Golden Gate Canyon State Park

Resource Stewardship Plan – *Public Version*

Prepared By: Collective Ecological Consulting, LLC

February 24, 2022

Table of Contents

List of Tables

List of Figures

List of Photos

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.

Developing the Golden Gate Canyon State Park Stewardship Plan was a collaborative planning process that would not have been possible without the support of the following staff, other members of the planning team and those that participated in the public involvement process. Colorado Parks and Wildlife would also like to extend thanks to the other major partners and stakeholders that were involved in the management planning process.

Stewardship Planning Team

Jeff Thompson	Resource Stewardship Program Coordinator
Matt Schulz	Forest Management Coordinator
Todd Farrow	Park Manager
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Sara Brandenburg	Resource Stewardship Technician
Emily Macklin	Resource Stewardship Technician

Other Major Partners and Stakeholders

List any individuals from other state and federal agencies and possibly adjacent landowners involved in the planning process. Consultants may be listed here (if relevant).

Melissa Belmar, Collective Ecological Consulting	Consultant
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--	Colorado Natural Heritage Program

--	US Fish and Wildlife Service

CPW Leadership Team

Dan Prenzlow	Director
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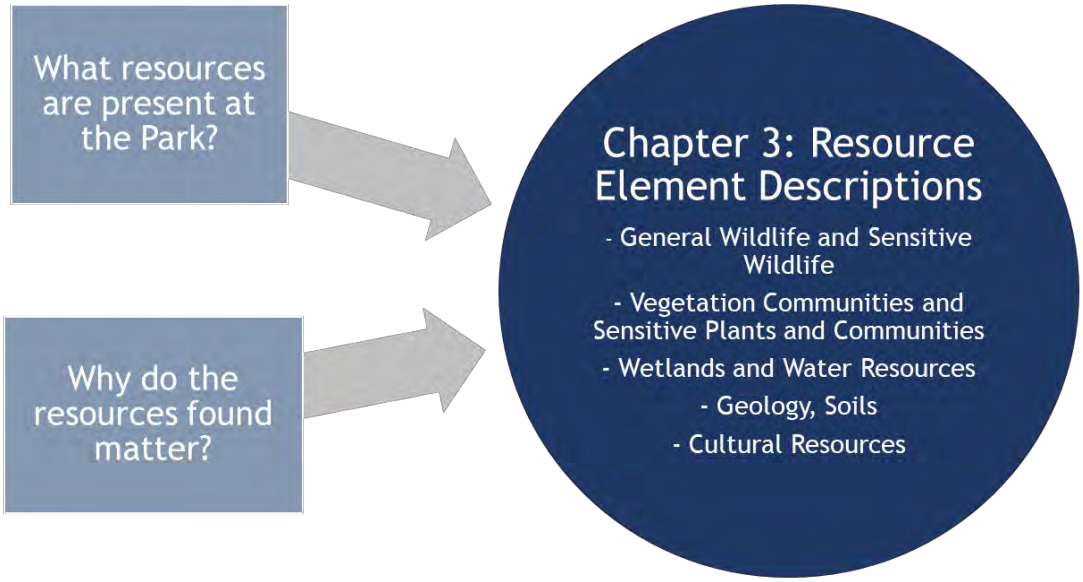
Cory Chick	Southwest Region Manager
Brett Ackerman	Southeast Region Manager
JT Romatzke	Northwest Region Manager
Mark Leslie	Northeast Region Manager

This User's Guide is a short introduction to how to use this Stewardship Plan. The User's Guide is meant for use by Park Managers, technicians, and other Park Staff.

The Stewardship Plan outlines goals, objectives, priorities, and implementation of these items. However, this plan is intended for use for the next 10 years, and it is inevitable that new issues will arise that are not directly addressed in this Plan. The Stewardship Plan aims to provide enough resources for Park staff to resolve future resource issues not specifically identified in this Plan. Resource Stewardship staff are always available as a resource for project ideas that Park staff develop as a result of this plan.

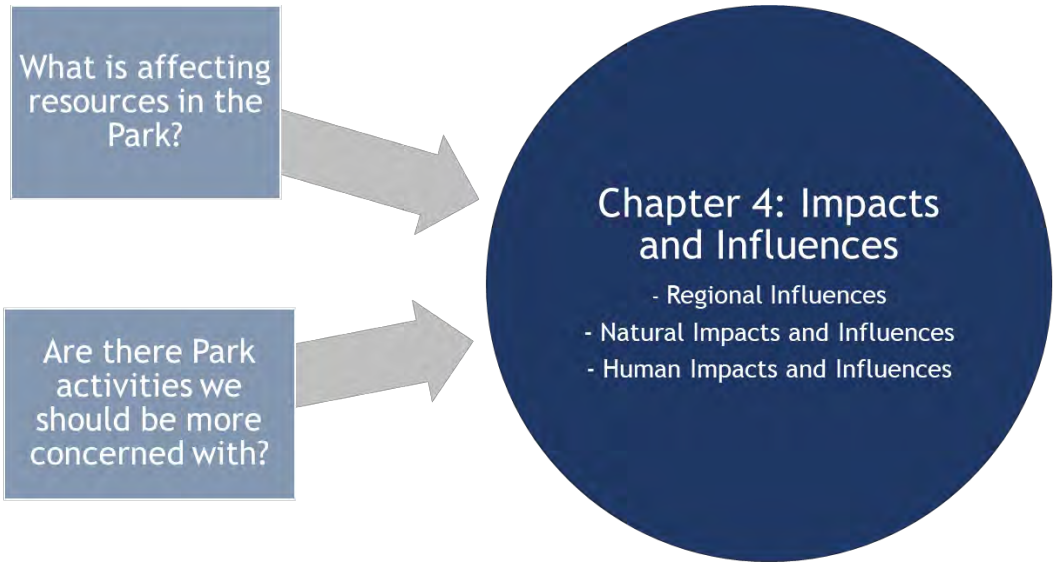
Stewardship Plan Outline

This section provides a brief overview of where to find information in this Plan based on questions Park staff may have.



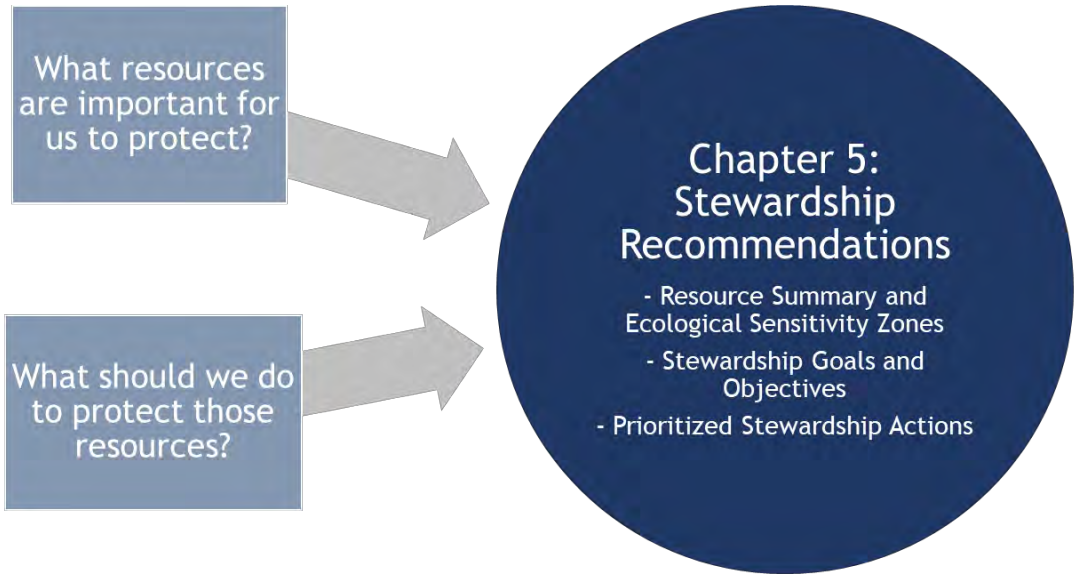
Chapter 3 : Resource Element Descriptions provides information of what resources are present in Golden Gate Canyon State Park based on knowledge gained from resource surveys, monitoring, institutional knowledge, and computer analyses conducted over several years. Chapter 3 summarizes findings, resource conditions, and highlights resources that are significant to Golden Gate Canyon State Park. Within Chapter 3, subsections are provided on the following resources:

- General Wildlife and Sensitive Wildlife
- Vegetation Communities and Sensitive Plants and Communities
- Wetlands and Water Resources
- Geology, Soils
- Cultural Resources



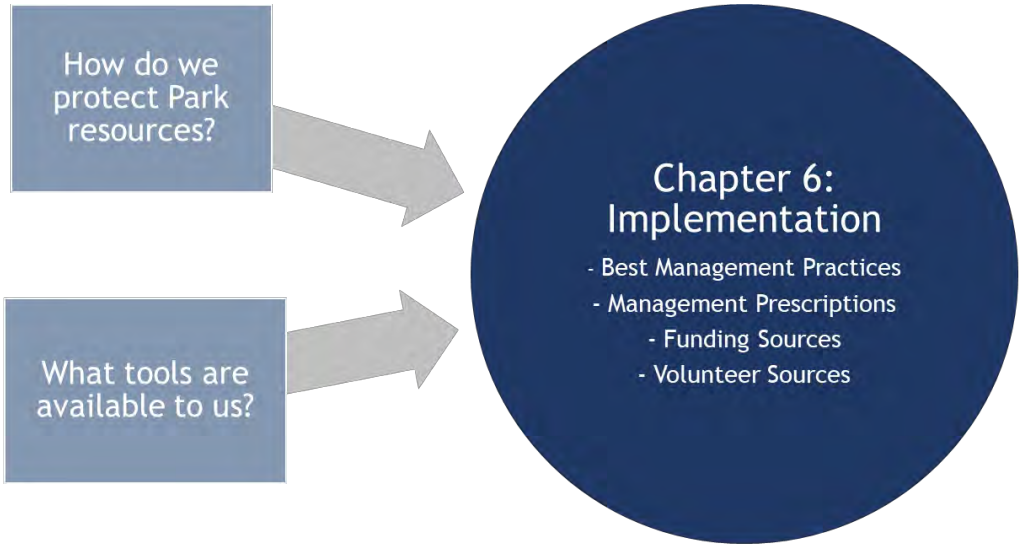
Chapter 4: Impacts and Influences provides information on what Park activities and influences outside of Golden Gate Canyon State Park are affecting the condition of resources present. It is imperative that the Park be able to provide recreational opportunities to visitors. However, some activities may affect the particular resources present at Golden Gate Canyon State Park more than others. Some topics discussed include population growth, pets, noxious weeds, and visitation, among many others. Within Chapter 4, subsections are provided on the following resources:

- Regional Influences
- Natural Impacts and Influences
- Human Impacts and Influences



Chapter 5: Stewardship Recommendations provides information on how to take the knowledge of the resources we have and use it to maintain or improve resource conditions in the Park. This chapter first summarizes the findings from Chapter 3, then identifies tangible goals for the Park, and provides a list of on-the-ground actions for how to achieve the goals. These actions are typically carried out in a collaborative way, with both Park staff and Stewardship staff involved. Within Chapter 5, subsections are provided on the following resources:

- Resource Summary
- Stewardship Goals and Objectives
- Prioritized Stewardship Actions



Chapter 6: Implementation provides information on how carry out recommended actions provided in Chapter 5. This chapter provides resources about management practices, management prescriptions, volunteer sources, and funding sources. The implementation chapter provides resources directly tailored to the Park. If information cannot be found in this chapter to address an issue at hand, the Stewardship Team can always be contacted to help develop a solution. Within Chapter 5, subsections are provided on the following resources:

- Best Management Practices
- Management Prescriptions
- Funding Sources
- Volunteer Sources

Stewardship Plan Examples

This section provides examples of how to use the Stewardship Plan to manage Park resources.

Example 1: Rare Plant in the Park

Scenario:

A rare plant was previously identified in the Park almost 20 years ago by Colorado Natural Heritage Program. However, no surveys have occurred since and therefore no occurrences have been documented in recent years. Habitat for the plant exists in the Park and has been improved over the last five years. Noxious weed control has increased and habitat restoration projects have occurred, making it more likely that the plant could be present in the Park.

Review the Stewardship Plan:

The Stewardship Plan addresses that the plant could occur in the Park but has not been found. It is a goal for the Park to protect the plant and potential habitat if found. Potential Actions that are provided in the Stewardship Plan include:

- Hire a contractor to conduct protocol-level surveys for the plant.
- Seek volunteers to monitor habitat areas of the Park for the plant during blooming season.
- Follow BMPs and Management Prescriptions for rare plant protection.

How to Implement:

- Contact the Stewardship Team, work together to hire a contractor to conduct surveys in the Park the following summer.
- If the plant is found, develop a rare plant monitoring program staffed by volunteers or Park employees. Work with the Stewardship Team to develop a monitoring form and protocol.
- Avoid the identified habitat areas during construction and development. Potentially temporarily close trails if the rare plant is present nearby.

Example 2: New Raptor Nest

Scenario:

A new raptor nest has been identified in the Park by Raptor Monitoring volunteers near a trail. This nest was not documented in the Stewardship Plan that was written five years ago.

Review the Stewardship Plan:

The Stewardship Plan does not specifically have this new nest documented in the plan. However, the plan does provide some information on raptor nests. Potential Actions that are provided in the Stewardship Plan include:

- Follow BMPs and Management Prescriptions for raptor nests.
- Continue the raptor monitoring program at the Park.

How to Implement:

- Contact the Stewardship Team, inform of the nest location and the trail nearby.
- Follow any BMPs or Management Prescriptions for raptor nest protection provided in the Stewardship Plan. This includes temporary trail closures and avoiding any development/construction near the raptor nest within a specified distance of the nest.
- Follow BMPs for how to successfully close a trail seasonally using signs and barriers. Enforce the trail closure.
- Encourage volunteers to continue monitoring the nest to document any significant life events, including young fledging. Once the nest is complete, the nearby trail may be reopened.

Example 3: Noxious Weeds

Scenario:

A noxious weed outbreak of Canada thistle has been identified by Park staff in a sensitive wetland area. The population is fairly small and contained but could spread if not addressed.

Review the Stewardship Plan:

The Stewardship Plan identifies that Canada thistle is present in the Park, but not in the area identified. Potential Actions that are provided in the Stewardship Plan include:

- Follow the Noxious Weed Management Plan.
- Follow BMPs and Management Prescriptions for noxious weeds in wetland areas.
- Monitor noxious weed populations in the Park.

How to Implement:

- Review the Noxious Weed Management Plan provided in the Stewardship Plan Appendix. Although this population of Canada thistle was not present at the time of the Plan, information is provided about how to treat the species in wetland areas.
- Have volunteers or Park staff monitor the population following treatment to ensure the methods employed are working and the population is under control.

About the Plan

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 resources, 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 Park resources. Through this process, we can continue to provide recreation opportunities to visitors in a natural setting.

Park Description

Golden Gate Canyon State Park lies approximately 25 miles west of downtown Denver in the foothills of the Rocky Mountains. The Park consists of 11,911 acres that lies across the boundary between the western edge of Jefferson County and the eastern edge of Gilpin County. Elevations range between 7,280 feet at eastern portion of the property where Ralston Creek leaves the property to 10,388 feet at the top of Tremont Mountain.

The Park was created when the state of Colorado made its first land purchases in the 1960's. Currently, the majority of the Park is surrounded by private lands. Arapaho National Forest land lies to the north of the Park. Ralston Creek State Wildlife Area is present to the southeast of the Park and is operated by CPW. Green Ranch, located to the west of the main Park area, is considered part of the Golden Gate Canyon State Park but is only currently open for limited elk hunting during hunting season.

Resource Summary

The first step in developing comprehensive stewardship strategies is to identify the resources and values that are present in the Park and prioritize resources for conservation and protection. The following section provides a brief overview of the many resources found in Golden Gate Canyon State Park and links to sections for more information.

Wildlife

- Five herptile species have been observed in the Park, and include smooth green snake, tiger salamander, western chorus frog, western terrestrial gartersnake, and American bullfrog. Other native herptile species that have a high likelihood of occurring in the Park include boreal chorus frog, prairie lizard, wandering gartersnake, and boreal toad. Northern leopard frog, prairie rattlesnake, bullsnake, milksnake, and North American racer could possibly occur in the Park, but are less likely to be present. Northern leopard frog and boreal toad are both federally-protected species.
- A total of 71 species of migratory and residential birds were recorded in the Park during bird surveys conducted in 2012. Twenty-three bird species of

conservation interest have the potential to occur in the Park and seven of these species have previously been documented during surveys.

- Raptor monitoring has occurred at the Park since 2012 and has historically documented nests for great-horned owls, northern goshawks, red-tailed hawks, and Cooper's hawks.
- Several fish species are stocked in the Park ponds by CPW including rainbow trout, brown trout, bluegill, and channel catfish.
- A 2020 inventory found 43 different butterfly species, making it one of the most species rich sites in the Colorado Front Range. Additionally, specific surveys have been conducted for Tolland fritillary (*Boloria selene tollandensis*) and Freija fritillary (*Boloria frija browni*), both of which are uncommon for the Park elevations, and therefore are a unique asset of the Park.
- Numerous mammal species use the Park for essential habitats including elk, mule deer, moose, mountain lions, and black bears. The federally-protected Preble's meadow jumping mouse has historically been trapped near the Park and designated Critical Habitat for the species can be found along Deer Creek. The Park also provides almost 3,800 acres of suitable habitat for Canada lynx, a federally-protected large mammal.

Vegetation

- The Park potentially provides habitat for nine rare plants and ten rare vegetation communities. Four of the rare plant species have been documented in the past and all ten communities have been recorded. Surveys for rare plants have never been conducted by CPW.
- The Park contains 29 distinct vegetation communities that were mapped according to the National Vegetation Classification System in 2015. Vegetation at the time was mostly ranked as in good to excellent condition.
- Noxious weeds are present throughout much of the Park and threaten native plants and communities. A total of 16 noxious weed species were identified during 2017 surveys and a Noxious Weed Management Plant was created to address the issue of noxious weeds.
- The Park contains 15 different forest communities in the Park that are actively managed for pests, disease, and wildfire. A Forest Management Plan was created in 2014 to address how to manage the Park's forests.

Water and Wetland Resources

- The Park contains numerous perennial streams, including Ralston Creek, Deer Creek, Nott Creek, Macy Gulch, and Smith Hill Gulch, all of which are part of the South Platte River Watershed. The streams in the Park provide important habitat for fish, amphibians, birds, and invertebrates and movement corridors for large mammals. Most of the streams are in good condition but some of the streams are considered impaired waters by the State of Colorado.
- Significant surface water resources in the Park include the Ranch Ponds, an unnamed pond in Forgotten Valley, Slough Pond, Kriley Pond and Dude's Fishing Hole. These ponds provide important aquatic habitat for stocked fish and

amphibians. Sedimentation of several of the ponds is an ongoing issue that should be addressed.

- Wetlands are found on the periphery of the ponds and streams and in depressional areas throughout the Park. They are important habitat for many wildlife species, including amphibians, birds, and invertebrates.

Geology and Soils

- Unique rock outcrops throughout the Park offer beautiful scenery for visitors to view and a variety of terrain for recreational activities.
- The Park contains unique geologic features that are highlighted in books about Front Range geology. Many nearby universities and geology clubs take field trips to the Park to view and study the features.
- A total of 48 soil types are present in the Park, with several considered to have a high erosion hazard ranking. These areas should be noted during construction activities.

Cultural Resources

- The Park contains six cultural sites eligible for protection under the National Register for Historic Preservation.
- The Park's unique cultural resource present an opportunity for education on the people who used to occupy the area where the Park now exists.

Impacts and Influences

Several factors influence the condition of natural and cultural resources at the Park. The primary impacts and influences on Park resources include, but are not limited to:

- Population Growth – The Jefferson County population is the fourth fastest growing county in the state, and visitation to the Park has correspondingly increased.
- Noxious Weeds – A total of 16 noxious weed species were discovered during the 2017 weed surveys. Noxious weeds greatly affect the ability of native plants and wildlife to thrive in the Park and degrade wildlife habitat.
- Visitation – As population growth continues in the Front Range of Colorado, more people visit the Park. Park visitation increased by 60 percent in 2019, which has impacted resources.
- Fire, Disease, and Infestations – Fire suppression has greatly impacted the structure of forests in the Park. Forestry management actions have been implemented, but the Park is still vulnerable to catastrophic fire events, disease, and pests from the overgrown forests.
- Drought – Drought threatens the health of vegetation communities, aquatic habitats, and wetlands present in the Park. The Park is currently considered to be in a moderate drought, but conditions may worsen with climate change predictions.

Stewardship Goals and Objectives

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

Wildlife

- Maintain use of the Park by general and sensitive wildlife species. Restore and improve habitat for sensitive wildlife species that are not currently present in the Park, such as Canada lynx, Preble's meadow jumping mouse, and the many bird species that could occur.
- Continue raptor monitoring and improve the program at the Park. Recruit volunteers and potentially utilize Stewardship Team technicians.
- 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. Continue to survey for bird species at least every five years. Implement appropriate temporary trail closures to protect nesting bird species.
- Evaluate the feasibility of restoring beaver populations to the Park. This species is native to the Colorado Front Range and could greatly improve water quality and wetland and riparian habitats in the Park.
- Improve fish habitat in the Park by dredging ponds and removing excess sediment.
- Document wildlife species and taxa that have not been inventoried for or inventories are out of date for.
- Promote a healthy forest ecosystem exemplifying more characteristics of forests subject to natural thinning processes. Follow recommendations provided in the Forest Management Plan (Appendix).
- Control and reduce the spread of noxious weed species to maintain and improve wildlife habitat quality. Continue to implement the Noxious Weed Management Plan (Appendix).
- Protect wildlife corridors and large tracts of contiguous habitat through collaborative programs and decisions.

