource and wildlife evaluation in Maps H & I of the **GIS Mapping and Spatial Analysis** section of the report is intended to assist the District in identifying those sensitive areas most in need of protection and to balance new recreation opportunities with preservation efforts.

Natural Resource Analysis

Geology and Topography

Coal Creek Canyon lies within the Southern Rocky Mountains and more specifically, Colorado's Front Range. The Southern Rockies contain some of the oldest rocks in the region, formed from sediments and transformed into metamorphic rocks of gneiss and schists, over a billion years ago. Peaks in the Southern Rockies comprise the highest portion of the Rocky Mountains.

Mountains form slowly, over a period of millions of years of uplift and erosion. Plates collided and denser oceanic crust fell below the less dense continental crust. Erosion by wind and water transported rock. Glaciation also played a role in the formations seen in the Canyon today, having carved many of the cirques and valleys.

Coal Creek Canyon's elevation ranges from 6200 – 9400 feet. In general, along the Front Range, elevation climbs to 8,500 feet within five miles of the plains, and then climbs gently for the next eight miles to 9,000 feet. The next 2 – 3 miles climb steeply to reach elevations of 11,400 feet. In the foothills, most valleys are narrow and deep with a gentle climb to 6,000 feet, get steeper to 7,500 feet in narrow deep gorges. Valleys then become broader and gentler before deepening with large steps up to cirques (concave, amphitheatre-shaped rock formations).

Soils

Due to its location in the foothills and its nature as a canyon, Coal Creek Canyon has a wide variety of soils. Lower elevations with moderately sloping to steep hill slopes and fans vary from shallow to deep soils depending on the parent material. The canyon slopes are nearly level with deep soils varying from sand and gravel to clay. Steep mountain slope soils are shallow to moderately deep loams (soil composed of sand, silt, and clay in relatively even concentration) with the amount of rock fragments varying widely.

Parent material ranges from igneous and metamorphic (granitic rock of 1,700 million year old age group; quartzite, conglomerate and interlayered mica schist; felsic and hornblendic gneisses - separate and interlayered of volcanic origin) to sedimentary (Colorado Group - shale, limestone; Pierre Shale - shale, bentonite; Lykins, Lyons & Fountain Formations - siltstone, sandstone; Dakota Group - sandstone, mudstone; Mesozoic rocks – clastics). Specific soil associations vary throughout the study area. Additional information about these associations can be found through the USDA's Soil Survey program.

Climate/Water Resources

The foothills lie within the rain shadow of the Rockies, resulting in a semi-arid environment. Compounding the rain shadow, storms over the Rockies tend to be drier to begin with since they loose a large portion of their moisture over the Sierra Nevada and Intermountain West. Most moisture is provided by air masses that arrive from the Gulf of Mexico or boreal regions and collide with the mountains, move upslope and drop their precipitation on the eastern mountains. Higher elevations tend to receive more precipitation.

Wind is a major factor in the climate. In the Canyon, the Continental Divide turns east forming a giant funnel that channels winds. Wind gusts near 90 miles per hour are common along the eastern foot of the Front Range. These winds, Chinook winds, can exceed 120 miles per hour near Boulder.

Elevation, slope and aspect affect climate locally. Precipitation, temperature, solar radiation and humidity are all affected. South facing slopes tend to be hotter and drier, while north facing slopes are cooler and have more moisture, which may be a consideration in the design of recreation facilities and amenities.

While not within the District's boundary, Gross Reservoir's proximity makes it important to the District not only for its recreation opportunities but also for the possible expansion that is currently proposed. Gross Reservoir provides storage for Denver Water's trans-mountain diversions through the Moffat Tunnel and a portion of South Boulder Creek. Approximately 59,675 acres of the South Boulder Creek drainage serves the reservoir. Water released from Gross Reservoir flows downstream to Ralston Reservoir for additional storage. The Gross Reservoir dam currently provides hydroelectric power secondary to its storage capacity function. Denver Water has proposed an expansion of the power generation facilities that will require raising the dam 131 feet, increasing the water surface area to 842 acres from its current 418 acres. An alternate proposal raises the dam 125 feet, increasing the water surface area to 818 acres. These proposals would not only impact water resources, but could have additional environmental and recreational impacts due to increased road traffic, pollution, habitat loss and temporary closure of the reservoir to water sports, fishing, etc.

Vegetation

Multiple ecosystems occur in the study area including shrublands, montane forest, and subalpine forest. Shrublands generally occur at elevations below forests. Montane forests typically occur between 5,000 and 9,000 feet. At the highest elevations in the study area and on some north facing slopes, subalpine forests may be found. Meadows and mountain riparian ecosystems occur within other ecosystems throughout the area.

Shrublands in the study area tend to have characteristics of montane shrublands, dominated by Mountain Mahogany and less often Gambel Oak. Skunkbrush, bitterbrush, ninebark, buckbrush, rabbitbrush and hawthorn are also found here. Deeper soils may grow plains grassland and mountain species. This ecosystem is a transition between the plains grasslands and Ponderosa Pine forests. It may extend to higher elevations on south facing slopes.

Montane forests of Ponderosa Pine occur between 5,600 and 9,000 feet. These forests vary based on elevation, exposure and soil. Stable stands are more open and park-like with abundant grasses and some wax currant. Drier, south facing slopes also have a more open structure, but with Blue Grama grasses and Rocky Mountain juniper. Stable stands at higher elevations and northern slopes may be denser and include Douglas Fir. Kinnikinnik, bitterbrush and common juniper. Quaking Aspen and Lodgepole Pine mark disturbed sites.