Vegetation

- Maintain the existing diversity and improve the condition of plant communities, including mountain meadows and shrublands, willow carrs, coniferous forests, aspen woodlands, and wet meadows and shrublands. Encourage a high diversity of native species and minimize disease and infestations.
- Hire a contractor to conduct protocol-level surveys in habitat areas for the many sensitive plants species that could occur in the Park. Additionally, survey for the species prior to construction in habitat areas. Enhance habitat for rare plant species and communities by reducing non-native species cover.
- Preserve and protect the rare plant communities found in the Park.

- Keep Park development activities (new buildings, trails, Parking lots, roads, etc.) out of native plant communities and wetlands to the extent possible.
- Contain, suppress or eradicate occurrences of noxious weeds, as appropriate for each species and in compliance with the Noxious Weed Management Plan (Appendix). Prevent the establishment of noxious weed species that are not already present in the Park.

Water and Wetland Resources

- Maintain and potentially improve the water quality of the streams and ponds in the Park. Restore and maintain riparian vegetation along the many streams and the ponds to reduce erosion and subsequent sedimentation of water.
- Limit visitors using areas that are eroded and devoid of vegetation near waterways and ponds.
- Reduce the spread of noxious weeds in wetlands and riparian areas by continuing to implement the Noxious Weed Management Plan (Appendix).
- Wetlands were last delineated and assessed for condition and health in the Park in 1995 and at Green Ranch in 2004. Revisit and document water and wetland resources.

Geology and Soils

- 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.
- Limit sediment-laden runoff from Park roads and parking lots.
- Construct and maintain trails to prevent erosion.

Cultural Resources

- Limit public access to six eligible cultural sites within Park to preserve cultural artifacts.
- Avoid impacts to all cultural resources that have been recommended or determined eligible for listing on either the State or National Registers of Historic Places.
- Educate Park visitors about cultural resources through signage and interpretative materials.
- Maintain and preserve cultural resource sites and mitigate natural- and human-caused deterioration.

Prioritized Stewardship Actions

Prioritized Stewardship Actions are created from assessing current resource impacts, potential threats, resource conditions, and resource knowledge gaps. These actions

are subdivided into Resource Management and Conservation Actions, Resource Plan and Report Actions, and Resource Surveys and Monitoring Efforts. The following is a summary of actions for Golden Gate Canyon State Park:

Resource Management and Conservation Actions

- Implement Noxious Weed Management Plan
- Implement Forest Management Plan
- Seasonally close trails for raptors during nesting season
- Apply for Leave No Trace Gold Standard Certification
- Reclaim inappropriate social trails
- Conduct wetland restoration around Dude's Fishing Hole to improve amphibian habitat
- Identify the cause of pond sedimentation to improve fishing habitat and water quality
- Remove unused plastic erosion control materials and barbed wire
- Install nesting platforms for raptors
- Improve and add cultural resource signage
- Stabilize historic structures
- Review cultural sites for state listing status

Resource Plan and Report Actions

- Conduct a Visitation Study and create a corresponding report
- Assess trail conditions and create a Trail Management Plan
- Beaver Reintroduction / Management Plan

Resource Surveys and Monitoring Efforts

- Conduct a survey for rare/sensitive plants
- Conduct breeding and migratory bird surveys (every 5 years)
- Reinitiate raptor monitoring efforts
- Create an amphibian monitoring program
- Conduct invertebrate surveys
- Survey for bats and other small mammals
- Inventory wetlands and water resources
- Survey for peat accumulations at Green Ranch
- Conducted focused flammulated owl and northern goshawk surveys
- Monitor cultural resource sites annually

Implementation

The implementation section provides resources for accomplishing recommendations provided in the Goals and Objectives and Prioritized Stewardship Actions sections. The resources provided in this chapter are specifically tailored to natural and cultural resources that may be found in the Park. The following is a summary of actions for Golden Gate Canyon State Park:

- Best Management Practices – Best Management Practices (BMPs) are proactive, operational management techniques that avoid or limit adverse impacts to resources.
- Management Prescriptions – Management prescriptions are standardized actions and protocols that address specific issues or action items.
- Funding Sources – Effective implementation is contingent on the Park maintaining adequate financial resources necessary to initiate and follow through with recommendations outlined in this plan.
- Volunteer Sources – Volunteers are an excellent source of information and a way successfully implement Park goals, objectives, and stewardship actions.

Purpose of the Plan

The Golden Gate Canyon State Park Stewardship Plan (Plan) serves as the foremost guiding document for natural and cultural resource management at Golden Gate Canyon State Park. The Plan serves as a bridge between the qualitative statements of current and future desired conditions and the measurable goals and strategies determined through Park planning.

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 focus of the document is to:

- Summarize and organize resource data collected in the Park in order to identify the nature and extent of the natural and cultural resources present.
- Create guidelines to facilitate a better understanding of resources.
- Provide suggestions for accomplishing short- and long-term resource management objectives.
- Develop priorities for future resource surveys and monitoring.

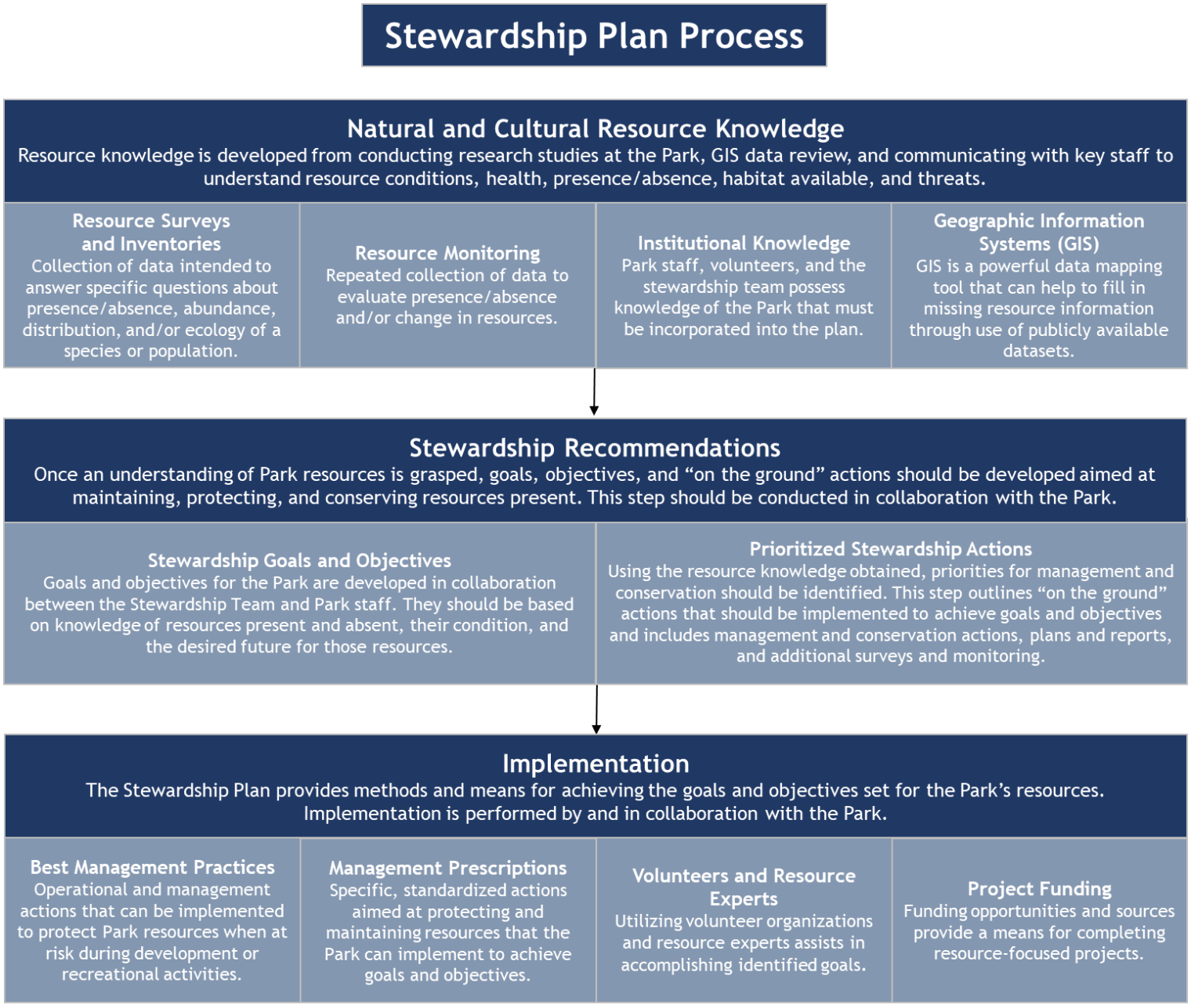
The team is tasked with identifying the nature and extent of the natural and cultural resources present at each Park, developing guidelines to facilitate a better understanding of these resources, and providing suggestions for short-term and long-term management. The process includes examining natural and cultural resources through field work, research, and collecting GIS data. Advice is provided to the Park staff in the form of a clear set of resource objectives, a list of actions to try to meet these objectives, and then actions, such as surveys and monitoring, to reach goals and objectives 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 make changes to the document during that interim period in order to keep it up to date. Park managers should regularly review the Plan to evaluate implementation progress. This includes annually reviewing the document at the beginning of each calendar year.

The actions, plans, or studies will require significant money and time to implement, and so they are prioritized (high, medium, low). 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 assist in finding resource specialists (contractors, academics, agency specialists) to accomplish some of the studies for plans for low cost. It may also be possible to get grants or other funding sources 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.

The graphic below provides an overall summary of the progression of this plan.



Mandate for the Stewardship Plan Process

The 2015 CPW Strategic Plan outlines the agency's mission, vision statement, goals, and objectives. This Plan presents a roadmap and understanding for where CPW is headed in the future. The Stewardship Plan is consistent with the following CPW-wide mission, vision and goals (as defined in the Strategic Plan) which are highlighted below.

Mission

CPW's mission is "to perpetuate the wildlife resources of the state, to provide a quality state park system, and to provide enjoyable and sustainable outdoor recreation opportunities that educate and inspire current and future generations to serve as active stewards of Colorado's natural resources" (C.R.S. 33-9-101).

Vision

CPW's vision is to be a national leader in wildlife management, conservation, and sustainable outdoor recreation for current and future generations.

Strategic Goals

CPW's Strategic Plan, finalized in November 2015, provides a roadmap for achieving the agency's vision and mission through concrete goals and objectives. The six CPW goals identified in the Strategic Plan are:

1. Conserve wildlife habitat to ensure healthy sustainable populations and ecosystems
2. Manage state parks for world class outdoor recreation
3. Achieve and maintain financial sustainability
4. Maintain dedicated personnel and volunteers
5. Increase awareness and trust for CPW
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."**

General Management Plan

The Golden Gate Canyon State Park Management Plan was last updated in 1997 and will be updated following the creation of this Stewardship Plan. The Stewardship Plan

provides a foundation for natural and cultural resource goals identified in the Management Plan.

The previous Management Plan identifies objectives related to resource protection, which are stated below.

- Protect and maintain the quality of the natural, cultural and scenic resources of the park for future generations.
- Foster an appreciation and understanding of the natural and cultural heritage of Golden Gate Canyon State Park.

Goals and Objectives of the Stewardship Plan Process

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 was originally created in 1999 based on the National Park Service planning handbook and The Nature Conservancy's planning process and was updated in 2020 based on CPW visions and goals for the stewardship process. Key CPW 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.

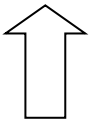
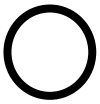
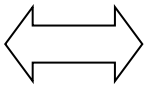
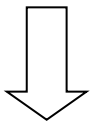
Baseline Resource Assessments

To effectively manage the natural systems, each Park must be aware of the significant resources present. Several baseline resource inventories have been conducted over many years to document wildlife, plant, water, wetland, cultural, and geological resources in the Park. These resource inventories are documented in the individual resource sections and needs for new inventories are discussed in detail in Chapter 5.

Resource Status, Trend, and Confidence Level

The status, trend, and confidence level symbols used in the natural and cultural resource condition tables in Chapter 3 are summarized in the following key. This system is based on the National Park Service Resource Stewardship Strategies. The color (red, yellow, green) symbolizes the current resource condition (significant concern, moderate concern, no concern). The arrow represents the trend in condition (improving, unchanging, declining). The thickness of the outside line represents the confidence level in the assessment. These conditions are based on those identified during resource surveys and assessments. Conditions and trends can be compared to what is "healthy" or ideal for the particular resource considering the location. For instance, if a grassland area is heavily infested with a new Canada thistle population, this area may be considered a significant concern that is deteriorating. However, if the same grassland is a monoculture of smooth brome that was seeded 50 years ago for grazing, it may be considered a moderate concern that is unchanging.

Table 1. Resource Condition Status, Trend, and Confidence Ratings.

Condition Status		Trend in Condition		Confidence in Assessment	
	Significant Concern		Improving		High
	Moderate Concern		Unchanging		Medium
	No concern, resource in good condition		Deteriorating		Low

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 ten years, a new stewardship plan will be necessary to update goals and objectives and to address current issues. Some important language that is unique to this plan includes:

- Stewardship Recommendations

    - Stewardship Goals and Objectives - Goals and objectives serve as the basis for land management activities in the Park. They provide direction to Park staff for the desired future of Park resources.
    - Prioritized Stewardship Actions - These action items aim to provide ways Park Managers, staff, and Resource Stewardship staff can help to achieve outlined goals and objectives.
        - Monitoring - The repeated collection of data to evaluate presence/absence and/or a change in resources. Monitoring includes frequently checking already identified resources and ensuring their presence continues and conditions remain stable or improve.
        - Surveys - A collection of data intended to answer specific questions about presence/absence, abundance, distribution, and/or ecology of a species or population. Surveys are usually conducted less frequently, are more focused, and most often require a biologist to conduct them.
- Implementation
    - Best Management Practices - Proactive, operational management techniques that avoid or limit adverse impacts to resources.
    - Management Prescriptions - Standardized actions and protocols for addressing specific natural or cultural resources issues.

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.

This section provides information on the regional setting in which Golden Gate Canyon State Park is situated.

Park Description

Physical Setting

Golden Gate Canyon State Park lies approximately 25 miles west of downtown Denver in the foothills of the Rocky Mountains. The Park consists of 11,911 acres that lies across the boundary between the western edge of Jefferson County and the eastern edge of Gilpin County. Elevations range between 7,280 feet at eastern portion of the property where Ralston Creek leaves the property to 10,388 feet at the top of Tremont Mountain. The approximate 3,000 feet of elevation gain is demonstrated by the large granite cliffs and rock outcrops found on the Park (Colorado Forest Management, LLC 2014). Lowland valleys and riparian areas contrast sharply with the steep slopes and cliffs of the uplands. Golden Gate Canyon State Park occupies an ecotone between the higher elevation lodgepole pine forests and the lower elevation ponderosa pine forests and meadows. Various creeks and intermittent drainages also add to the diversity in vegetation types. The majority of the park is a part of the Ralston Creek watershed with Ralston Creek, Nott Creek, and Deer Creek all flowing through the park into Ralston Creek. Ralston Creek makes its way to Ralston Reservoir, and eventually feeds into Clear Creek near west Denver. There are multiple ponds along Ralston Creek including Kriley, Slough, and Ranch Ponds. Only the very north portion of Green Ranch drains to Ralston Creek. The majority of Green Ranch is drained by Macy Gulch and Smith Hill Gulch directly to Clear Creek just south of Black Hawk (Colorado Forest Management, LLC 2014). The Park is chiefly surrounded by private property but is bounded by the Arapaho National Forest on the north side. Figure 1 displays the regional location of the Park.

Land Use and Land Ownership

The Park lies on land that has had a variety of owners and past uses. Past uses of the area were typical of the Front Range of Colorado. Following the relatively innocuous land use of the Native Americans, European settlement of the area began. Various activities occurred in the area surrounding the Park, ranging from fur trading, mining, homesteading, ranching, and bootlegging liquor that have all left their legacy in this area. The area was heavily logged during the late 1800's to supply timber and charcoal for mining needs. Many 160-acre parcels in the area were claimed for homesteading from 1860-1900. Because of the requirements of homesteading, houses were built, properties were fenced, and crops were planted in the area. However, due to the relatively harsh environment, many homesteaders found they needed more than 160 acres to survive. As homesteads were abandoned or sold, larger ranches began to emerge in the area that could better support a ranching lifestyle. These larger ranches, such as the Green, Harmsen, and the Strang Ranches are the ones that have created major parcels within the development of Golden Gate Canyon State Park.

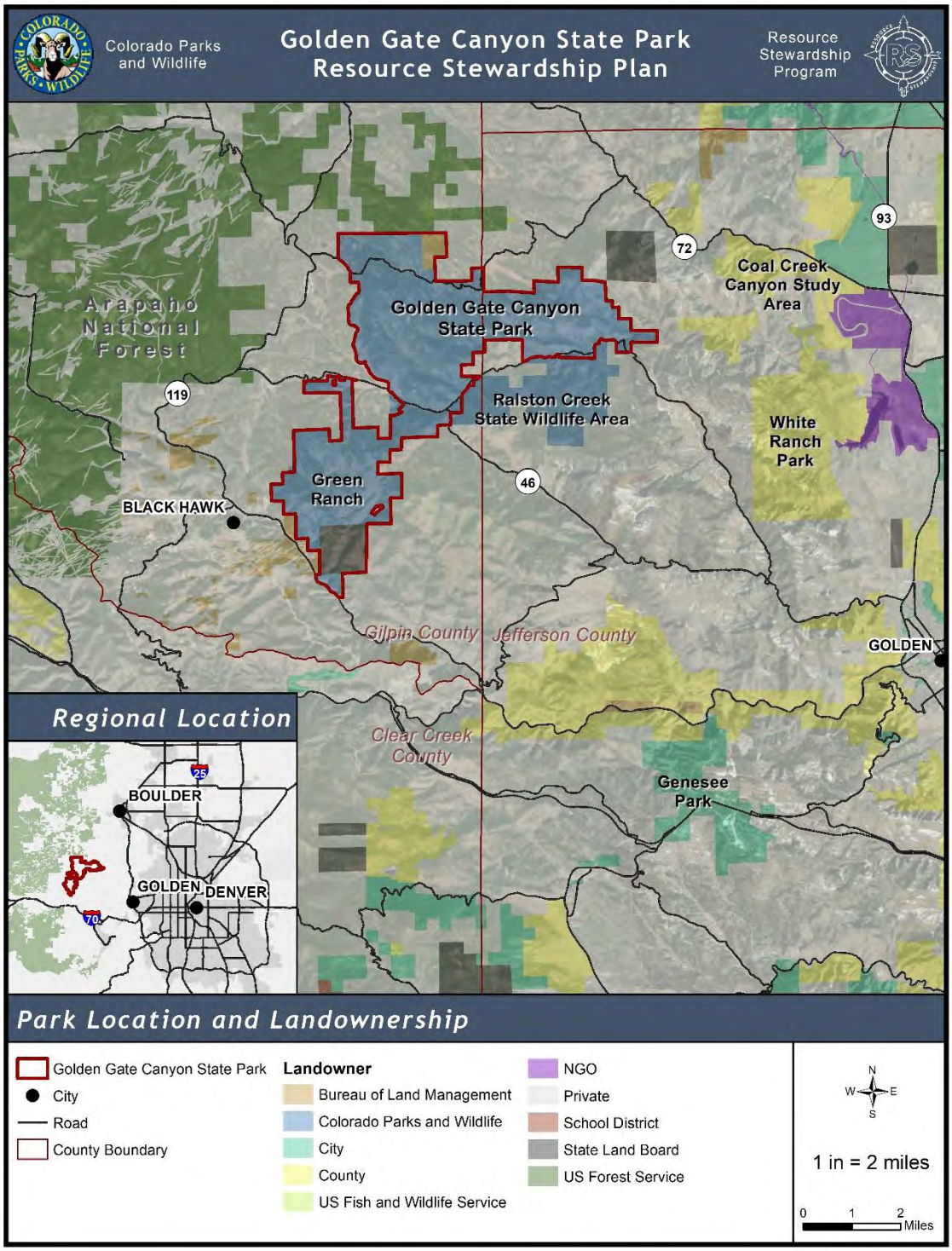
The Park was created when the state of Colorado made its first land purchases in the 1960's. By the end of the 1960's, the Park consisted of 4,608 acres. A total of 46 land

acquisitions were executed through 1995, when the acquisition of the Green Ranch was complete. Throughout these acquisitions, fairly few conditions were put on the purchased properties. The Nelson/ Gruchy property in the north central part of the Park was granted as a perpetual easement for public recreation purposes where the state can build roads, parking areas and the Nelsons could install pipes, conduits and wires on the property, but neither party can construct dwellings. The properties deeded by the Bandimeres and the BLM require a memorial marker and a marker signing the cooperation of the BLM, respectively, must be erected on these properties. The Green Ranch must be a place where disabled and older people are able to observe wildlife in its natural state, horseback riding on this property should only be on horses brought in from horse owners, limited hunting should be allowed, and the name 'Green Ranch' be preserved in memory of the family. Most property at Golden Gate Canyon State Park is presently under 'fee title.'

The various purchases and subsequent development of Golden Gate Canyon State Park is consistent with many of the surrounding communities' master plans in creating a network of recreational opportunities for residents as well as preserving valuable open spaces for wildlife. Many entities including Jefferson County Open Space and Gilpin County have considered linking together existing and future open space, trails, and roads between the various agencies and jurisdictions, and preserving the rural environment. The Arapaho and Roosevelt National Forest, which lies on the northern boundary of the park, also realizes the importance of preserving open spaces in this area for improving recreational opportunities and wildlife habitat.

Currently, the majority of the Park is surrounded by private lands. Arapaho National Forest land lies to the north of the Park. Ralston Creek State Wildlife Area is present to the southeast of the Park and is operated by CPW. Green Ranch, located to the west of the main Park area, is considered part of the Golden Gate Canyon State Park but is only currently open for limited elk hunting during hunting season. Hiking trails may be added to this area in the future.

Figure 1. Park Location and Regional Landownership Map.



Natural Setting and Ecoregion

Ecoregions reflect broad ecological patterns occurring on the landscape (LandScope America 2021a). In general, each ecoregion has a distinctive composition and pattern of plant and animal species distribution. Abiotic factors, such as climate, landform, soil, and hydrology are important in the development of ecosystems, and thus help define ecoregions. Within an individual ecoregion, the ecological relationships between species and their physical environment are essentially similar (LandScope America 2021a).

Photo 1. Elk are a species commonly found in the forests and mountain meadows of the Park.

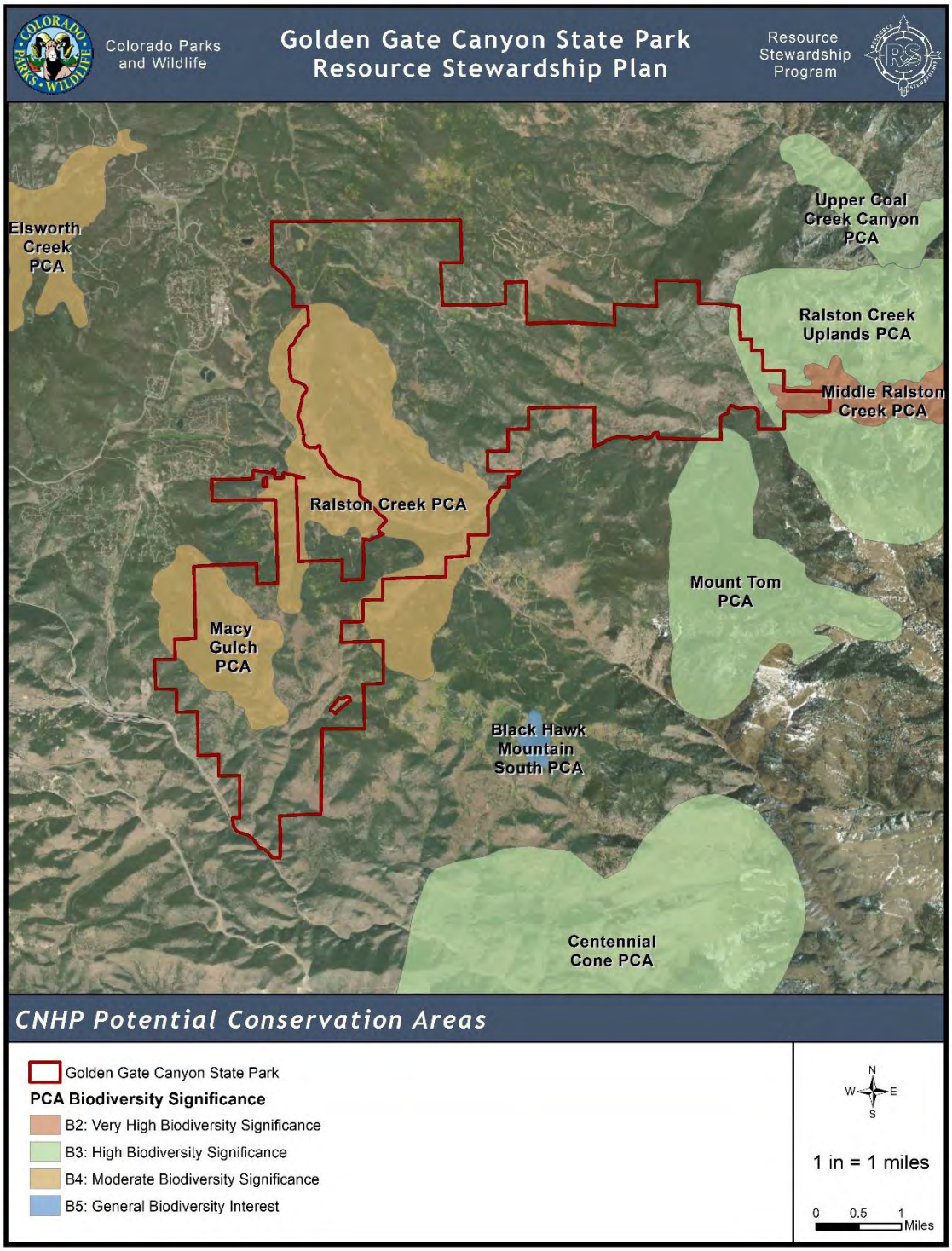
Source: CPW

Golden Gate Canyon State Park is located in the Southern Rocky Mountain Ecoregion. This Ecoregion overlaps primarily with Colorado but extends north into Wyoming and south into New Mexico. Due to the unique landscape and harsh climate, over 180 plant and animal species are known to be endemic and uniquely adapted to the region. The Ecoregion is known for high species diversity in butterflies and moths, mammals, birds, and several plant groups (LandScope America 2021b).

Golden Gate Canyon State Park is dominated by habitat types that are widespread across the Front Range. The forest types in Golden Gate Canyon State Park are composed of lodgepole pine, Douglas-fir, and ponderosa pine, with smaller patches of mountain meadow, juniper, and aspen stands. Golden Gate is dominated by forests, and thus supports healthy numbers of wildlife species that utilize forests. Common wildlife species found in the Park includes black bear, elk, mule deer, mountain lion, coyote, and numerous bird species.

Colorado Natural Heritage Program (CNHP) identifies Potential Conservation Areas (PCAs) in the state. PCAs highlight areas in the state contributing to Colorado's biological diversity. Their boundaries encompass rare species and natural plant communities and reports often contain valuable information on ecological conditions, unique ecological communities, and management recommendations. PCAs are assigned biodiversity significance ranks using a 1-5 ranking system with 1 being globally outstanding to 5 being locally significant. CNHP currently has over 1,800 mapped PCAs (CNHP 2021). The Park overlaps with four PCAs identified by CNHP identified as having moderate diversity (4), high diversity (3), and very high diversity (1). Figure 2 displays the location of these PCAs within the Park boundaries. These areas should be considered for future conservation efforts including preservation, restoration efforts, and development avoidance in order to best sustain and improve resources present. Details about the biologically significant resources found in these PCAs can be reviewed in the Appendix.

Figure 2. CNHP Potential Conservation Areas Map.



Climate

Climatic patterns influence the nature of geophysical resources with differences in moisture availability, length of growing seasons, and overall ecosystem development. The climate of the Park is typical of that of higher elevations in the Front Range of Colorado. Average temperatures range from a high of 78.2 degrees in July to a low of 17.9 degrees in December. Most precipitation falls in April and May, and the highest snowfall occurs in December, with snow covering the ground for most of the winter. Due to the vast elevation and aspect differences in the park, the climate can be very variable over a short period of time and over short distances. A summary of average annual temperature and precipitation is given for Golden, CO, which is about 15 miles east of the Park in Table 2. These data should be representative of the climate of Golden Gate Canyon State Park.

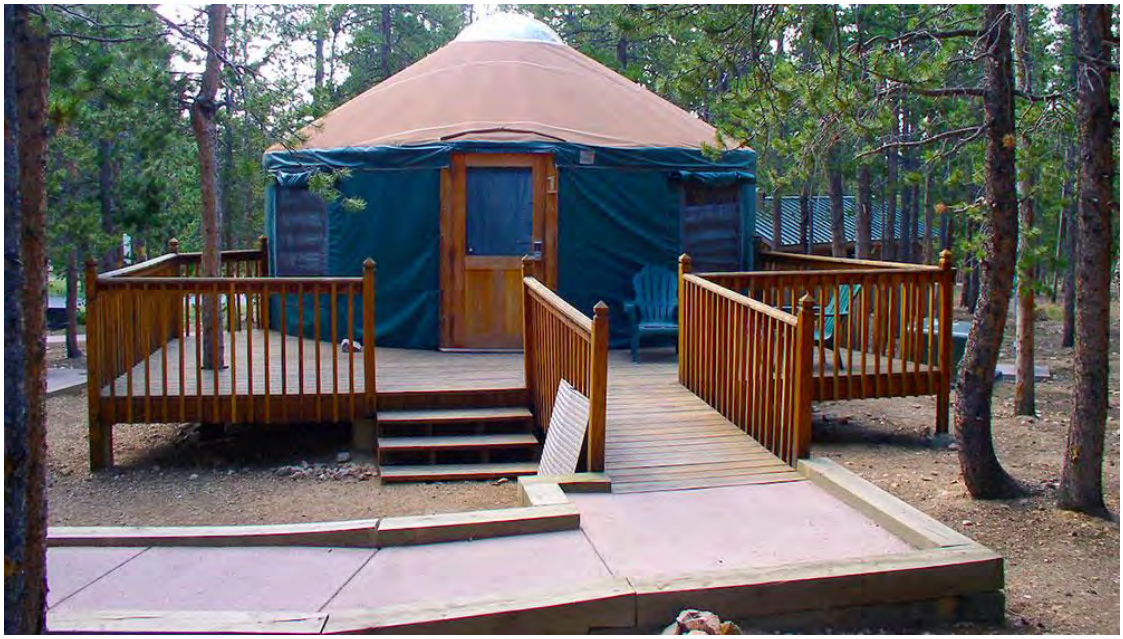
Table 2. Climate Data for Golden, Colorado.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Max Temp. (F)	39	39	49	50.9	58.9	70.4	78.2	77.4	69.0	59.3	49.5	37.8	56.5
Avg. Min Temp. (F)	19.2	19.6	28.2	30.1	38.3	47.9	56.5	55.2	47.1	38.4	28.5	17.9	35.6
Avg. Total Precip. (in.)	1.07	1.55	1.92	3.93	3.42	2.00	2.44	1.58	1.29	1.69	0.83	1.97	23.69
Avg. Total Snowfall (in.)	15.5	19.1	18.6	24.8	7.1	0	0	0	0.5	6.2	7.6	30.4	129.6
Source: (WRCC 2021)*, Length of record for data is 1989 - 2016, Station 053387.*													

Park Recreational Activities

Golden Gate Canyon State Park offers a variety of recreation opportunities within an hour's drive of the Denver Metro Area. Over forty miles of multiple-use trails await the outdoor enthusiast, providing access to high mountain meadows, lush streamside corridors, rocky peaks, and dense forest. Overnight accommodations range from the Harmsen Ranch Guest House, to tent and RV sites, to rustic backcountry sites with no amenities. The Park has two main campgrounds, Reverend's Ridge (97 sites) and Aspen Meadows (35 sites). First class campgrounds, picnic areas, trails, and fishing areas are nestled within nearly 12,000 acres of semi-wilderness. Panorama Point Scenic Overlook and group facility offers spectacular views of over 100 miles of Colorado's Continental Divide throughout the year. Trails are present throughout the Park and total over 35 miles. Sportsmen of all ages and abilities will find numerous hunting and fishing opportunities within the boundaries of this spectacular state park (CPW 2020a). The Park also provides 125 picnic sites throughout the Park that are first-come first-serve and facilities to host weddings.

Photo 2. The Park contains two yurts that visitors can reserve.



Source: CPW

3.0 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 is discussed, surveys completed for the resource are listed, and the resource conditions are summarized in terms of the resource status, trend, and confidence levels discussed in the previous section. The Discussion and Conclusions section describes the ideal condition of the resource in the future, any goals and objectives for the resources, and the resource potential trajectory based on the current conditions. Each resource is then evaluated in terms of what is needed in order to achieve the desired future condition. Prioritized Stewardship Recommendations are found in Chapter 5. The significant resources found at the Park are summarized below.

- Wildlife
- Vegetation
- Wetlands and Water Resources
- Geology and Soils
- Cultural Resources

Wildlife

Resource Summary

Significant Features

- The Park is adjacent to several protected lands and provide a contiguous landscape for long-ranging mammals such as elk, mule deer, black bear, moose, and mountain lions.
- Forest communities dominate the Park and include lodgepole pine, Douglas-fir, aspen, and ponderosa pine. These forest types are common on the Front Range, and support many of the wildlife species found at the Park.
- Approximately 40 sensitive species could occur, and several have been documented over the years. Habitat for federally-protected Preble's meadow jumping mouse, Canada lynx, and boreal toad exists in the Park although they have not been documented.
- Several perennial drainages provide well-developed willow and riparian areas that numerous wildlife species require for foraging and migration.

Threats

- Noxious Weeds - These non-native 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 abundance and diversity.
- Development - Growth and development are occurring surrounding the Park, leading to decreased habitat quality and increased habitat fragmentation.

General Wildlife

Description

Golden Gate Canyon State Park provides habitat for many species of wildlife that inhabit aspen, lodgepole pine, Douglas-fir, ponderosa pine, mountain meadows, wetland habitats and ponds and lakes. A wildlife species list for the Parks can be found in the Appendix. Knowledge of species and habitats that occur in the Park is a result of conducting surveys and monitoring that serve as the foundation for this Stewardship Plan and for CPW's ability to conserve resources at Golden Gate Canyon State Park. Table 3 below lists the surveys and monitoring efforts that have been conducted related to General Wildlife Species. Sections following provide information about specific taxa and associated habitats that are known in the Park based on these efforts. Chapter 5 discusses future survey and monitoring effort needs for the Parks based on those that have been conducted.

Table 3. List of Surveys and Monitoring Conducted for General Wildlife at Golden Gate Canyon State Park.

Resource	Description	Years	Performed by
Wildlife Survey Report	A quantitative wildlife-sign survey was conducted throughout the Park and Green Ranch.	2002	Heather Brown, One Earth Consulting
Tolland fritillary *(Boloria selene tollandensis)* Field Study	Marked and released silver bordered fritillary to determine the population size and how long their flight period lasted.	2004-2006	Barbara Bartell
Freija fritillary *(Boloria freija browni)* Field Study	Capture, mark, release and recapture study in the Park.	2008	Barbara Bartell
Breeding and Migratory Bird Surveys	Breeding and migratory bird point counts were visited 3 times throughout the summer and all birds heard or seen were documented.	2012	Dave Hallock, Earthwork Conservation Planning
Herpetological Habitat Survey	Desktop review, habitat surveys, and presence/absence herptile surveys in suitable habitat	2012	ERO
Herpetological Species Survey	Surveys conducted in wetland and riparian areas on foot.	2013	Resource Stewardship Team
Raptor Nest Surveys and Monitoring	The Park has been monitored by volunteers for raptor occurrences and nests in accordance with Raptor Monitoring Guidelines (Appendix).	2012 - 2017	Volunteers
Herpetological Species and Habitat Survey	Visual encounter and road cruising surveys conducted in habitat areas.	2017/2018	Adaptation Environmental Services
Butterfly Survey	Visual encounter, capture and DNA sampling	2020	Paul Opler

Golden Gate Canyon State Park is dominated by habitat types that are widespread across the Front Range. The forest types in Golden Gate Canyon State Park are composed of lodgepole pine, Douglas-fir and ponderosa pine, with smaller patches of mountain meadow, juniper and aspen stands. What makes the Park unique with respect to wildlife is the size of the property. Visitors can experience all of the major forest habitat types and have the opportunity to see most of the wildlife species found on the Front Range of Colorado in one location. Golden Gate is dominated by forests, and thus supports healthy numbers of wildlife species that utilize forests. Black bear, elk, deer, pine squirrel, pine marten, long-tailed weasel, and numerous bird species call the forests of Golden Gate home.

The Park's large meadow systems are important for elk and deer, but also support mice species and their predators such as great-horned owl, red-tailed hawk, coyote, butterfly species, and western garter snake. Adjacent to many of these meadows are various riparian systems, including intermittent streams, perennial streams, and large wetland systems. As the Front Range has somewhat limited water supplies, the riparian systems are heavily utilized by both upland wildlife species as well as more wetland obligates such as chorus frog, and possibly northern leopard frog.

Amphibians and Reptiles

Eighteen species of amphibian have been documented in Colorado. Colorado amphibian species have been found in every ecological zone within the state. The greatest diversity of amphibians occur within the eastern plains and western valleys. Many amphibians inhabit areas near wetlands and areas containing a water source throughout much of the year. A few species (spadefoots and toads) that are able to tolerate extended dry periods may be found considerable distances from water (ERO 2013).

Five herptile species have been observed in the Park, and include smooth green snake, tiger salamander, western chorus frog, western terrestrial gartersnake, and American bullfrog (Triece et al. 2019, ERO 2013). Other native herptile species that have a high likelihood of occurring in the Park include boreal chorus frog, prairie lizard, wandering gartersnake, and boreal toad. Northern leopard frog, prairie rattlesnake, bullsnake, milksnake, and North American racer could possibly occur in the Park, but are less likely to be present. Northern leopard frog and boreal toad are both federally-protected species. and are discussed in more detail in the Sensitive Wildlife Section.

Western chorus frogs were identified in the Park during surveys conducted in 2005 and 2006 for boreal toad (ERO 2005, 2006). According to Park staff, some developed areas in the Park including the visitor center, picnic areas, and restrooms have been inhabited by tiger salamanders (ERO 2013). Surveys conducted in 2018 documented the presence of American bullfrog and western terrestrial gartersnake. American bullfrog is a non-native, invasive amphibian and efforts should be made to eradicate the species from the Park to protect native wildlife, including the rare species, northern leopard frog (Triece et al. 2019). However, this effort will require adequate planning and may require the creation of a statewide strategy before action is taken. Suitable removal methods and areas for implementation must first be identified by state wildlife officials and herptelogists.

Birds

Golden Gate Canyon State Park supports a diverse assemblage of migratory and breeding birds. A mix of resident, short-distance migrants, and neotropical migratory birds are present. The composition of the breeding bird community in the Park reflects the habitat, which is dominated by coniferous forests and woodlands with patches of aspen, meadow, riparian, and rock outcrops. Well-developed riparian areas are found along Ralston Creek, Deer Creek, Nott Creek, Macy Creek, and their tributaries.

Breeding and migratory bird surveys were conducted in 2012 when 24 point count locations were established. During the survey, a total of 71 species of migratory and residential birds were recorded in Golden Gate, with 25 of which confirmed to breed on Park property. A total of 157 species could potentially be seen in the Park, of which 122 are documented as being observed in the Park (Ebird, surveys, etc). There are 113 potential nesting species in the Park, based on habitat availability. It is likely that many more have been confirmed as nesting, but Park records do not distinguish between confirmed or possible breeding and Ebird records do not indicate confirmation of breeding (Hallock 2012).

Common bird species include broad-tailed hummingbird, warbling vireo, ruby-crowned kinglet, dark-eyed junco, and American robin (Hallock 2012). The greatest diversity of bird species was found at locations with more complex, diverse vegetation. Many of these areas were found along well-developed riparian areas near permanent creeks with cottonwoods, willows, and aspen trees (Hallock 2012).

Raptors

Raptors and owls were documented during the migratory and breeding bird surveys conducted in 2012. Surveyors documented an active red-tailed hawk nest in Green Ranch, red-tailed hawks in other areas, an active great-horned owl nest, great-horned owls calling in other locations, a calling flammulated owl, a calling northern saw-whet owl, and a Cooper's hawk (Hallock 2012). Flammulated owls are a Colorado Species of Greatest Conservation Need and are discussed in more detail in the Sensitive Wildlife Section.

Photo 3. A saw-whet owl was documented in the Park calling near Nott Creek during the 2012 bird surveys.