Subalpine forests occur between 9,000 and 11,000 feet and are dominated by Engelmann Spruce and Douglas Fir. These forests are dense, with patchy dense understory growth. Understory plants that occur in this area include blueberry, broom huckleberry, heart-leaved arnica, lousewort, elk sedge, wintergreen and wild rose.

Meadows occur within the previously described ecosystems. Meadows form where slopes become gentler and soils are deeper, these are less common at higher elevations. Members of the sedge and rush families primarily characterize wet meadows. Dominated by grasses and forbs, dry meadows typically have more species than wet meadows.

Mountain riparian ecosystems occur between 5600 and 11,000 feet on moist sites along streams and bodies of water. Alder, cottonwood, willow and birch typically dominate these ecosystems. Colorado Blue Spruce and White Fir may also be found here. Composition changes as elevation increases.

Aspen are a unique feature in montane forests. A successional species, it marks a site that has been disturbed, typically by fire or disease. Aspen do not grow from seed in the Front Range, but grow as shoots from existing roots creating clones consisting of multiple stems. Decline of aspen stands is a concern throughout the Intermountain West. Several factors may be contributing to this decline. Dense stands create shade, which allows shade-tolerant conifers to grow. Since aspen are not shade-tolerant, they will eventually succumb to their own shade as well as that of the conifers. These dense stands of aspen are often a result of a lack of natural fire occurrence. Decline is also affected by ungulate (hoofed animal) grazing as they eat the shoots, eventually allowing shrubs to grow in place of the new trees. Various diseases and fungi may also be contributing to the decline of aspen.

Wildlife Habitat

The wide range of plant species and climate provide such a diversity of habitats that the number of animal species is also large and varied in the Canyon. In fact, the Rocky Mountains are home to the richest diversity of native ungulates of any region in North America. A number of species that occur in the Front Range are threatened or endangered.

According to the Colorado Department of Wildlife Natural Diversity Information Source, the following occur within the study area:

- Peregrine Falcon - Nesting Area (2)
- Turkey - Overall Range, Winter Range
- Abert's Squirrel - Overall Range
- Black Bear - Fall Concentration, Human Conflict Area, Overall Range, Summer Concentration
- Black-tailed Prairie Dog - Overall Range
- Elk - Overall Range, Severe Winter Range, Winter Range
- Moose - Migration Patterns
- Mountain Lion - Human Conflict Area, Overall Range
- Mule Deer - Migration Patterns, Critical Winter Range, Highway Crossing, Overall Range, Summer Range, Winter Concentration Area, Winter Range
- Preble's Jumping Mouse - Occupied Range, Overall Range
- White-tailed Deer - Overall Range

Animal species are sensitive to disturbance; however, the level of that sensitivity varies. Habitat fragmentation creates more edge, affecting species dependent on large blocks of uninterrupted forest cover. Recreational activities can also cause disturbance. Yet, impacts are varied and difficult to observe and interpret. Some animals initially retreat from disturbance, but may adapt over time. Others may alter their behavior permanently. Others yet, may not be able to avoid the disturbance and may be negatively affected. Obvious disturbance such as large groups of people, artificial feeding of wildlife and harassment can have severe and lasting affects on wildlife.

Human Influences

Extractive Resources

Colorado's geologic make-up has made it a prime area for extracting resources from the ground. There are more than 7,000 abandoned mines in Colorado, and several fall within the study area. Abandoned mines are of concern for a variety of reasons including acid mine drainage, which affects 1616 miles of streams throughout the state. Gold, uranium, copper, lead, zinc and molybdenum are a few of the metals that were mined. Sand and gravel continue to be mined throughout the area.

Forestry is also important to the region's history. By 1879, there were 70 sawmills in the South Platte River basin that could process as many as 7.5 acres of trees per day. By 1920, little old-growth forest remained. The forest industry is still active, but in a much reduced capacity from its peak.

Fire

Fire is a natural occurrence in the foothills environment. Forest fires were generally left to burn until the severe fires of 1910. Those fires spurred the moved to begin aggressive fire suppression. Suppression efforts were successful until the late 1900's, when large wildfires burned thousands of acres.

A necessary process, fire recycles nutrients, regulates plant succession, maintains diversity, reduces biomass, controls disease an insect populations, triggers and regulates chemical processes, and maintains biological and biogeo-interactions between vegetation and animals. Fire suppression can cause changes in forest composition and diversity and lead to fuel accumulation. Suppression can also change the forest from single layer canopy to multiple layer canopy, which creates ladder fuels that lead to crown fires. Lack of fire often leads to denser tree growth. Dense forests not only impact wildlife and vegetative habitat, it also restricts views and may have a negative impact on outdoor recreationists' experience. However, fires in the foothills and urban interface areas also greatly impact safety and property of residents who have settled in these forests and foothills

Key Findings

Coal Creek Canyon is a diverse and complex environment that is sensitive to human impact. The District should continue to work to balance the preservation of these natural resources with context-appropriate enhancements (incorporating sensitive areas, considering water resources and community values) of recreation facilities and programs that celebrate, conserve and promote stewardship of these lands. For example, the District has been proactive in sponsoring Forest Stewardship and Pine Beetle workshops and is working to be a role model for Healthy Forest Stewardship. CCCPRD is also currently working with The Environmental Group (TEG), Boulder County, the Coal Creek Canyon Fire Protection District (CCCFPD), and other agencies for these purposes.

Planning of major trail corridors and greenways should take into account primary wildlife corridors, which can play multiple roles and also provide potential fire breaks. Therefore, thorough site and corridor analysis will need to occur in the programming and design process of any recommended recreation facilities or amenities. Protection of these resources and education is necessary to continue to provide recreation resources for residents and provide ecological benefit.