Source: Cornell Lab of Ornithology

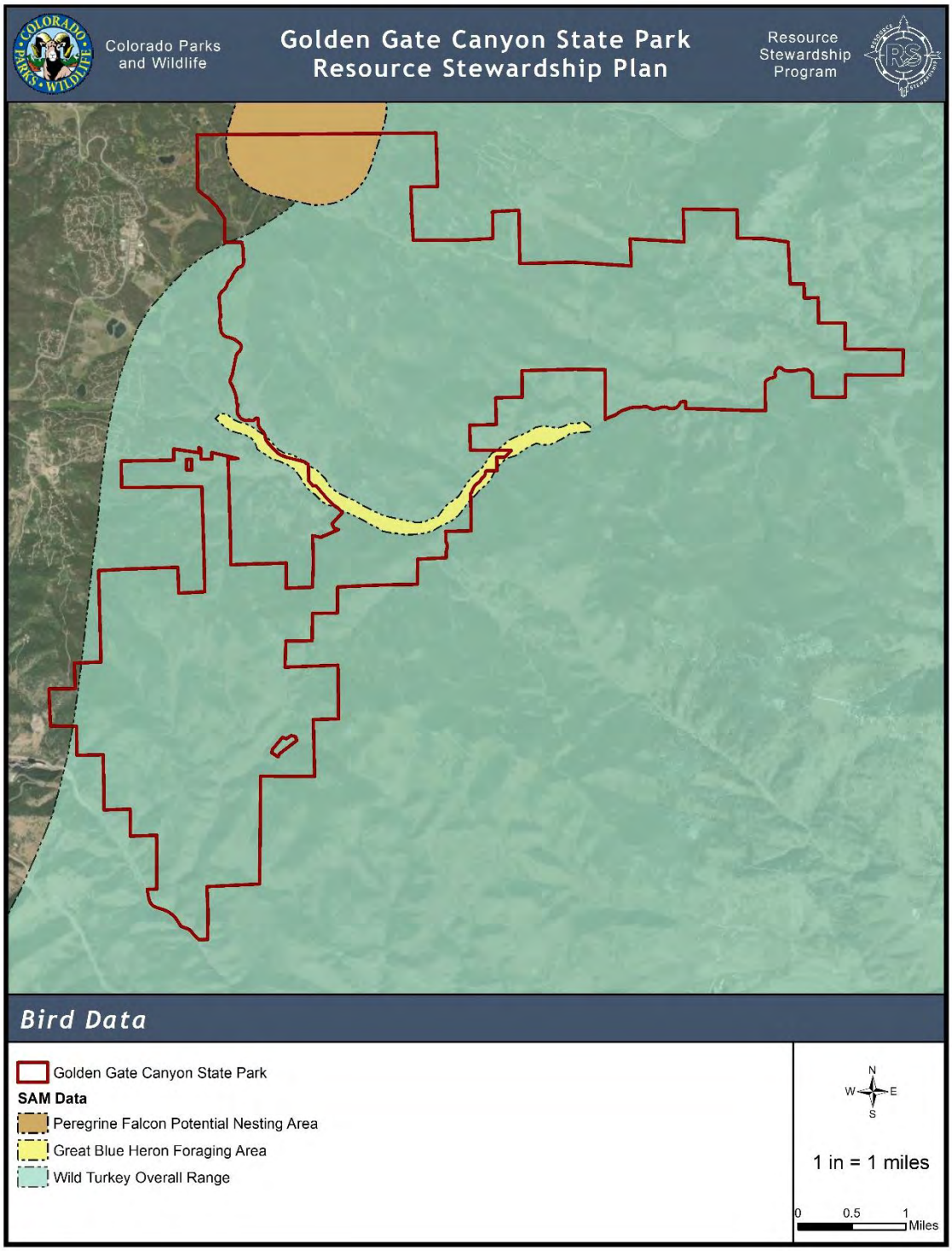
Raptor monitoring has occurred at the Park since 2012. The most recently documented raptor nest is a Cooper's hawk nest in Green Ranch that fledged one individual. In 2017, bald eagle, red-tailed hawk, American kestrel, and northern goshawk were all observed in the Park. Turkey vulture, sharp-shinned hawk, Cooper's hawk, rough-legged hawk, great-horned owl, and prairie falcon were also observed in the Park in years past. Great-horned owl, northern goshawk, and red-tailed hawk have all been observed to nest in the Park. The locations of the nests documented can be seen on Figure 3. Several nests have been documented in the past and have since

been destroyed and are no longer present. CPW Species Activity Mapping (SAM) data for peregrine falcon nesting overlaps with the Park (Figure 3).

Game Birds

Game bird species documented in the Park include dusky grouse and wild turkey. Neither species was documented on the 2012 bird survey, but they have been recorded on Ebird. CPW SAM data for wild turkey overall range overlaps with the Park (Figure 3).

Figure 3. Bird Data Map.



Fish

The Colorado Division of Wildlife actively stocks the Parks ponds including Kriley, Slough, Dude's Fishing Hole, and Ranch Ponds. Rainbow trout are the dominant stocked species, but channel catfish, bluegill, and brown trout are planned to be stocked in 2021 (Table 4).

Brook trout can be found in many of the perennial creeks. Brook trout were introduced to Colorado in 1872 and throughout much of the mountainous areas of the United States from its original habitats from Minnesota to the east. Brook trout favor swift running cold water streams, and have proven to be very competitive in Colorado, pushing out native cutthroat populations. As brook trout spawn in the fall, and native cutthroat trout spawn in the spring, brook trout fingerlings have earlier hatching and development than native cutthroat trout.

Rainbow trout are native to coastal streams and lakes of the western United States and Canada, but have been widely introduced to cold waters across the U.S. Rainbow trout eat aquatic invertebrates, as well as any unlucky insect to fall into the moderately to swift moving streams they prefer. Rainbow's spawn in June in Colorado, but the park has only a few suitable spawning areas. Trout populations are heavily fished by visitors, thus stocking is necessary.

With the extensive willow establishment along Ralston Creek, the aquatic habitat is in excellent condition to support fish species. Every fall, the willows drop their leaves into the water, providing the base food source for the aquatic food chain. The willows also keep the waters at a cool, constant temperature, and provide cover from predators such as raccoon, great blue heron, and black bear. Throughout the Park, the willow communities are in excellent condition.

Table 4. 2021 Fish Distribution Schedule.

Water Body	Fish Species	Number
Dude's Fishing Hole	Brown trout	500
Kriley Pond	Rainbow trout	7325
Ranch Pond Lower	Bluegill	75
	Channel catfish	25
Ranch Pond Upper	Bluegill	225
	Channel catfish	50
Slough Pond	Rainbow trout	2425
Source: (CPW 2021a)		

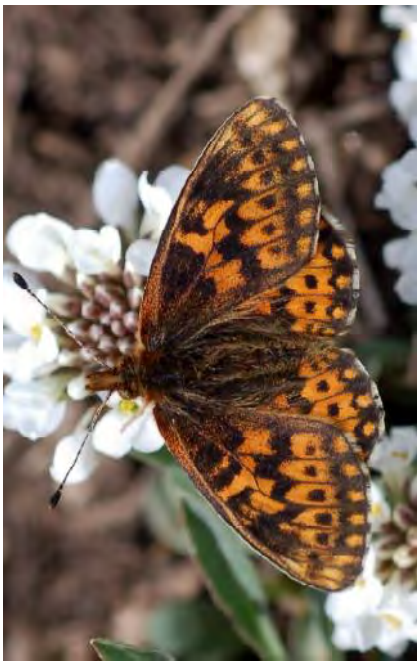
Invertebrates

Several butterfly surveys have been conducted in the Park over the years. Surveys were conducted for Tolland fritillary (*Boloria selene tollandensis*) and Freija fritillary (*Boloria frija browni*). Both studies involved capturing individuals, marking them, and

releasing them. The two butterfly species are uncommon for the Park elevations, and therefore are a unique asset of the Park (Bartell 2004, 2005, 2006, 2008). Additionally, a spider survey was conducted in the past, but this report could not be located for this plan (CPW 2005). A recent survey of butterflies was completed in 2020 and found a very high diversity of species. A total of 43 species were documented, making the Park one of the richest sites in the Front Range for butterflies. Twenty-two individuals were taken for DNA sequencing and study at the Utah Southwestern Biomedical Research Institute (Opler 2020).

A comprehensive butterfly species list was created for the Park and is included in the Appendix.

Photo 4. Freija fritillary is a butterfly species that has been documented at the Park.



Source: Barbara Bartell

Mammals

Species that inhabit Golden Gate Canyon State Park are common throughout the mountains of the Front Range. Some of these species are: mule deer, elk, coyote, bobcat, mountain lion, moose, black bear, long-tailed weasel, yellow-bellied marmot, pine squirrel, deer mouse, red-backed vole, pine marten, porcupine, badger, snowshoe hare, mountain cottontail, golden-mantled ground squirrel, chipmunk, and northern pocket gopher among others.

Golden Gate is unique in that it provides year-round habitats for a sizeable elk herd. Because of the low human use levels in Green Ranch, elk utilize the area quite heavily for calving and winter range. Evidence of large and small mammal use was documented during a summer-long wildlife species distribution study conducted in 2020 where 30 wildlife cameras were distributed throughout Green Ranch in different habitat types.

Beaver

Beavers have not been observed regularly in the area for some time. Recent observations have occurred on the lower end of Smith Hill Road, near Highway 119 in Green Ranch (Dornbrock 2021). Historically, the species was trapped and removed from the Park. Beavers are natural components of the ecosystem in Colorado and without them present, the land suffers. Beavers occupy habitats adjacent to water with abundant willow, aspen, or cottonwoods (Armstrong, et al. 2011).

Beavers are one of only a few animals that have the ability to modify the environment for their benefit, constructing dams, lodges, and canals to create a home that will afford protection from predators and provide a self-sustaining food supply. By constructing dams across flowing streams, beavers impound water, cause localized flooding and temporarily destroy a portion of the landscape. This flooding transforms former wetland habitat into aquatic habitat and converts some upland areas into wetlands. Tree cover is often greatly reduced in such areas due to a combination of flooding and felling by beavers for use as food and building materials (CPW 2003).

Though these activities temporarily destroy habitat, they soon affect positive changes that increase the diversity and productivity of the area. Numerous studies show that beaver activities provide benefits to natural systems by slowing and storing floodwaters, removing pollutants, increasing the amount and availability of nutrients, raising plant productivity, elevating the water table, and creating habitat for a greater diversity of plants and animals, especially compared to an unimpounded section of stream (CPW 2003).

Beaver presence at the Park may offer a solution to the sedimentation issues in the ponds and streams that are a result of erosion. Beaver reintroduction is underway on some Boulder County Open Space properties. Current projects could be used as an example of how to reintroduce beavers to Golden Gate Canyon State Park. A discussion of reintroducing beavers to the Park can be found in the Prioritized Stewardship Actions and Management Prescriptions Sections.

Black Bear

The Park provides excellent black bear habitat. Bear on the Front Range are most often associated with riparian draws where lush vegetation can support them. Upland forest types are used intermittently, but do not provide the amount of food needed. As long as Golden Gate has healthy riparian and shrub systems, black bear populations will do well in the area. Bear will always be in potential conflict with visitors, especially along densely vegetated riparian trails and around campgrounds. Black bears were documented frequently at Green Ranch during the wildlife camera species distribution study conducted in 2020. The species was noted in almost all habitat types present. Only one black bear cub was documented on cameras throughout the summer, indicating the species may not breed frequently on the property (Belmar 2020).

Photo 5. A black bear documented in a willow carr/aspen woodland at Green Ranch on a wildlife camera in 2020.

Source: Belmar 2020

The CPW SAM database maps black bear summer concentration area overlaps with the far east and west sides of the Park and a fall concentration area overlaps with the west side of the Park. The entire Park overlaps with black bear overall range. Figure 4 displays range areas for black bear.

Photo 6. Two mountain lions documented in a willow carr/aspen woodland at Green Ranch on a wildlife camera in 2020.

Source: Belmar 2020

Mountain Lion and Bobcat

Mountain lion habitat is also present throughout the Park. In Colorado, they are most abundant in foothills, canyons or mesa country. They are more at home in brushy areas and woodlands than in forests or open prairies (CPW 2017a). Golden Gate Canyon provides habitat for the species along riparian corridors that act as migration routes, ponderosa pine woodlands, mountain mahogany shrublands, and rocky outcrop areas. CPW SAM data mountain lion overall range overlaps with the entire Park (CPW 2019a).

Bobcats are present in roughly the western two-thirds of Colorado, but may be found throughout much of the state (Armstrong, et al. 2011). The species prefers rocky, broken terrain of foothills and canyonlands with pinyon-juniper woodlands and montane forests. However, they may occupy a variety of habitat types. Much of their diet consists of rabbits, so they often can be found where this prey item occurs. The species will consume a variety of other items, including mice, chipmunks, squirrels, hares, porcupines, birds, deer, amphibians, and even crayfish (Armstrong, et al. 2011).

Elk and Mule Deer

Elk and mule deer are able to thrive on the Park lands. Elk are habitat generalists and use most of the habitat available within the Park for various purposes. Foraging, escape, and security habitat all exists within different vegetation zones for the species. Water availability also enhances the habitat for this species, with the perennial stream, Macy Gulch, and a few ephemeral streams in the Park. Females select calving grounds with cover, forage, and usually within 200 meters of water (Armstrong, et al. 2011). Golden Gate Canyon State Park and Green Ranch have been documented to contain considerable elk herds. The 2005 Resource Stewardship Plan calls attention to aspen stands in poor condition and lack of new aspen regrowth from elk chewing off bark on older trees and grazing on younger trees (CPW 2005). Since the Stewardship Plan, a hunting program at Green Ranch has been implemented that allows approximately 70 permitted hunters a season to use the property. Additionally, a 2014 Forest Management Plan addresses aspen health and some forest management activities have been implemented to restore the impacts of elk on forest communities (Colorado Forest Management, LLC 2014).

Mule deer are present throughout all of Colorado, in a range of habitat types. Mule deer use habitat from grasslands to alpine tundra, but most preferred habitat is shrublands with varied terrain (Armstrong, et al. 2011). Since mule deer are habitat generalists, they can use much of the diversity of habitat the Park contains.

Individuals make seasonal movements, summering at higher elevations and wintering at lower elevations (Armstrong, et al. 2011).

The CPW SAM database maps elk overall range, migration routes, production areas, summer range, and winter concentration area and range as overlapping with the Park. Mule deer overall, winter, and summer range overlap with the entire Park. Mule deer winter concentration area overlaps with the western-most part of the Park (CPW 2019a). Figure 4 displays range data for these species.

Elk herds at the Park are part of the E-38 herd and Game Management Unit (GMU) 38 (Huwer 2005). Mule deer herds at Green Ranch are part of the D-27 herd and GMU 38 (Huwer & Kraft 2012). A report for E-38 and D-27 herds can found in the Appendix (CPW 2019b). Hunting is permitted within Green Ranch for elk during hunting season.

Moose

Moose are established in several areas of Colorado, including Middle Park, the upper reaches of Laramie and Cache La Poudre Rivers, and Rocky Mountain National Park. Sightings are frequently documented in South Park, near Leadville, near Gunnison, near Yampa, and west of Denver metro area. Moose were reintroduced to Colorado in 1978, and prior to that, individuals of the species would wander into the northern part of the state from Wyoming(Armstrong, et al. 2011).

Photo 7. A moose calf documented in a willow carr at Green Ranch on a wildlife camera in 2020.

Source: Belmar 2020

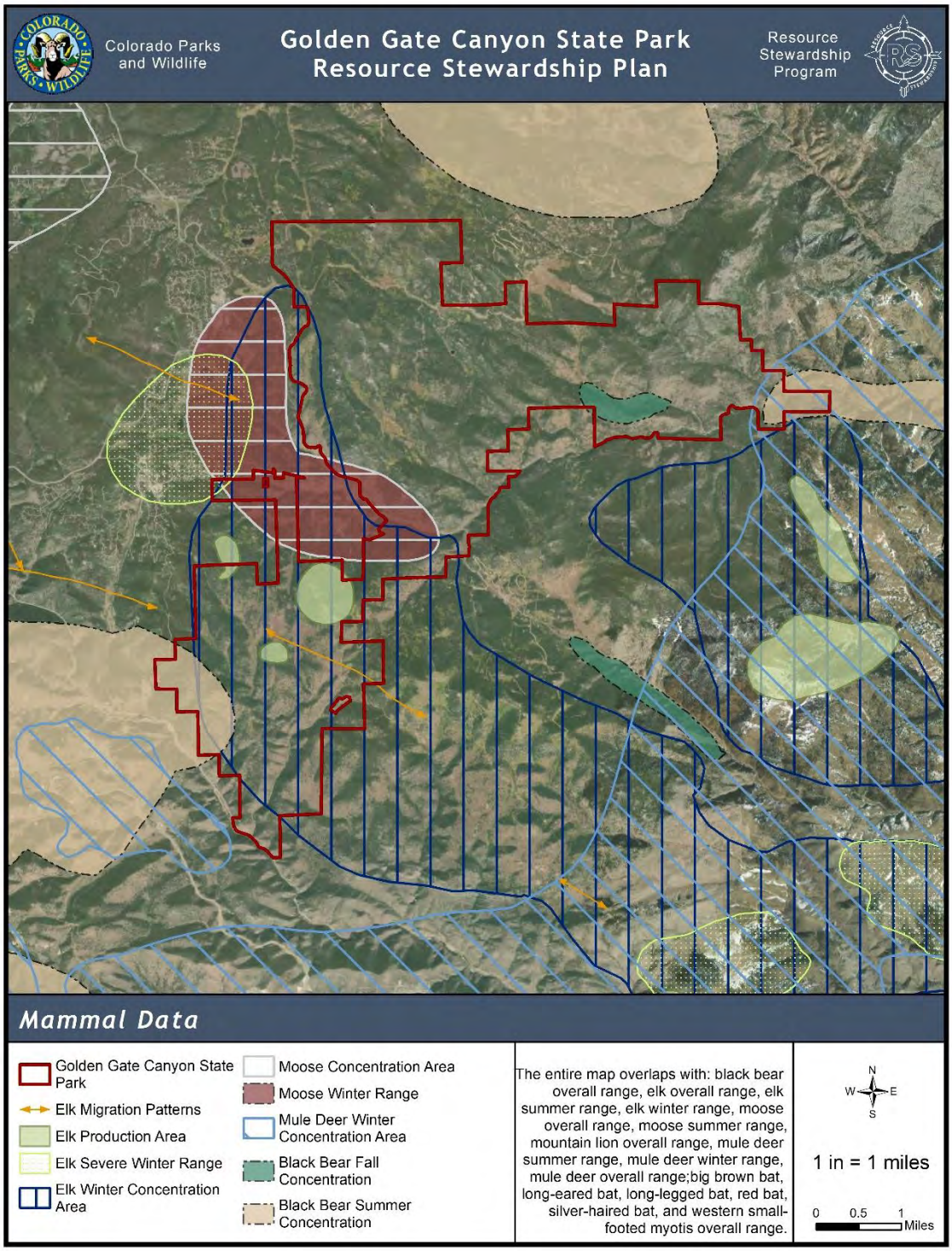
Moose prefer boreal forest edge and forest openings near water sources. Moose browse on a variety of vegetation and prefer newly successional vegetation sprouting after disturbance. Typical habitat may include a mixture of willow, spruce, fir, aspen, alder, and birch. Moose breed from mid-September to early November and calving occurs from late May to early June when most often a single calf is born, but occasionally twins are produced. Moose are adapted to cold weather conditions and can withstand low temperatures and significant snowfall. The species is solitary but will "yard up" or congregate with other moose during the winter in riparian areas (Armstrong, et al. 2011). Moose were documented frequently at Green Ranch during the wildlife camera species distribution study conducted in 2020. The species was noted in aspen woodlands, willow carrs, and in some ponderosa pine woodlands. Moose calves were documented a few times as well, indicating the species is breeding at Green Ranch (Belmar 2020).

CPW SAM data for moose summer and overall range overlaps with the entire Park. Additionally, moose concentration area and moose winter range overlaps with a portion of the Park. Figure 4 displays range area for this species.

Bats

The CPW Species Activity Mapping data shows several bat species' ranges as overlapping with the Park. Big brown bat, long-eared myotis, long-legged myotis, red bat, silver-haired bat, and western small-footed myotis all overlap with the Park. In addition, four species that are considered species of concern have ranges that overlap with the Park (hoary bat, little brown myotis, fringed myotis, and Townsend's big-eared bat). These species are addressed in the Sensitive Wildlife section. Habitat for bat species may be present on rock outcrops and trees in both upland coniferous and deciduous forests and riparian areas. Bat surveys have never been conducted in the Park and should be considered in the future in order to understand bat populations present and necessary conservation measures.

Figure 4. Mammal Data Map.



Resource Conditions

Wildlife habitat and populations at Golden Gate Canyon State Park are in good condition. The Park provides ample forest, montane meadows, and wetland and riparian habitats along perennial creeks for a wide variety of wildlife species. Large wildlife species, such as mule deer and elk are commonly seen in the Park. Other species such as black bear and mountain lion are known to use the Park but are not seen as frequently. Raptors continue to use the Park and are an indicator of an ecosystem in good health. A total of 71 species of migratory birds were documented in the Park, indicating bird populations and bird diversity is high and the Park contains ample foraging and breeding habitat.

Riparian habitats generally are in fair condition, with areas away from trails and recreational zones in good condition. In riparian areas adjacent to old hay meadow operations, such as in the Frazer Meadow and the meadows in the upper part of the Green Ranch, non-native agricultural grasses dominate the vegetation adjacent to creeks and streams. Willow species are beginning to reclaim some of these creeks as well. With increased willows, more suitable habitat will be available for fishes and amphibians in the future. Noxious weed species tend to colonize wet areas more easily, making riparian and wetland habitats more susceptible to noxious weed populations. Riparian and wetland areas surrounding high visitation areas, such as Kriley Pond, have seen human impacts that include erosion, soil compaction, and vegetation trampling. Allowing these areas to naturally restore themselves by closing them temporarily could help to improve wildlife habitat.

Historic actions have affected how the forests of Golden Gate have evolved into their current condition. Logging of coniferous forests was widespread at Golden Gate Canyon State Park in the past 100-120 years, especially on the southern portions of Green Ranch. Additionally, wildfire suppression reduced the number of wildfire events that have occurred in the Park, affecting the forest patch size. Current forests are more homogenous and have less diversity in patch size and age classes than found in the past. However, these changes in forest habitats are not large enough to preclude use of these habitats by wildlife populations. Habitat specialists that required more spruce/fir dominated forests would have had more habitat within the Park than today, but the vast majority of species currently have similar habitat structure to what was found historically at the Park. A lack of fire in areas dominated by ponderosa pine and shrublands (dominated by mountain mahogany) is creating less diverse stand types and denser forests. It is difficult to ascertain if this lack of fire is having a measurable effect of wildlife species. The species most likely affected by denser forest ecotones and a lack of fire are insects such as butterflies and moths, and their predators such as the flammulated owl.

Aspen stands were likely more widespread prior to fire suppression and the current drier climate cycle. As elk were more inclined to migrate to lower elevations prior to European settlement of Colorado, winter use by elk in the area around the Park would have been less during the winter months. Additionally, larger predators such as gray wolf and grizzly bear would have also moved elk herds around more. The current condition of the aspen stands for wildlife use in Golden Gate Canyon State Park are in flux. The aspen stands are slowly being invaded by conifers (Douglas-fir, ponderosa pine, and lodgepole pine). As these conifers continue to invade these aspen stands, the aspen trees will slowly die off and cease to regenerate due to aspen's lack of shade tolerance. Wildlife use of these stands are likely similar to past use patterns

but will slowly change to more coniferous-tolerant wildlife species. Elk use of these stands is further reducing the ability of these stands to regenerate. New shoots are being heavily browsed, and mature aspen trees are also being browsed by the elk.

Golden Gate Canyon State Park is surrounded by large tracts of public lands managed by local county governments and the US Forest Service, which provides a contiguous, connected landscape for wildlife species. Large contiguous blocks of open space are of greater benefit to wildlife than smaller, isolated parcels. Within the Park, an effective method to preserve large blocks of habitat is by clustering development. The proper coordination and planning of open space, trails, and corridors can greatly benefit wildlife.

Table 5. List of General Wildlife Resource Conditions at Golden Gate Canyon State Park.

Resource	Condition / Status	Description
Bird Diversity		The Park was documented in 2012 to have high bird diversity and abundance. The Park provides important habitat for migratory and resident birds. Additionally, several raptor species use the Park and have been documented to successfully nest. Continued raptor monitoring, although a difficult task with the rough terrain and forested landscape, should continue into future years to document raptor species.
Mammal Populations and Migration Corridors		Mammal populations seem to be stable and healthy in the area. Preserved public lands surround the Park in all directions, which help to connect habitat for long-ranging animals. Elk and deer herds are especially healthy and thriving in the Park. Development surrounding the Park, including increased housing subdivisions, mining operations, and grazing may affect migration corridor connectivity in the future. Increased visitation to the Park could influence mammal species from using the Park.
Amphibians and Reptiles		Amphibian and reptile populations are in good condition. Wetland habitat is available throughout the Park and is mostly in good condition. Areas near high visitation have been degraded by vegetation trampling and the introduction of noxious weeds. Restoring these areas through reseeding and restricting access will improve them in the future. Ample habitat exists throughout the Park for reptiles

		and amphibians and habitat could be restored for the rare species, boreal toad.
Riparian and Wetlands Habitat		An explosion of increased visitation in 2020 has contributed to the degradation of riparian and wetland areas by spreading noxious weeds and trampling vegetation in these areas. Many visitors recreate at the ponds for fishing, which increases habitat degradation. A wetland assessment has not been conducted in several years however, so the full impacts are not completely known.
Coniferous Forest Habitat		Forested areas have undergone disturbance from mining, logging, fire suppression, and pests and disease. Many of forests of the Park are not currently representative of what should be present as a result of these human-caused disturbances. However, forest management activities are restoring forests to good conditions for wildlife by thinning overgrown areas, creating patches and edge habitat, and introducing prescribed fire that initiates succession. Overall, forests are in good condition for wildlife and are improving.
Aquatic Habitat		Aquatic habitats and species that inhabit them are largely in fair to good condition. Increased visitation may affect this in the future by introducing erosion to shorelines and sediment to waterways. The streams provide excellent habitat for mammals, fish, invertebrates, and amphibians. Ponds in the Park could be improved and currently have sedimentation issues that affect the quality of fish habitat.

Discussion and Conclusions

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 area. These trends are expected to continue in future years. Visitation has also increased exponentially as a result of the the COVID-19 pandemic in 2020, when the Park saw a 60 percent increase in visitors. Visitation to the Park was already increasing without the pandemic occurring, and is likely to continue increasing even afterwards, but at a slower rate.

Due to this increase in growth and visitation, wildlife populations could incur disturbances. Wildlife may be affected by damage to vegetation, especially in sensitive areas such as wetlands and riparian zones. Heavy recreational use degrades vegetation by soil compaction, erosion, and sedimentation. These impacts reduce the

amount and diversity of herbaceous vegetation, and young trees are eliminated by seed-bed compaction or root injury. Old trees suffer from root exposure caused by sheet erosion.

Some of the mammals that occur in the Parks are, for the most part, tolerant of human activity. These species, such as 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, moose and black bear will likely incur disturbance with increased human activity. The human-wildlife interface that the Parks present creates room for conflict between humans and these species. The replacement of native food plants by noxious weeds could cause a decline in ungulate populations. The value of animal habitat is affected by human use, noise, and the subsequent introduction of non-native species. Beaver populations have been low to non-existent for years. Reintroducing beavers to the Park can help to increase habitat value for many wildlife species that use riparian and wetland areas along the perennial streams of the Park.

The migratory birds will continue to use the Parks for its water resources, vast forested areas, riparian 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. Research has shown more complex vegetation structure increases bird diversity and abundance (MacArthur et al. 1966; Karr & Roth 1971). 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.

Amphibians could experience impacts from the spread on invasive species in wetland habitats. This outcome could reduce the amount of suitable habitat for amphibian species that require cover but not dense vegetation. Maintenance of ponds, emergent wetlands next to streams, and natural pools such as beaver habitat, will continue to provide habitat for amphibians and other wildlife, such as invertebrates, birds, and mammals. Rock outcrops are important areas for reptiles and should be avoided by trails and maintained as habitat.

Sensitive Wildlife

Description

Golden Gate Canyon State Park contains ample habitat for a variety of wildlife species, including several that are considered sensitive. Knowledge of species and habitats that occur in the Park are a result of conducting surveys and monitoring that serve as the foundation for this Stewardship Plan and for CPW's ability to conserve resources at the Park. Table 6 below lists the surveys and monitoring efforts that have been conducted related to Sensitive Wildlife Species. Sections following provide information about specific taxa and associated habitats that are known in the Park based on these efforts. Section 5 discusses future survey and monitoring effort needs for the Park based on those that have been conducted. Figure 5 displays the CNHP element occurrence and CPW SAM data for species documented within or in the

vicinity of the Park. More details about the surveys completed for sensitive wildlife may be found in the Appendix.

Table 6. List of Surveys and Monitoring Conducted for Sensitive Wildlife at Golden Gate Canyon State Park.

Resource	Description	Years	Performed by
Canada Lynx Habitat Inventory and Mapping	Mapping and assessment of the vegetation and site conditions based on established criteria.	2004	Patrick Murphy, Ecotone Corporation
Northern Goshawk Survey	Broadcast surveys conducted in part of Green Ranch.	2004	Resource Stewardship Team
Biological Evaluation	Evaluated the effects of fuel mitigation treatments to federally threatened, endangered, and proposed species.	2005	Eric Petterson, Rocky Mountain Ecological Services, Inc.
Boreal Toad Surveys and Report	Conducted presence/absence surveys of fuels mitigation sites in Green Ranch.	2006	ERO Resources Corporation
Owl, Goshawk, and Boreal Toad Surveys	Conducted surveys for listed species in fuels mitigation sites in the Park.	2007	ERO Resources Corporation

The Park may provide habitat for approximately 40 sensitive wildlife species, 11 of which have historically been documented in the Park. Seven sensitive bird species were documented as present in the Park during the 2012 migratory bird survey or during other surveys (Hallock 2012; Belmar 2020). Potential habitat for the CNHP-listed boreal toad and northern leopard frog exists in the Park, but neither species has been documented in the past. Canada lynx and Preble's meadow jumping mouse are two mammal species that have habitat in the Park but have not been documented in the past. A summary of the sensitive wildlife species with potential to occur in the Parks is provided below in Table 7.

Table 7. List of Sensitive Wildlife Species that Could Occur in Golden Gate Canyon State Park.

Common Name	Scientific Name	Listing Status			Park Presence
		USFWS	CPW	CNHP	
Birds					
American white pelican	*Pelecanus erythrorhynchos*		Tier 2	G4 / S1B	Not detected

Common Name	Scientific Name	Listing Status			Park Presence
		USFWS	CPW	CNHP	
Bald eagle	*Haliaeetus leucocephalus*	BGEPA	SC, Tier 2	G4 / S1B, S3N	Not detected
Band-tailed pigeon	*Patagioenas fasciata*		Tier 2	G4 / S4B	Not detected
Boreal owl	*Aegolius funereus*		Tier 2	G5 / S2	Not detected
Brewer's sparrow	*Spizella breweri*		Tier 2	G5 / S4B	Not detected
Black rosy-finch	*Leucosticte atrata*		Tier 2	G4 / S4N	Not detected
Brown-capped rosy-finch	*Leucosticte australis*		Tier 1	G4 / S3B, S4N	Not detected
Cassin's finch	*Haemorhous cassinii*		Tier 2	G5 / S5	Yes - documented in 2012, 2020
Ferruginous hawk	*Buteo regalis*		SC, Tier 2	G4 / S3B, S4N	Not detected
Flammulated owl	*Otus flammeolus*		Tier 2	G4 / S4	Yes - documented in 2012
Golden eagle	*Aquila chrysaetos*	BGEPA	Tier 1	G5 / S3S4B, S4N	Not detected
Grasshopper sparrow	*Ammodramus savannarum*		Tier 2	G5 / S3S4B	Yes - documented in 2020
Lazuli bunting	*Passerina amoena*		Tier 2	G5 / S5B	Yes - documented in 2012, 2020
Lewis's woodpecker	*Melanerpes lewis*		Tier 2	G4 / S4	Not detected
Loggerhead shrike	*Lanius ludovicianus*		Tier 2	G4 / S3S4B	Not detected
Northern goshawk	*Accipiter gentilis*		Tier 2	G5 / S3B	Yes - documented in 2015
Olive-sided flycatcher	*Contopus cooperi*		Tier 2	G4 / S3S4B	Yes - documented in 2012, 2020
Peregrine falcon	*Falco peregrinus*		Tier 2	G4T4 / S2B	Not detected
Prairie falcon	*Falco mexicanus*		Tier 2	G5 / S4B,S4N	Not detected

Common Name	Scientific Name	Listing Status			Park Presence
		USFWS	CPW	CNHP	
Rufous hummingbird	*Selasphorus rufus*		Tier 2	G5 / SNA	Not detected
Swainson's hawk	*Buteo swainsoni*		Tier 2	G5 / S5B	Not detected
Veery	*Catharus fuscescens*		Tier 2	G5 / S3B	Not detected
Virginia's warbler	*Oreothlypis virginiae*		Tier 2	G5 / S5	Yes - documented in 2012, 2020
Amphibians					
Boreal toad	*Anaxyrus boreas boreas*	FP	SE, Tier 1	G4T11 / S1	Not detected
Northern leopard frog	*Lithobates pipiens*		SC, Tier 1	G5 / S3	Not detected
Mammals					
Abert's squirrel	*Sciurus aberti*		Tier 2	G5 / S1ST	Detected annually
Bighorn sheep	*Ovis canadensis*		Tier 2	G5 / S4	Not detected
Canada lynx	*Lynx canadensis*	FT	SE, Tier 1	G5 / S1	Not detected
Dwarf shrew	*Sorex nanus*		Tier 2	G4 / S2	Not detected
Fringed myotis	*Myotis thysanodes*		Tier 1	G4 / S3	Not detected
Hoary bat	*Lasiurus cinereus*		Tier 2	G5 / S5B	Not detected
Little brown myotis	*Myotis lucifigus*	FP	Tier 1	G3 / S5	Not detected
Preble's meadow jumping mouse	*Zapus hudsonius preblei*	FT	ST, Tier 1	G5T2 / S1ST	Not detected
Pygmy shrew	*Sorex hoyi montanus*		Tier 2	G5T3T4 / S2	Not detected
Red-backed vole	*Clethrionomys gapperi*		Tier 2	G5 / S5	Not detected
Townsend's big-eared bat	*Corynorhinus townsendii*		Tier 1	G4 / S2	Not detected
Invertebrates					

Common Name	Scientific Name	Listing Status			Park Presence
		USFWS	CPW	CNHP	
Crossline skipper	*Polites origenes*		Tier 2	G4G5 / S3	Last documented in 1975
Mottled duskywing	*Erynnis martialis*			G3 / S2S3	Last documented in 1968
Schryver's elfin (Moss's elfin)	*Callophrys mossii schryveri*		Tier 2	G4 / S2S3	Last documented in 1982
Yellow dotted alpine (Theano alpin)	*Erebia pawlowskii*			G5 / S3	Last documented in 1974

Sources: (CPW 2005, 2019a; Hallock 2012; Triece et al. 2019; Belmar 2020; Dornbrock 2021)

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.

FP – Federally Proposed, FE – Federally Endangered, SE – State Endangered, ST – State Threatened, SC - State Special Concern, BGEPA – Bald and Golden Eagle Protection Act.

Tier 1 - species which are truly of highest conservation priority in the state, and to which CPW will likely focus resources over the life of the State Wildlife Action Plan.

Tier 2 – species considered important in light of forestalling population trends or habitat conditions that may lead to a threatened or endangered listing status, but the urgency of such action has been judged to be less than Tier 1.

Amphibians and Reptiles

Boreal Toad

Boreal toads (*Anaxyrus boreas boreas*) can be found in a variety of wetlands, including emergent marshes, kettle ponds, beaver ponds, streams, lakes, reservoirs, and wet meadows. They tend to occur in wetland sites surrounded by coniferous forests. Boreal toads travel up to 1.5 miles from their breeding and summer ranges to hibernate in microhabitats that do not freeze, including under logs and rocks, in rodent burrows, chambers beneath large boulders, and beaver lodges. Boreal toads occur mostly above 8,000 feet in elevation, whereas Woodhouse's toads occur mostly below 8,000 feet (CPW 2019c).

Boreal toad populations have declined for numerous reasons, including diseases, environmental stress to the immune system, ultraviolet radiation, environmental toxins, altered hydrology, and habitat disturbance. Disease caused by chytrid fungus appears to be the main cause of declines, especially in the Southern Rocky Mountain population (CPW 2015, 2019c). Breeding habitat degradation from recreation, grazing,

and sedimentation due to road runoff has also been found to directly affect this species. Climate change impacts such as reduced snowpack and shorter periods of snow cover, earlier snow melt times, and overall warmer, drier conditions may also affect this species in the future (CPW 2015).

Boreal toad habitat has been documented in Golden Gate Canyon State Park near wetland areas, beaver ponds, slow-moving creeks and streams, kettles, and wet meadows (ERO 2013). Boreal toad populations have been located by CNHP outside of the Park to the west and northwest several years ago. However, there are no known records of the species documented in the Park. Surveys for the species were conducted in 2005 and 2006 near Mule Deer Pond, the Works Property, Frazer Meadow, and on Green Ranch as a preventive measure prior to conducting fuels mitigation work in the Park. These surveys concluded that it is likely the species never has existed in the Park due to the isolation of potential habitat areas from intact populations (ERO 2005, 2006, 2013). Despite populations not being located in the Park, there is potential for habitat restoration and enhancement in the Park and introducing the species to habitat areas. The Park is in close proximity to historic populations and although natural dispersion from these sites to the Park property is unlikely, it could be possible for CPW to assist in introduction efforts (Triece et al. 2019).

Photo 8. Boreal toad is a species of concern that could occur at the Park.

Source: Brad Lambert, CNHP

Northern Leopard Frog

Northern leopard frogs (*Lithobates pipiens*) 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, quite 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 Species of Concern by Colorado Parks and Wildlife and a sensitive species by USDA Forest Service in Rocky Mountain Region (Region 2) and Bureau of Land Management.

Northern leopard frogs were not documented during 2018 amphibian surveys. However, habitat for this species exists in the Park and continued monitoring efforts should occur to assist in finding any populations that may exist in the Park (Triece et al. 2019).

Birds

Seven sensitive bird species were previously documented within the Park during the breeding bird survey or during other monitoring and surveys conducted (Hallock 2012; Belmar 2020). The seven species confirmed to be present in the Park are discussed in more detail in following sections. Sixteen other bird species of concern could occur within the Park or have been documented through other sources but have not been confirmed (i.e. Ebird). Therefore, a total of 23 bird species of concern have the potential to occur in the Park (Table 7).

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 2019). 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 2016). Nests are typically located on top of a conifer tree or on a side branch away from the trunk (Cornell University 2019).

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 2015). 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 2016).

Cassin's finches were recorded during the 2012 bird surveys and the 2020 wildlife camera study in the Park (Hallock 2012; Belmar 2020). Ample habitat exists for the species in the large acreage of the Park covered in lodgepole pine, Engelmann spruce, and subalpine fir forests. The CPW SAM data maps the entire Park as breeding range for the species (Figure 5).

Flammulated Owl

In Colorado, flammulated owls (*Psiloscops 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 calling flammulated owl was heard near the intersection of Mountain Base Road and Gap Road during the 2012 bird surveys (Hallock 2012). The Park contains ample habitat

for this species, with the abundant ponderosa pine, Douglas-fir, and aspen stands present throughout the Park.

Grasshopper Sparrow

Grasshopper sparrow (*Ammodramus savannarum*) breeding range covers the eastern quarter of the state, making Green Ranch just on the cusp of being within range, if not just slightly out of range (Vickery 2020). The species' preferred breeding range habitat in the western US includes large tracts of open grasslands with some shrub cover. Nests are usually built on the ground and are made of grasses in a dome shape, with a side entrance (Kingery 2016; Vickery 2020). Grasshopper sparrows have been documented to arrive at their territories as early as late April. Fall migration is not well documented for Colorado, but individuals have been documented to still be feeding young as late as August (Kingery 2016).

Grasshopper sparrows are listed as a Tier 2 species in the State Wildlife Action Plan primarily due to habitat being converted to cropland (CPW 2015). The species is also listed as a US Forest Service (USFS) sensitive species and US Fish and Wildlife Service (USFWS) Bird of Conservation Concern (BCC) (CPW 2015; USFS 2017).

A grasshopper sparrow was recorded at Green Ranch in the Summer of 2020 during the wildlife camera study (Belmar 2020). The individual was located in tall grassland with scattered shrubs and trees, a wet meadow, and an aspen woodland nearby. Adequate nesting and foraging habitat are present in Green Ranch in the area the species was documented. A portion of the Park falls within SAM breeding range for this species (Figure 5).

Lazuli Bunting

Photo 9. Lazuli bunting is a bird species of concern that has been documented in the Park.

Source: Cornell Lab of Ornithology

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).

Lazuli bunting were documented during the 2012 bird surveys and the 2020 Green Ranch wildlife camera study (Hallock 2012; Belmar 2020). Ample habitat exists for the species in the montane willow shrublands, cottonwood and willow riparian areas, and pine and fir forests with shrubby understory. A portion of the Park falls within SAM breeding range for this species (Figure 5).

Northern Goshawk

In Colorado, northern goshawks (*Accipiter gentilis*) primarily inhabit mature coniferous or mixed conifer-aspen forests. Specifically, they have been reported most often in mixed conifer-aspen, mixed conifer, spruce-fir, and ponderosa pine forests. Pairs typically nest in mature forests near the bottom of slopes with high canopy closure and open understories. Most nests found in Colorado are in aspen trees but have also been documented in pine and fir trees. Occasionally, the species has been found the nest in pinyon-juniper woodlands (Topolewski Jr. 2016). They seem relatively intolerant of human disturbance and will abandon nesting territories after trails are constructed close by. Due to the remoteness of their nests, little is known about North American population trends (Jones 2016).

Photo 10. Northern goshawk is a bird species of concern that has been documented in the Park.

Source: Cornell Lab of Ornithology

Northern goshawk are listed as a Tier 2 species in the State Wildlife Action Plan (CPW 2015). The Colorado population of the species seems relatively stable. However, they are still threatened by forest management practices and large-scale natural disturbances. Logging practices fragment large tracts of mature forests needed for nesting. Pine beetle infestations across the state have also decreased the amount of mature forest stands available for use, and researchers believe the populations of goshawks will be affected by this in the next 20 years (Topolewski Jr. 2016). The entire Park falls within SAM breeding range for this species.

Northern goshawks have nested in the Park in the past. Raptor monitoring has documented active nests in 2002, 2006, 2007, and 2015 in the Park (Figure 5). Although the species has not been documented recently, it is possible that active nests are present in the Park. The Park contains variable terrain and heavily forested landscapes that make locating raptor nests difficult. Continued efforts to locate this species in the Park should be made and may include following raptor monitoring protocols to look for nests or conducting protocol-level playback surveys. It should be

noted that protocol-level playback surveys should only be conducted by a professional biologist, as they may disturb the species if not properly conducted.

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).

Olive-sided flycatchers were recorded during the 2012 breeding bird surveys several times. They were found primarily in the ponderosa pine woodlands and savannas of the Nott Creek and Deer Creek areas. One was also heard singing on Green Ranch on the edge of the meadow just west of the hunter's parking lot (Hallock 2012). The species was also documented in an aspen woodland in Green Ranch during the 2020 wildlife camera study (Belmar 2020). The Park contains ample habitat for the species within Douglas-fir, aspen woodlands, and ponderosa pine woodlands, especially areas that have received fuels treatments. The CPW SAM data maps the entire Park as breeding range for the species.

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 (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).

Olive-sided flycatchers were recorded during the 2012 breeding bird surveys several times. They were found primarily in the ponderosa pine woodlands and savannas of

the Nott Creek and Deer Creek areas. One was also heard singing on the south-facing hillside above the trail that takes you to Frazer Meadow (Hallock 2012). The species was also documented in a mountain mahogany shrubland in Green Ranch during the 2020 wildlife camera study (Belmar 2020). The CPW SAM data maps the entire Park as breeding range for the species.

Invertebrates

Sensitive invertebrate species include mottled duskywing, crossline skipper, Schryver's elfin, and yellow dotted alpine. CNHP records of these species occurring in the Park date back to 1968-1975 and therefore are not considered relevant due to the amount of time lapsed from the current year and the sightings. Other sensitive invertebrate species are likely to occur in the Park but a comprehensive invertebrate survey has not been completed. Butterfly surveys have been completed in the past for species that are not considered sensitive and are discussed in the General Wildlife section. A more thorough survey of invertebrates should be completed in the future.

Mammals

Bats

The CPW SAM data shows that little brown myotis, fringed myotis, hoary bat, and Townsend's big-eared bat overall range overlaps with the Park. All of these species are listed as Tier 1 or Tier 2 level species under the Colorado Wildlife Action Plan (CPW 2015, Table 7). Little brown myotis is also federally proposed to be listed under the Endangered Species Act (ESA). No surveys have been conducted at the Park for bat species in the past but should be conducted in order to gain an understanding of what is present and how to better manage habitat for bats. Habitat for bat species may be present on rock outcrops and trees in both upland coniferous and deciduous forests and riparian areas.

Photo 11. Habitat for Canada lynx, a federally-protected species, is present in the Park.

Source: CPW

Canada Lynx

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 under ESA, State endangered, and is a Tier 1 species in the State Wildlife Action Plan (CPW 2015). The CPW SAM data shows

that Canada lynx range overlaps with a large portion of the Park (CPW 2019a, Figure 5). Several studies have been conducted in the Park to assess Canada lynx habitat to prevent impacts to individuals and habitat and to simply better understand where lynx may exist in the Park (Murphy 2004a; Rocky Mountain Ecological Services Inc. 2005). A study in 2004 found a total of almost 3,800 acres of lynx habitat present in the Park (Table 8). More detailed information about habitat availability can be found in the report "GIS Mapping Services for Lynx Habitat Data" in the Appendix (Murphy 2004a).

Table 8. Canada lynx habitat types and availability in the Park.

Habitat Class	Habitat Description	Acreage
Denning	Denning area (with Foraging also provided on same acres). Cover type = subalpine fir; Engelmann and blue spruces; and lodgepole, limber and bristlecone pines.	273.51
Winter Forage	Winter forage areas only (generally, yearlong foraging also provided on same acres). Cover type = subalpine fir; Engelmann and blue spruces; lodgepole, limber and bristlecone pines; aspen; and narrowleaf cottonwood.	1,418.91
Other	Not denning or primary foraging areas, but secondary snowshoe hare winter habitat. Cover type = lodgepole pine and aspen; subalpine fir; Engelmann and blue spruces; limber and bristlecone pines; and narrowleaf cottonwood.	2,100.66
	Total Acreage	3,793.08
Source: (Murphy 2004a)		

Preble's Meadow Jumping Mouse

Preble's Meadow Jumping Mouse (PMJM) (*Zapus hudsonius preblei*) 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, the USFWS designated Critical Habitat in Colorado and Wyoming for PMJM. Overall range and designated Critical Habitat for PMJM is present along Deer Creek in a small portion of the east side of the Park. The species has never been trapped or found in the Park. A trap has been set just outside of the Park along Deer Creek and did not capture any PMJM. One trapping record

Photo 12. **Preble's meadow jumping** mouse is a rare mammal species that was historically documented near the Park.

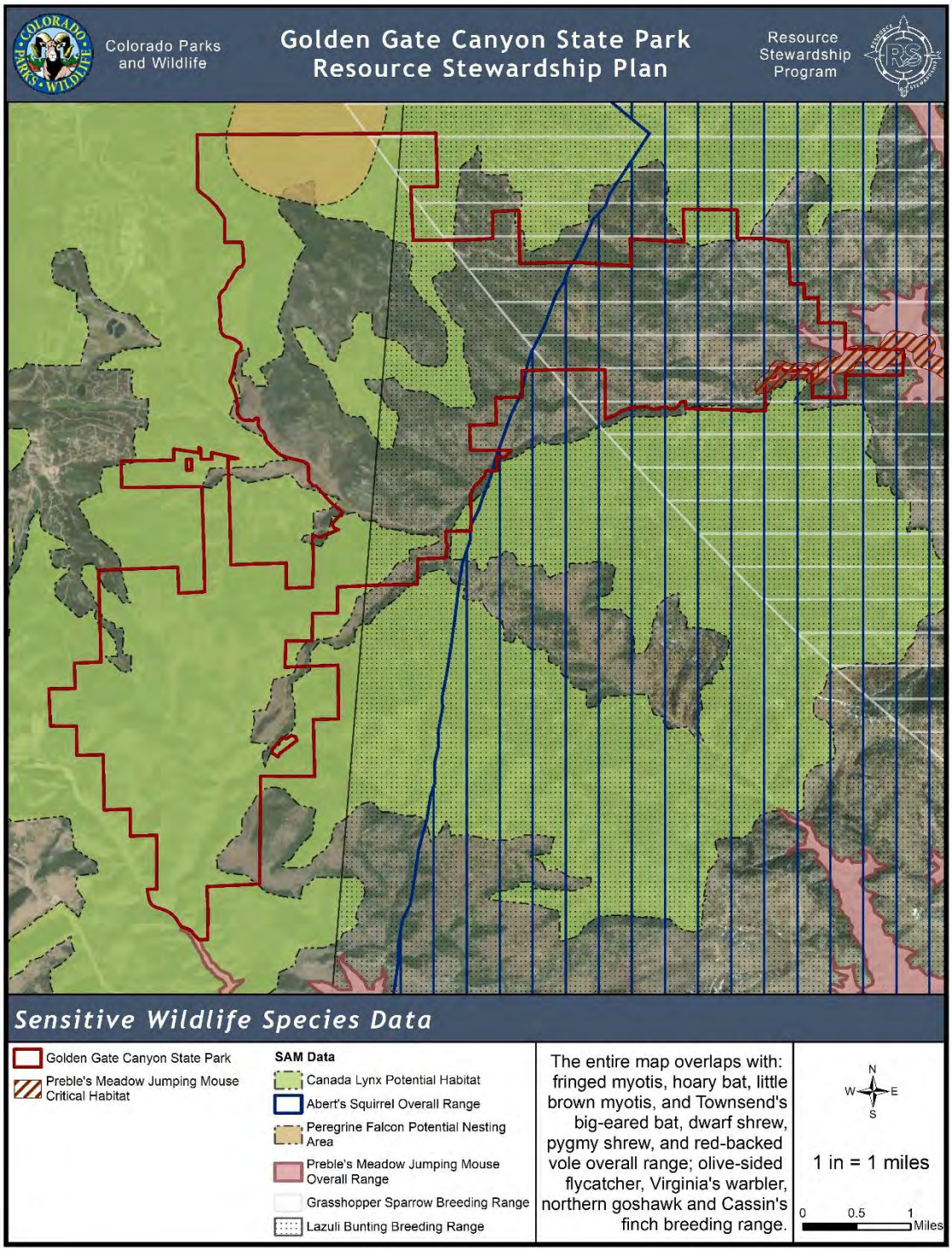
Source: CNHP

southeast of the Park exists from 1997, but the location is several miles from the Park boundary.

Other Small Mammals

Several small mammal species of concern have the potential to occur within the Park, including Abert's squirrel, red-backed vole, pygmy shrew, and dwarf shrew. No formal surveys have been conducted at the Park to confirm whether these species are present. However, habitat exists for them and they could occur. Future studies should be conducted in order to gain a better understanding of the small mammal community present at the Park.

Figure 5. Sensitive Wildlife Species Map



Resource Conditions

Sensitive wildlife populations at Golden Gate Canyon State Park appear to be in good condition. The varied habitats found at the Park provide for an equally diverse suite of wildlife species – both common and rare. Bird surveys performed in 2012 confirmed the presence of several rare bird species, including flammulated owl (Hallock 2012). Raptor monitoring in the past has documented nesting northern goshawks in the Park. The rare amphibians, boreal toad and northern leopard frog, have not been documented in the Park but habitat exists and there is potential for habitat restoration. The Park overlaps with four rare bat species overall ranges and provides habitat for four small mammals. Surveys for bats and small mammals are recommended in the future to confirm the presence of habitat or individuals present in the Park. Habitat for the rare Canada lynx and Preble's meadow jumping mouse is also present, but neither species have been found there in the Park.

Forest habitats are improving due to planned forest management activities. Forest management activities implemented in the past 10 years are creating a more diverse forest structure in health and age, which ultimately provides better quality habitat for the majority of wildlife species. Wetland and riparian habitats are present and in good condition, but could be improved by managing hydrology regimes, the spread of noxious weeds, and visitor impacts such as social trails. Many of the points discussed in the General Wildlife Resource Condition Section are also applicable to Sensitive Wildlife Species.

Overall, the Park provides habitats for sensitive species, but species have not been documented due to a lack of monitoring or surveys, or simply they have not been seen. With many rare or sensitive species, habitat assessments are important since documentation of the species is often difficult.

Table 9. List of Sensitive Wildlife Resource Conditions at Golden Gate Canyon State Park.

Resource	Condition / Status	Description
Large Mammals		Sensitive large mammals such as Canada lynx, have not been documented in the Park. However, ample habitat exists for them, in the Park and on adjacent public lands. Continued development in the area threatens habitat connectivity required for wide-ranging mammals.
Bats		No surveys or documentation of sensitive bat species are available for either Park so it is difficult to understand their current condition. However, habitat for bat species is present at the Park.
Birds		The Park was documented in 2012 to have incredible bird diversity and abundance. The Parks provide important habitat for several bird species, some of which are

		documented to nest in the Parks. Some species (flammulated owl, northern goshawk) were documented in the past but recent data on their occurrence is not available.
Amphibians		Sensitive species, northern leopard frog and boreal toad, could occur in the Park but have never been documented in surveys or monitoring efforts. Habitat is threatened by noxious weed spread, water sedimentation, and habitat degradation. Monitoring and habitat enhancement efforts may help improve the condition of habitat that can be used by sensitive amphibian species.

Discussion and Conclusions

Current management practices have allowed for the conservation of natural resources, and thus habitat availability for sensitive wildlife in Golden Gate Canyon State Park. However, factors detrimental to sensitive wildlife may escalate in the future and management practices need to evolve to meet these challenges.

The Park is an extremely popular recreational destination and visitation continues to grow. High visitation leads to more social trails, more noxious weeds, higher impacts on riparian areas, and increased disturbance to wildlife. Increasing capacity will be at the cost of natural resources in the Park.

Implementation and aggressive management of noxious weeds is critical, especially to ensure the sustained quality of sensitive wildlife habitat. Noxious weed spread may be exacerbated by increased visitation and recreational activities.

Increased Park visitation could lead to degradation of sensitive wetland habitats and a subsequent decline in rare animal populations, among many other potential outcomes. Wetland and riparian habitats are extremely important to several of the rare animal species with potential to occur at the Park, including the federally-listed boreal toad and northern leopard frog.

In recent years, the Park has developed and implemented forestry management efforts due to a lack of wildfire and overgrown forests. Human intervention and fire suppression has drastically changed the forest structure within the Park and is likely to continue to impact available habitat for years to come. Thinning, prescribed fires, and other forest management activities are creation a forest more diverse than the forest that came before in terms of age class and species mix. This is important because it provides a good start to a future desired condition where there is more age and species diversity and thus greater resiliency against events such as an insect epidemic. This new forest structure benefits some species and has negative impacts to others, including many sensitive wildlife species.

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. Rare species such as Canada lynx could be impacted by habitat fragmentation.

Consistent monitoring and management programs for sensitive wildlife species and their habitats will afford a greater understanding of habitat use and shortcomings in the Parks. Several surveys have been conducted since the last stewardship plan and continuing such surveys and regular monitoring is important to identify sensitive species population and occurrence changes over time. Some changes to Park resources have been documented already due to increased human presence, including noxious weed occurrence and degradation of sensitive habitats. Several surveys are recommended for the future in order to document the presence of species in the Park and are outlined in the Resource Surveys and Monitoring Efforts Section.

Vegetation

Resource Summary

Significant Features

- Many wildlife species use the Parks' various plant communities for cover, shelter, and forage. A total of 29 vegetation communities have been identified in the Park.
- Based on background research, the location of the Park, historical occurrences, and baseline vegetation surveys, the Park may provide habitat for nine rare plants and ten rare communities.
- The majority of the Park's vegetation was recently rated as in good to excellent condition during a vegetation mapping project.

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 results 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.

Vegetation Communities

Description

Approximately 25 miles west of Denver, Golden Gate Canyon State Park exemplifies vegetation of Colorado's Front Range Southern Rockies ecoregion. Park vegetation varies with elevation, aspect and substrate (Jones et al. 2015). Land-use history that includes logging, mining, and ranching has also influenced plant composition. Low-gradient stream valleys contain meadows dominated by native and introduced grasses, forbs and shrubs, including extensive willow thickets. Cottonwood woodlands dominate at lower elevations and spruce often dominates at higher elevations. Lower elevation uplands are dominated by ponderosa pine woodlands on drier slopes and Douglas-fir on wetter slopes. Higher elevations are dominated by lodgepole pine forests and often have aspen present either intermixed or in pockets. Mesic drainages and north-facing slopes often include a mix of spruce, fir (less common), and Douglas-fir. Higher elevation xeric sites are sometimes dominated by limber pine. Aspen is

found in mixed stands and small patches throughout the Park; pure stands are rare (Jones et al. 2015).

Like today, the large elevation difference within the Park likely made for equally diverse climatic conditions. The upper elevations had (and have) a shorter growing season than the lower elevations. A shorter growing season also translates into an abbreviated fire season in the higher elevations as compared to the lower elevations. Moreover, previous to the year 1900, wildfire was a much more common occurrence, as more effective fire suppression likely began around 1900 in the West. The intensities and frequencies of these pre-suppression wildfires varied greatly according to elevation, moisture, and vegetation type. These differences in fire type created landscape heterogeneity and patchy fire mosaics. In all cases, fire was historically one of the most important driving forces influencing the extent and structure of vegetation communities in and around Golden Gate Canyon State Park. A majority of the vegetation and wildlife species have evolved with frequent fire and thus have an array of biological, structural and chemical mechanisms with which to mitigate the negative impacts of fire.

Knowledge of vegetation communities and conditions that are present in the Park are a result of conducting surveys and monitoring that serve as the foundation for this Stewardship Plan and for CPW's ability to conserve resources at Golden Gate Canyon State Park. Table 10 below lists the surveys and monitoring efforts that have been conducted related to Vegetation Communities. Sections following provide information about specific communities identified in the Park based on these efforts. Chapter 5 discusses future survey and monitoring effort needs for the Park based on those that have been conducted.

Table 10. List of Surveys and Monitoring Conducted for Vegetative Resources at Golden Gate Canyon State Park.

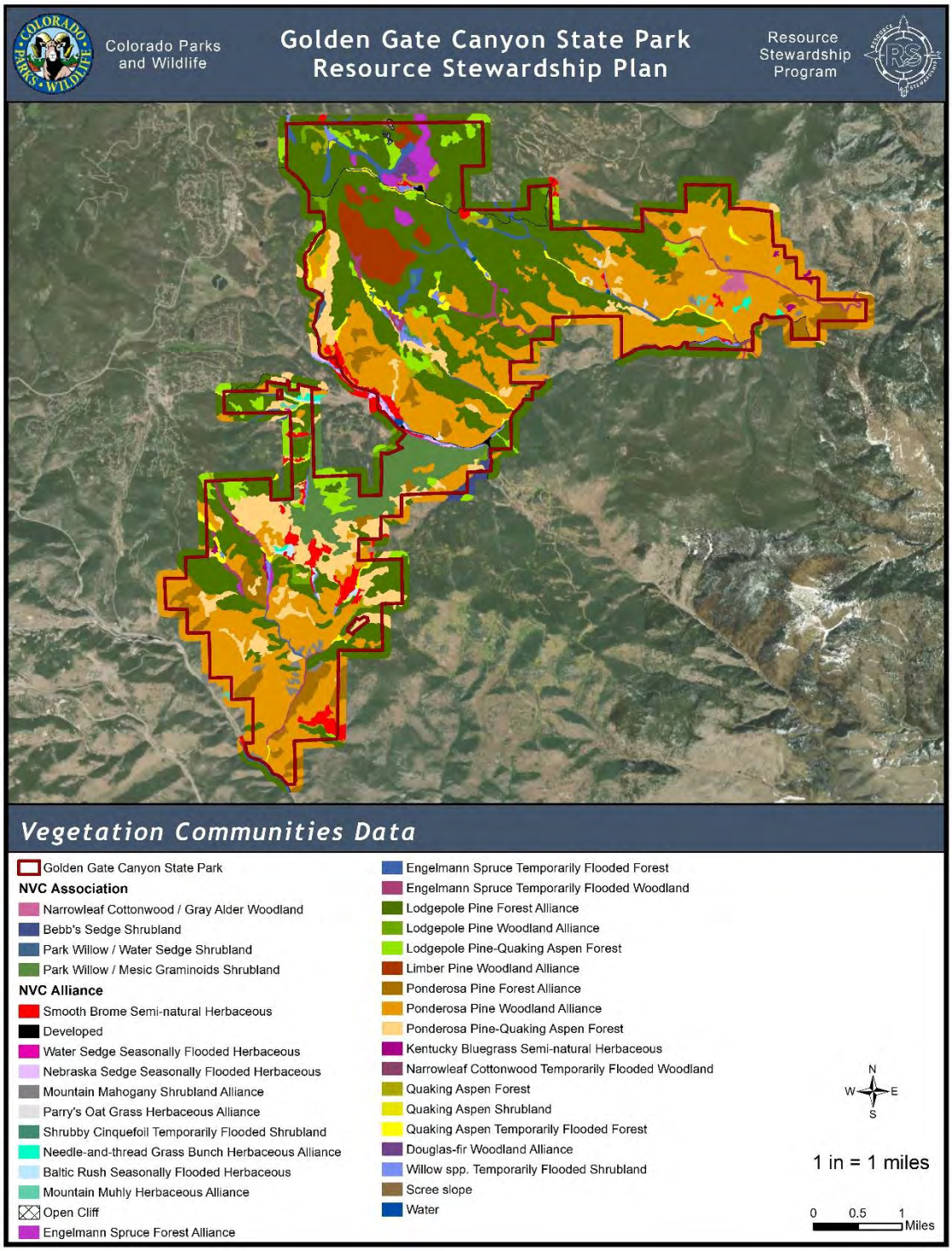
Resource	Description	Years	Performed by
Vegetation Assessment	Vegetation communities were mapped according to the NVC and condition was assessed. 40 plots for monitoring were established.	2002	Rita Berberian
Fuels Assessment and Mitigation Recommendations	Fuel loading, operability and stand ecology were assessed in most forest stands in the Park.	2005	Rocky Mountain Ecological Services, Inc.
Forest Management Plan	Forest conditions were assessed, and recommendations were provided for forest management at the Park.	2014	Colorado Forest Management, LLC.
Vegetation Mapping and Monitoring	Vegetation communities were mapped according to the NVC and condition was assessed. 24 of the 40 monitoring plots	2015	Center for Environmental Management of Military Lands

	established in 2002 were revisited.		
Noxious Weed Survey	The Park was surveyed for listed noxious weeds and management prescriptions were provided to control populations.	2017	Stewardship Team

A total of 29 vegetation community Alliances and Associations (classified according to the 2008 National Vegetation Classification [NVC] system) were identified in Golden Gate Canyon State Park in 2015: 10 coniferous forest and woodland classes, 3 deciduous forest and woodland classes, 2 mixed coniferous/deciduous forest and woodland classes, 5 shrubland classes, 9 herbaceous classes, and 7 non-vegetated or other land-use classes. The 29 primary plant community Associations and Alliances at the Parks as depicted in Figure 6 are:

- Engelmann Spruce Forest Alliance
- Engelmann Spruce Temporarily Flooded Forest Alliance
- Engelmann Spruce Temporarily Flooded Woodland Alliance
- Lodgepole Pine Forest Alliance
- Lodgepole Pine Woodland Alliance
- Limber Pine Woodland Alliance
- Ponderosa Pine Forest Alliance
- Ponderosa Pine Woodland Alliance
- Douglas-fir Woodland Alliance
- Narrowleaf Cottonwood Temporarily Flooded Woodland Alliance
- Quaking Aspen Forest Alliance
- Quaking Aspen Temporarily Flooded Forest Alliance
- Lodgepole pine-Quaking Aspen Forest Alliance
- Ponderosa Pine-Quaking Aspen Forest Alliance
- Mountain Mahogany Shrubland Alliance
- Shrubby Cinquefoil Temporarily Flooded Shrubland Alliance
- Quaking Aspen Shrubland
- Willow Species Temporarily Flooded Shrubland
- Smooth Brome Semi-natural Herbaceous Alliance
- Water Sedge Seasonally Flooded Herbaceous Alliance
- Nebraska Sedge Seasonally Flooded Herbaceous Alliance
- Parry's Oatgrass Herbaceous Alliance
- Needle-and-thread Grass Bunch Herbaceous Alliance
- Baltic Rush Seasonally Flooded Herbaceous Alliance
- Mountain Muhly Herbaceous Alliance
- Kentucky Bluegrass Semi-natural Herbaceous Alliance
- Unclassified coniferous
- Unclassified shrubland
- Unclassified herbaceous

Figure 6. Vegetation Communities Map.



Within the Park boundaries, 9,898 acres or 83% of the area was mapped as coniferous forest and woodland. The two main components of that area were lodgepole pine forest alliance (4,689 acres or 39.4% of the Park) and ponderosa pine woodland alliance (3,854 acres or 32.4% of the Park). These two alliances also had the largest polygons of any mapped class within the Park. Deciduous forest and woodland comprised 275 acres or 2.3% of the park, the majority of which was aspen types. Mixed coniferous and deciduous forest types made up 1,134 acres or 9.5% of the park. Shrublands occupied 194 acres or 1.6% of the park. The two dominant shrubland types were mountain mahogany shrubland alliance and a mixed willow map class that included a number of different shrub willow species. Herbaceous classes were mapped on 351 acres or 2.9% of the park. The most extensive herbaceous community is smooth brome herbaceous alliance. Most of the other map classes are native upland and wetland graminoid alliances (Jones et al. 2015).

A general description of the vegetation communities found at the Park are provided below, including a history and the natural ecology. More detailed information about the NVC vegetation communities identified in 2015 can be found the Vegetation Report in the Appendix.

Photo 13. Ponderosa pine forests were the one of the most abundant vegetation communities mapped in the park.

Source: Jones et al. 2015

Ponderosa Pine Woodlands

Ecological and morphological characteristics of ponderosa pine favor colonization of disturbed sites and fire resistance. Seedlings are shade intolerant, quickly develop a

long taproot to reach moisture and are better able to tolerate drought than other conifers. Adaptations to survive surface fires include open crowns; thick, insulative bark; self-pruning lower branches; tight needle bunches that enclose and protect meristems, then open into a loose arrangement that does not favor combustion or propagation of flames; exceptional moisture levels in the needles; and a deep rooting habit (Bradley et al. 1992).

The combination of the above mentioned characteristics of ponderosa pine and historically frequent, low intensity fires within these community types naturally removed smaller diameter conifers from the stand. Laven et al. 1980 found a fire return interval for these stands in the Rocky Mountains to range between 21 and 66 years, making a mean fire return interval of 48.5 years. Ponderosa stands historically had open canopies with varied age class distributions (Mast et al. 1998, 1999), with a diverse and relatively lush understory of grasses and forbs. The historical structure and appearance of ponderosa stands was that of an open Park. It is estimated that historic ponderosa woodlands had as few as 12-40 trees per acre, up to 150 trees per acre (CPW 2005).

True ponderosa woodlands were likely more abundant previous to settlement than they are today, as fire suppression encourages artificially dense ponderosa forests and Douglas-fir encroachment. Ponderosa woodlands likely had the same range as they do today, but were much more open, and possibly looked more like meadows, than forests.

Related NVC Communities identified include:

- Ponderosa Pine Forest Alliance
- Ponderosa Pine Woodland Alliance

Ponderosa Pine / Douglas-fir Forests

Although relatively dense ponderosa and Douglas-fir forests is a vegetation community that is generally induced by fire suppression, this vegetation type could have historically developed in some areas. For instance, it has been postulated that there were likely some areas that were quickly and densely colonized by ponderosa after a gap opening event such as fire, large scale bug kills or catastrophic winds. After approximately 70 years of ponderosa colonization, the canopy begins to close (Lundquist & Negron 2000) and either frequent fire would thin out the ponderosas, or more shade tolerant species (such as Douglas-fir) would begin to germinate under the ponderosa canopy. Should fire occur within this mixed stand when the Douglas-fir is still young, the Douglas-fir would likely die, as Douglas-firs are generally not fire tolerant until about 40 years of age (Bradley et al. 1992). If fire does not occur, or is not allowed to occur, Douglas-fir soon becomes co-dominant with ponderosa and can eventually displace the ponderosa.

The combination of the historic average of a 48.5 year fire return interval and the fact that young Douglas-fir is not fire tolerant, these communities would naturally trend toward ponderosa woodlands. Mature ponderosa pine forests (greater than 70 years old) or forests where ponderosa and Douglas-fir share dominance were historically likely somewhat of an anomaly.

Related NVC Communities identified include:

- Ponderosa Pine Forest Alliance

- Ponderosa Pine Woodland Alliance
- Douglas-fir Woodland Alliance

Douglas-fir Forests

Generally, Douglas-fir is a shade tolerant climax species in dry to moist lower and middle elevation forests but is (relatively) shade intolerant in wetter forests (CPW 2005). Optimum habitat conditions for Douglas-fir in Colorado include a combination of moisture and shade, but as the canopy closes in ponderosa pine forests, Douglas-fir has become adaptable to drier habitats. Moreover, successional ecology of Douglas-fir can be complex, as it depends on a variety of factors including past disturbances, moisture and shade regimes and presence of other species. In this region of the Rocky Mountains, Douglas-fir forests often have ponderosa pine as a co-dominant and/or lodgepole pine as a seral species within the stand. In the absence of disturbance within primary elevation ranges, Douglas-fir tends to replace ponderosa, lodgepole, limber pine and aspen (Arno et al. 1997). As mentioned previously, Douglas-fir is relatively fire resistant after 40 years but can easily generate a crown fire because of the morphological traits of Douglas-firs. Hanging, drooping branches easily catch fire that quickly travels up to the crown. Fire regimes in Rocky Mountain Douglas-fir/interior ponderosa forest types below 8,200 feet (2,500 m) were historically likely "mixed and variable" with fires historically larger than 3.6 square miles (10 km2) occurring 50 to 60 years apart (Kaufmann et al. 2000; CPW 2005).

Historically, it is likely that mature Douglas-fir forests would most often have occurred on the lower elevation north facing slopes in this region, as the climatic conditions of these areas are favorable for Douglas-fir establishment and growth. Although Douglas-fir is a highly adaptable species with a wide ecological amplitude, the historic frequent fires in the lower elevations would have limited the population sizes by fierce competition from two conifer species that are extremely adapted to fire- the ponderosa and the lodgepole.

Related NVC Communities identified include:

- Douglas-fir Woodland Alliance

Lodgepole Pine Forests

Lodgepole pine is a shallow rooted, non-shade tolerant species that depends upon openings in the canopy for regeneration. This species is limited by a lack of water at lower elevations and short growing seasons at higher elevations (Tackle 1961; Bartolome 1983). Reproduction and regeneration are often dependent upon a combination of disturbance and the cones of the trees releasing seed at optimum conditions. Most lodgepole stands have a proportion of serotinous cones (cones that store seed that gradually open over a period of years or when exposed to high temperatures) to non-serotinous cones (cones that appear open in absence of fire), and the proportion depends upon the fire history of the stand (Anderson & Romme 1991). Frequent stand replacing fires favor serotinous cones, whereas stands with a history of low severity fires tend to have a lower proportion of cones that depend on fire to release seed.

The effect of fire on the structure and composition of a lodgepole stand depends greatly on its severity as well as habitat type. High severity fires – or stand replacing fires- generally produce even-aged single storied, dense stands where seed and

climatic conditions combined to produce a large number of seedlings at one time. In these conditions, lodgepole pine can be considered a persistent seral or subclimax species where stands are the result of periodic stand replacing fires. Lower severity fires in lodgepole generally occur in the open, multi-aged stands that remove young trees and create a seed bed for subsequent regeneration. Fires tend to recur in lodgepole stands on an average of 150 year intervals (Franklin & Laven 1991; Antos & Parish 2002) in the climate such as that found at Golden Gate Canyon State Park. Fire has generally recurred before some of the more shade tolerant conifers can move in. In short, fire cycles in lodgepole tend to perpetuate the structure and density of the previous stand. However, as fire intervals reach between 100-200 years with the advent of fire suppression, a lodgepole stand will begin to break down and more shade tolerant conifers will begin to move in (Arno 1976; Peet 1981).

Both frequency and abundance of lodgepole on a landscape scale prior to settlement would likely have been a bit different than it is today due to fire suppression. More frequent fires in lodgepole pine ecosystems would have produced less homogenous stand structures than what is seen today throughout Colorado and the west. A patchier mosaic of different ages of lodgepole pine stands would be noticeable on the landscape, with stands in various stages of recovery from past wildfires. Historic distributions of lodgepole would have been about the same as observed today, but more stands would have been in younger stages due to recovery from wildfires.

Related NVC Communities identified include:

- Lodgepole Pine Forest Alliance
- Lodgepole Pine Woodland Alliance

Mixed Conifer Forests

Mixed conifer stands at Golden Gate Canyon often do not have a clear dominant species and are a result of years of competition between species and selective logging. Mixed conifer stands have reached a dynamic equilibrium (or climax condition) and will likely persist until an inevitable stand replacing fire runs through the stand. Engelmann spruce and Douglas-fir are large components of the mixed conifer stands at Golden Gate Canyon. These species are more shade tolerant and optimum conditions for Engelmann spruce include long cold winters with heavy snowpack and short cool summers but can extend down to lower elevations along stream bottoms where cold air flows down the valley and collects in localized frost pockets. Engelmann spruce is easily killed by fire; therefore, on some of the lower elevation spruce habitat types, spruce will not achieve climax dominance because of repeated fires that favor shade intolerant seral conifers.

It is likely that mixed conifer stands such as those found at Golden Gate Canyon today would have been present 300 years ago. The location and abundance of these stands was (and is) likely constantly shifting with the various fires that move through the area.

Related NVC Communities identified include:

- Engelmann Spruce Forest Alliance
- Engelmann Spruce Temporarily Flooded Forest Alliance
- Engelmann Spruce Temporarily Flooded Woodland Alliance

- Douglas-fir Woodland Alliance

Photo 14. A mixed coniferous forest along a stream in Green Ranch, containing Engelmann spruce and Douglas-fir.

Source: Belmar 2020

Rush Meadow / Mountain Shrublands

The ecological balance of these relatively moist communities is a result of a characteristic suite of topography, soils, hydrology, and time. Species composition and structure within a wet meadow establish and develop according to relatively minor differences in seasonal moisture, hydrologic regime and soil textures.

Since the soils and topography of the area have not significantly changed since pre-settlement times, hydrology and species composition are the only factors that have been modified to alter the ecology of the wet meadows. Water and land management in areas of the park that were more conducive to settlement was favored for grazing and/or haying. Rush and shrubby cinquefoil both serve as "increasers" with grazing, meaning both these species are not preferred forage by cattle. Cattle will eat other species present first, serving to increase the cover of rush and shrubby cinquefoil. Therefore, previous to the advent of cattle production, these areas likely supported a much more diverse riparian community consisting of a variety of sedges, rushes, and perhaps willows. The vegetation community was likely tightly associated with slight differences in seasonal moisture and soil textures. Since the soils in this area were formed in loamy alluvium, but underlain by sand and gravel, aerobic (oxygen rich) conditions likely created conditions needed to support large stands of willows.

Related NVC Communities identified include:

- Water Sedge Seasonally Flooded Herbaceous Alliance
- Nebraska Sedge Seasonally Flooded Herbaceous Alliance
- Baltic Rush Seasonally Flooded Herbaceous Alliance
- Shrubby Cinquefoil Temporarily Flooded Shrubland Alliance

Non-native Grasslands

This vegetation community has been modified by recent human management of the land. Many of these areas were seeded with grazing grass species but have existed on the landscape for decades.

Related NVC Communities identified include:

- Kentucky Bluegrass Semi-natural Herbaceous Alliance
- Smooth Brome Semi-natural Herbaceous Alliance

Mountain Meadows

Mountain meadows nestled within the forest can be formed by fires or other disturbances, but some in this area are likely the result of growing conditions that will not tolerate trees (e.g. too wet, dry, cold, etc). As a result, many of these areas harbor a high diversity of forbs and grasses that are not found in other communities. Moreover, the landscape heterogeneity they create offers essential wildlife habitat and wildfire fuel breaks. If grasslands persist without regular disturbance such as fire or consistent grazing, they become susceptible to tree and/or shrub encroachment and thus a gradual conversion to a woodland or shrubland occurs.

Mountain meadows in this area may have had a wider distribution as a result of a higher frequency of fire or consistent historic grazing that may have reduced the encroachment of trees.

Related NVC Communities identified include:

- Parry's Oatgrass Herbaceous Alliance
- Needle-and-thread Grass Bunch Herbaceous Alliance
- Mountain Muhly Herbaceous Alliance

Aspen / Conifer and Aspen Stands

Aspen stands can occur in almost any soil type but are most vigorous in areas with somewhat fertile soils and sufficient moisture. Aspen is not shade tolerant and cannot reproduce under its own canopy. The most common regeneration method for aspen is root sprouting. Sprouting is generally controlled by plant hormones that are transported from the stems to the roots. If the movement of the hormones from the stem to the roots ceases as a result of fire or other disturbance, hormones from the roots are activated to produce sprouts. As a result, aspen regeneration is most effective following a fire or other major disturbance. In the West, aspen is considered seral to more shade tolerant conifers. Moreover, aspens generally have much higher understory diversity, more fertile soils and support a large variety of wildlife when compared to conifer stands.

Aspen may have been more abundant 300 years ago as frequent fires often created gaps in the canopy suitable for sprouting aspen. Additionally, the cooler wetter

climate before settlement also likely assisted in successful aspen colonization and persistence. However, new research suggests that the widespread fires in the late 1800's may have increased aspen presence to an unusually high level shortly after those fires (CPW 2005).

Related NVC Communities identified include:

- Quaking Aspen Forest Alliance
- Quaking Aspen Temporarily Flooded Forest Alliance
- Quaking Aspen Shrubland
- Lodgepole pine-Quaking Aspen Forest Alliance
- Ponderosa Pine-Quaking Aspen Forest Alliance

Riparian Shrublands

All willows need an abundance of moisture at their roots in order to survive and reproduce. Reproduction is achieved by a combination of sprouting and seed production. Different species of willows are best adapted to different soil textures as well as slight differences in moisture requirements. Some species of willows are encouraged to sprout when their root crowns get buried in stream sediment.

Photo 15. Willow carr located in Green Ranch.

Source: Belmar 2020

300 years ago, riparian shrublands may have had a slightly larger distribution in the past as compared to today as water development and grazing have likely decreased suitable habitat. As water is diverted for livestock or other uses, the streams transport less water losing some of its erosive ability to meander within the flood plain. The decrease of power of this natural process has likely not allowed the natural rate of creation of habitat for riparian shrublands and willow carrs.

Related NVC Communities identified include:

- Willow Species Temporarily Flooded Shrubland
- Narrowleaf Cottonwood Temporarily Flooded Woodland Alliance

Resource Conditions

Both natural and human disturbances have played an important role in determining the current vegetative communities of the Park. The areas surrounding the Park have a deep history of mining, logging, and ranching. Widespread mining near the town of Black Hawk left areas devoid of trees for mining timbers, fuelwood, and general construction. The southern areas of Green Ranch were historically logged off for these reasons.

Many of the Douglas-fir stands were impacted by past western spruce budworm and Douglas-fir beetle outbreaks (Jones et al. 2015). As of 2014, Mountain pine beetle, *Ips* beetle, and dwarf mistletoe were all found on the property at varying levels. These insects and pests are relatively under control and are being treated, but could cause impacts to forest communities if they worsen (Colorado Forest Management, LLC 2014). Mountain pine beetle infestation and mortality have not been heavy in this part of Colorado (Jones et al. 2015). More information about forest pests and disease can be found in the Impacts and Influences chapter.

The coniferous forests of Golden Gate Canyon State Park are in relatively good condition but require maintenance and management due to human alteration of the natural course of wildfire on the landscape. Many of the lodgepole pine forests are overly dense and even-aged because of the lack of wildfire on the landscape. As a result, lodgepole pines in many areas are stagnant in growth because of a lack of mortality. This homogenous forest leads more easily to insect and disease issues, such as mountain pine beetle. Like aspen forests, lodgepole pine forests also develop from large initial disturbances. The most common disturbance factor in lodgepole was wildfire which would kill the overstory of trees but allowed the seeds to release from the cones due to the heat of the wildfire.

The widespread aspen stands are in poor condition due to intensive and extensive elk browsing. Many of the aspen stands are losing their overstory due to elk barking, and subsequent aspen suckers are being browsed annually. This elk browsing is beginning to cause some aspen stands to die out, or become dramatically reduced in size (Rocky Mountain Ecological Services Inc. 2005). Many areas of mixed aspen and lodgepole pine are seeing lodgepole pine shading out new aspen growth. Successional aspen forests are typically replaced over time by coniferous forests; and this is no different at Golden Gate Canyon State Park. These lodgepole/aspen areas are slowly being turned into conifer forests as the conifers overtop and replace the aspen. Treatments that remove the conifer overstory can help more aspen persist on the landscape (Colorado Forest Management, LLC 2014).

Riparian woodlands and shrublands are in good condition overall. No forestry treatments are required in these areas. Should water quantity, quality and seasonal flows remains relatively unchanged, the riparian shrublands and willows carrs should remain in good condition. The lack of grazing in the area has potentially allowed the spread of willows in suitable habitat. Noxious weed introduction and spread is the biggest threat to these areas and developments, such as trails, should be avoided in these areas to prevent weed dispersal.

Active forest management has been an integral piece of the stewardship at Golden Gate Canyon State Park. The Golden Gate Canyon State Park Forest Management Plan was created in 2014 (Colorado Forest Management, LLC 2014). Prior to the plan, coordination between the Colorado State Forest Service and the CPW has occurred on

the Park since the 1980's regarding forest management activities. The Park has seen a significant increase in the frequency and size of forest management activities in the past 15 years. Projects in the Park include fuel break thinning, fuels reduction, patch cut treatments, and prescribed fires have all been implemented in order to manage forests at the Park. Future recommendations for forest management are provided in the 2014 Forest Management Plan included in the Appendix (Colorado Forest Management, LLC 2014).

As part of the 2015 vegetation mapping project, vegetation was rated for condition according to exotic species, community health, structure, and species diversity. These four variables ultimately contributed to an overall rating of an area's condition. Condition was attributed to each area of the Park by the vegetation community it was classified. Approximately 1,313 acres (14% of assessed acres) were in excellent condition, 8,052 acres (83% of assessed acres) were in good condition, 301 acres (3% of assessed acres) were in fair condition, and 0 acres were in poor condition. Approximately 2,237 acres (23% of the park) were not assessed. Table 11 below provides a breakdown of the vegetation condition by the four variables and overall for the Park and Figure 7 displays the vegetation condition data for the Park.

Table 11. Acreage summary for component condition and overall condition at Golden Gate Canyon State Park.

Condition Class	Community Health	Weeds	Community Structure	Species Diversity	Overall Condition
Not Rated	2,237	2,237	2,237	2,237	2,237
Poor	6,341	442	42	-	-
Fair	836	366	80	50	301
Good	1,805	1,189	5,394	2,199	8,052
Excellent	685	7,670	4,151	7,418	1,313

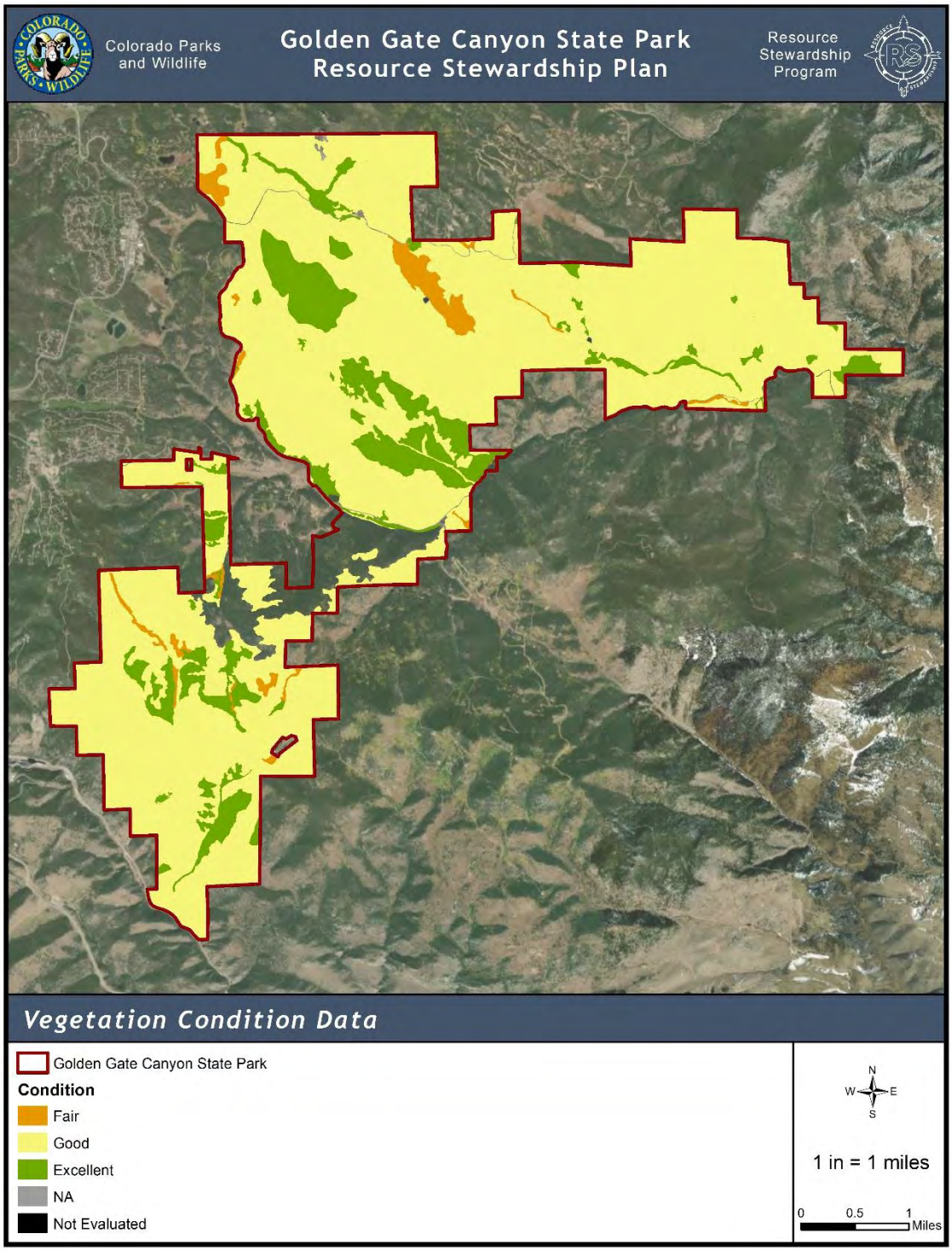
Source: (Jones et al. 2015)

Additionally, the Resource Stewardship group completed a 2017 weed inventory for the Park, 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 outline in the report, with easy to follow instructions for Park staff and managers. For more information, see CPW's 2017 Weed Management Plans in the Appendix and Chapter 4 Impacts and Influences (CPW 2017b).

Table 12. List of Vegetation Community Conditions at Golden Gate Canyon State Park.

Vegetation Community	Condition / Status	Description
Aspen Woodlands		Elk barking and overgrown coniferous trees shading aspen stands threaten the health and viability of aspen woodlands in the Park. Continued forest management in areas containing aspens will assist in this community thriving in the future.
Mountain Meadows / Grasslands		Mountain meadows in the Park are in good condition except for areas dominated by non-native grasses, such as smooth brome.
Coniferous Forests		The majority of coniferous forests in the Park are healthy and in good condition. Many areas are overgrown and have even-aged trees present, but proactive forest management activities have been underway for decades. These activities are continually improving the Park's forests. Additionally, some pests and disease are present, but levels are not nearly as high in other areas of the state.
Riparian Willow Carrs		Riparian willow carrs are well-developed along the creeks and drainages in the Parks and are in good condition. These areas are hugely important for many wildlife species that use the Park.
Wet Meadows / Shrublands		Wet meadows and shrublands are more prone to weed invasion and species composition has been altered by historic cattle grazing activities. However, these communities are in relatively good condition and seem to be unchanging.

Figure 7. Vegetation Conditions Map



Discussion and Conclusions

Overall, the condition of vegetation will remain in the same but could be impacted by noxious weed spread, catastrophic wildfire, and pest and disease spread. Noxious weed 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. Continued and proactive forest management must continue as the forests of the Parks including wildfire mitigation activities and pest and disease control.

- Aspen Woodlands: The structure and health of some of the aspen and aspen/ conifer forests will likely continue to decline, as the continued lack of disturbance will encourage more conifer encroachment. As fire suppression continues, shade tolerant conifers will continue to establish under the aspen canopy, reducing the health and vigor of the aspen stand and its ability to regenerate after a disturbance. Additionally, the declining acreages of aspen are subject to grazing from the elk in the area, putting further stress on the aspen. Forest management activities may lessen these impacts in the future.
- Coniferous Forests: Continued fire suppression in coniferous forests will promote the development of an unnatural forest structure. However, the Park is actively implementing the Forest Management Plan and is improving forest conditions through thinning forests and introducing prescribed fire.
- Mountain Meadows / Shrublands: The few small, but unique mountain meadows in the Park will likely persist at least in the future. However, weed infestations and monocultures of smooth brome threaten the diversity of these areas. Native forbs and graminoids are essential for a variety of wildlife, including pollinators and birds. Smooth brome is likely to persist and continue to decrease the diversity of native grassland communities in the Park.
- Riparian Willow Carrs: Willow carrs are in good to excellent condition in the Park and will continue to remain that way. Drought is the biggest influence on these areas and may pose a threat with climate change and increasing temperatures in the region.
- Wet Meadows / Shrublands: Wet meadows and shrublands are in good condition and will continue to remain that way. Moisture availability is essential to these areas, and climate change-induced drought may threaten the health of these communities in the future.

Sensitive Plants and Communities

Description

Golden Gate Canyon State Park contains a landscape of different vegetative communities that provide habitat for sensitive or rare plant species. Although the Park is highly visited and disturbances are incurred in developed areas, there are acres of land that remain undisturbed, in excellent condition. Areas devoid of disturbances are able to sustain sensitive plants and communities. Disturbance such as vegetation trampling, erosion, and noxious weed spread all limit the ability of native species to thrive.

Knowledge of species and habitats that occur or could occur in the Parks are a result of conducting surveys and monitoring and serve as the foundation for this Stewardship Plan and for CPW's ability to conserve resources at Golden Gate Canyon State Park. Table 13 below lists the surveys and monitoring efforts that have been conducted related to Sensitive Plant Species and Communities. No specialized surveys for rare plants or communities have ever been conducted for the Park, yet several rare species and communities could occur. Sections following provide information about specific taxa and associated habitats that are known in the Park based on these efforts. Section 5 discusses future survey and monitoring effort needs for the Park based on those that have been conducted.

Table 13. List of Surveys and Monitoring Conducted for Sensitive Plants and Communities at Golden Gate Canyon State Park.

Resource	Description	Years	Performed by
Vegetation Assessment	Vegetation communities were mapped according to the NVC and condition was assessed. 40 plots for monitoring were established.	2002	Rita Berberian
Vegetation Mapping and Monitoring	Vegetation communities were mapped according to the NVC and condition was assessed. 24 of the 40 monitoring plots established in 2002 were revisited.	2015	Center for Environmental Management of Military Lands

Based on background research, the location of the Park, historical occurrences, and baseline vegetation surveys, the Park may provide habitat for nine rare plants and ten rare communities. The species alpine aster (*Aster alpinus var. vierhapperi*), Sprengel's sedge (*Carex sprengelii*), broad-leaved twayblade (*Listera convallarioides*), and pale blue-eyed grass (*Sisyrinchium pallidum*) were all documented within the Parkhistorically by CNHP or CPW and fiddleleaf twinpod (*Physaria vitulifera*) historically documented just outside of the northeast corner of the Park. Additionally, all ten communities have previously been documented in the Park by CNHP. A recent survey to document any potential new occurrences of these species should be conducted. Table 14 below lists the species and communities and Figure 8 displays available data on occurrences.

Table 14. List of Sensitive Plants and Vegetation Communities that Could Occur in Golden Gate Canyon State Park.

Scientific Name	Common Name	Listing Status		Habitat Description	Park Presence
		USFWS	CNHP		
Aster alpinus var. vierhapperi	Alpine aster		G5 / S1	Found in park at 8600 feet within an aspen forest, usually found on residual turf of gravelly tundra.	Documented in the Park in 2013 by CPW.
Botrychium echo	Reflected moonwort		G4 / S3S4	Gravelly soils, rocky hillsides, grassy slopes, and meadows. Elev. 9500-11,000 ft.	Not Documented in the Park.
Botrychium hesperium	Western Moonwort		G4 / S3	Grassy slopes, roadsides and at edges of lakes	Not Documented in the Park.
Botrychium lineare	Slender Moonwort		G3 / S2S3	Grassy slopes among medium height grasses, along edges of streamside forests. Elev. 7900-9500 ft.	Not Documented in the Park.
Carex sprengelii	Sprengel's sedge		G5 / S2	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.	Documented in the Park in 2011 by CNHP.
Cercocarpus montanus / Muhlenbergia montana Shrubland	Alderleaf Mountain-mahogany / Mountain Muhly Shrubland		GU / S2	Lower montane foothills of the southern Rocky Mountains.	Documented in the Park in 2012 by CNHP.
Listera convallarioides	Broad-leaved twayblade		G5 / S2	Cool ravines, subalpine forests	Documented in the Park in 2009 by CNHP.
Liatris ligulistylis	Gay feather		G5? / S2	Moist areas within Ponderosa pine woodlands.	Not Documented in the Park.

Scientific Name	Common Name	Listing Status		Habitat Description	Park Presence
		USFWS	CNHP		
Phacelia denticulata	Rocky Mountain phacelia		G3 / S2	Found in sandy and rocky soils, typically in lightly disturbed areas such as loose soil on the sides of recently constructed trails, or along gullies. It has also been found on steep forested mountainsides with boulders and rocky outcrops (1,676 - 3,048 m elevation).	Not Documented in the Park. Observed in 2011 by CNHP (Pam Smith & R. Scully) about 5 mi to southeast of Park boundaries.
Physaria vitulifera	Fiddleleaf twinpod		G3 / S3	Found on rocky slopes and dry hillsides, often on decaying granite (1,741 - 3,118 meters).	Not Documented in the Park. Documented to the northeast of the Park in 2020 by CNHP.
Pinus ponderosa / Leucopoa kingii Woodland	Ponderosa Pine / Spike Fescue Woodland		G3 / S3	Occurs most typically on non-southerly aspects with gentle to moderate slopes.	Documented in the Park in 1992 by CNHP.
Populus angustifolia / Alnus incana Woodland	Narrowleaf Cottonwood / Gray Alder Riparian Woodland		G3 / S3	Found in narrow bands on the floodplains and benches of montane streams (1900-2700 m elevation) in the southern Rocky Mountains.	Documented in the Park in 1996 by CNHP.
Populus angustifolia - Pseudotsuga menziesii Woodland	Narrowleaf Cottonwood - Douglas-fir Riparian Woodland		G3 / S2	Found along small active streams in rocky, cool canyons and valleys between 2000-2700 m in Colorado.	Documented in the Park in 2011 by CNHP.
Populus tremuloides / Salix drummondiana Forest	Quaking Aspen / Drummond's Willow Riparian Forest		G3 / S1	Occurs in streambeds and drainage channels at 2710 to 3150 m elevation.	Documented in the Park in 2009 by CNHP.
Salix bebbiana Shrubland	Bebb's Willow Wet Shrubland		G3 / S2	Found in the montane regions and western plains of the United States. This	Documented in the Park in 2009 by CNHP.

Scientific Name	Common Name	Listing Status		Habitat Description	Park Presence
		USFWS	CNHP		
				community is a briefly flooded scrub-shrub wetland on slightly to moderately alkaline soils, usually near low-gradient streams.	
Salix monticola / Mesic Graminoids Shrubland	Park Willow / Mesic Graminoids Wet Shrubland		G3 / S3	Dominates broad, swift mountain streams with active floodplains at 2000-3350 m (6600-11,000 feet) elevation.	Documented in the Park in 2009 by CNHP.
Salix monticola / Calamagrostis canadensis Shrubland	Park Willow / Bluejoint Wet Shrubland		G3 / S3	Occurs along broad floodplains and narrow streams in the montane to upper montane elevations of Colorado. The elevational range is 2530-2865 m (8300-9400 feet).	Documented in the Park in 2009 by CNHP.
Salix monticola / Carex aquatilis Shrubland	Park Willow / Water Sedge Wet Shrubland		G3 / S2	Occurs in the southern Rocky Mountains on coarse-textured streambanks and floodplains of narrow, sinuous streams in narrow valleys, often forming a continuous canopy across the entire valley floor at elevations of 2100-2980 m (7000-9760 feet).	Documented in the Park in 2009 by CNHP.
Salix planifolia / Carex utriculata Shrubland	Diamondleaf Willow / Northwest Territory Sedge Wet Shrubland		GNR / S2	Known from high mountain valleys at elevation ranges from 1750 to 2690 m (5740-8830 feet)	Documented in the Park in 2009 by CNHP.
Sisyrinchium pallidum	Pale blue-eyed grass		G3 / S3	Occurs in wet meadows often where ample fresh, often standing water is available at least through June or early July.	Documented in the Park in 2009 by CNHP.
Sources: (CPW 2005; CNHP 2019a, 2019b)					

Scientific Name	Common Name	Listing Status		Habitat Description	Park Presence
		USFWS	CNHP		
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.					
FP - Federally Proposed, FE - Federally Endangered, FT - Federally Threatened					

Alpine Aster

Alpine aster (*Aster alpinus var. vierhapperi*) is a rare plant that has little information about habitat preferences and occurrence in the state. Apparently, within its primary range, the species prefers a broad range of habitat types. It has been found in alpine tundra on slopes and saddles of high mountains, with many occurrences along the Continental Divide. Other occurrences have occurred in aspen forests and mountain-steppe open woodlands (USFS 2021).

The species was documented in 2013 by CPW staff/volunteers in the Park. Little is known about this species, so investigating the occurrence in the Park further would be worthwhile. More information on the identification and habitat preferences of this species can be found in the Appendix.

Broad-leaved twayblade

Broad-leaved twayblade (*Listera convallarioides*) is found in shady, moist forests, and along streams. It is often associated with Engelmann spruce, white fir, boxelder, quaking aspen among other species. The species is usually found from 6,732 - 9,455 feet in elevation (CNHP 2015).

The species was documented in the Park in 2009 as recorded by CNHP's data. More information on the identification and habitat preferences of this species can be found in the Appendix.

Photo 16. Broad-leaved twayblade is a rare plant species that historically has been documented in Golden Gate Canyon State Park.

Source: CNHP, Susan Spackman Panjabi

Fiddleleaf Twinpod

Fiddleleaf twinpod (*Physaria vitulifera*) is found on rocky slopes and dry hillsides, often on decaying granite. The species is usually found from 5,712 - 10,230 feet in elevation and has been found in Boulder, Clear Creek, Douglas, El Paso, Gilpin, Jefferson, Park and Teller counties. (CNHP 2015).

The species was documented just outside of the Park boundary in 2020 as recorded by CNHP's data.

Pale Blue-eyed Grass

Pale blue-eyed grass (*Sisyrinchium pallidum*) occurs in wet meadows often where ample fresh, often standing water is available at least through June or early July. These include stream, lake and river margins up slope from the most hydrophytic sedges and rushes, seep areas down stream from earthen dams, and irrigated hay meadows. It grows especially on alkaline soils, often with Arctic rush (*Juncus arcticus*) and water sedge (*Carex aquatilis*). The species is usually found from 6,322 – 9,708

feet. The primary threat at this time to this species is considered to be alteration of wetland habitat through peat mining and water diversion projects (CNHP 2015).

The species was documented in the Park in 2009 as recorded by CNHP's data. More information on the identification and habitat preferences of this species can be found in the Appendix.

Sprengel's Sedge

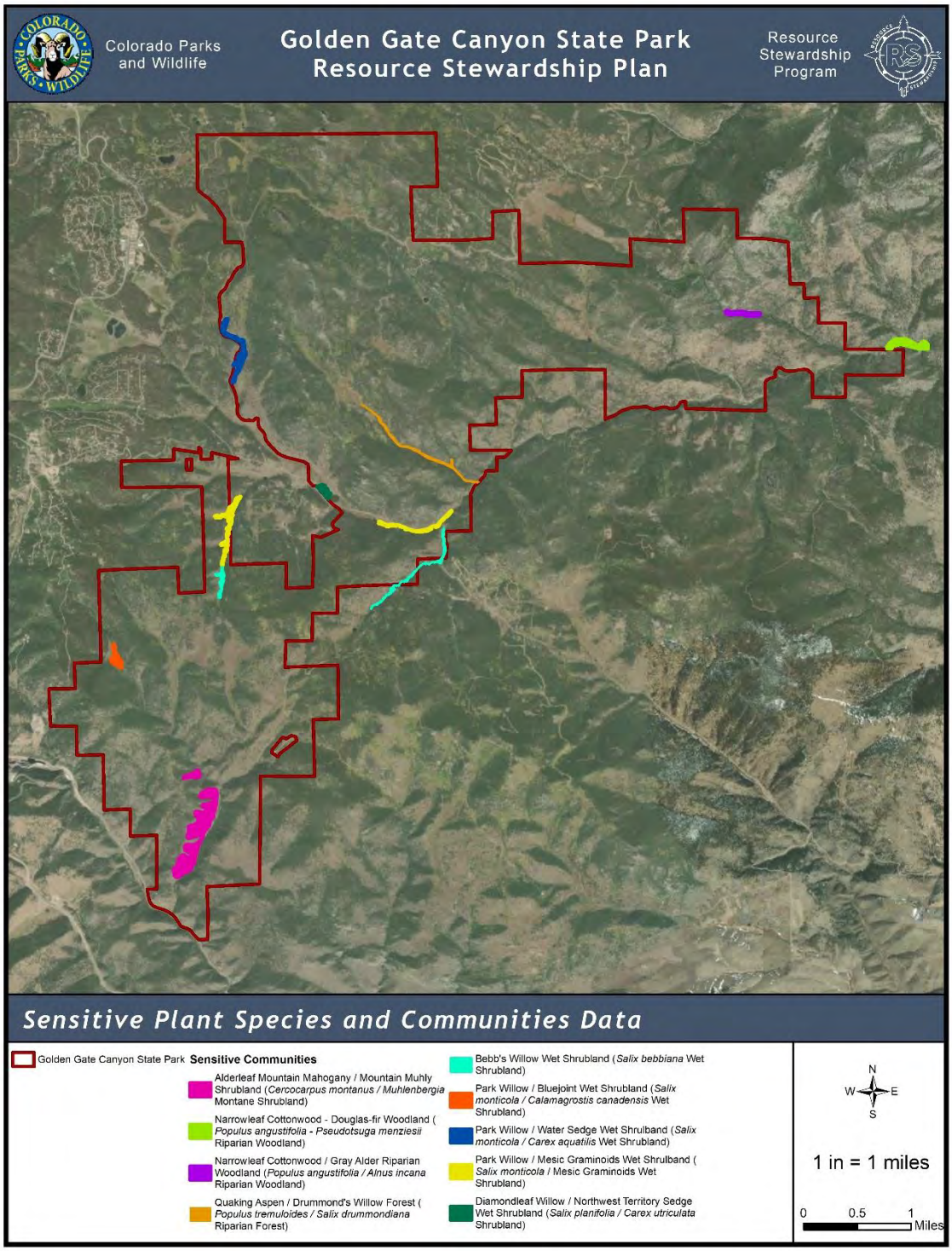
Sprengel's sedge (*Carex sprengelii*) can be found in dry to mesic deciduous forests and forest openings, floodplain forests and riverbanks, lakeshores, limestone river bluffs, mixed conifer-hardwood forests, thickets, meadows, roadsides, often associated with calcareous rocks and soils.

The species was documented in the Park in 2011 as recorded by CNHP's data. The location of the occurrence is provided on Figure 8. More information on the identification and habitat preferences of this species can be found in the Appendix.

Sensitive Communities

Ten sensitive plant communities have been documented within the Park according to CNHP's data. Table 14 provides a list of these communities, where they may be found and when they were last documented. Additionally, Figure 8 shows available data on the approximate location of the rare communities that were documented in the Park.

Figure 8. Sensitive Plant Species and Communities Map



Resource Conditions

The condition of sensitive plants and communities is not currently known in the Park. Surveys for potential species have not been conducted by CPW. CNHP and CPW have documented occurrences in the past, but populations date from 1992 to 2013. A lapse of nearly a decade since the last occurrence record for any rare species provides insight of what could still be present at the Park but not about the current populations. Vegetation communities and their condition provide a basis for rare species and communities to survive, and vegetation was documented as in good to excellent condition during the 2015 vegetation mapping project. It is likely that habitat in good condition is present for many of the species and communities that could occur, away from developed and disturbed areas. Noxious weeds, development, vegetation trampling, and climate change all pose threats to the existence of sensitive plants and communities at the Park. If these threats worsen over time, the condition of sensitive plants, communities, and associated habitats are sure to decline. Implementing the noxious weed plan, using native seed mixes, and avoiding potential habitat areas for development (trails, roads, campgrounds, etc.) are all ways to protect sensitive plants and communities from threats.

Table 15. List of Sensitive Plant and Vegetation Community Conditions at Golden Gate Canyon State Park.

Resource	Condition / Status	Description
Sensitive Plant Species		Populations of four sensitive plant species were historically identified within the Park by CNHP and CPW. However, protocol-level surveys have not been conducted in the Park. It is uncertain what the current condition of sensitive species is in the Park without surveys or monitoring being conducted. Vegetation in the Park was classified as in good to excellent condition, and therefore is likely to provide good habitat for the sensitive species that could occur.
Sensitive Communities		Ten sensitive communities were identified in the past. Vegetation in the Park was classified as in good to excellent condition, and therefore is likely to provide good habitat for the sensitive communities that could occur.

Discussion and Conclusions

The Park contains habitat for both sensitive plants and communities. Four rare plants and ten sensitive communities were documented in the past according to CNHP and CPW data. Enhancing habitat for both sensitive plants and communities at the Park through noxious weed control is a priority. Exotic species compromising the natural vegetation communities is a continuing issue. Habitat improvement actions, such as targeting exotic species by following the Noxious Weed Management Plan and seeding

disturbed areas with native seed mixes provided in the Appendix will continue to increase the possibility of rare plant occurrences.

Knowing what is present in the Park is the highest priority for rare plant species and communities. A protocol-level survey in potential habitat areas has not been conducted in the past. It is very difficult to conserve a resource when its presence is not currently known. The Park contains habitat for a large number of rare plants species, which is a unique feature of the Park and should be a priority for the Park.

Water and Wetland Resources

Resource Summary

Significant Features

- Upper Frazer Meadow – This high altitude meadow has a decadent but unique willow carr that escaped destruction for agricultural purposes. Many willow species, birch, and blue spruce populate this very dense wetland.
- Ralston Creek and Ponds – Ralston Creek has excellent ponds for recreational fishing and has a healthy mountain stream system.
- Various Creeks and Streams – Smith Hill Gulch, Macy Gulch, Dude's Fishing Hole, Nott Creek, and Deer Creek have moderately healthy riparian systems that act as sediment filters, assist with flood retention and support rich plant and animal communities.

Threats

- Noxious Weeds – Weed infestations threaten diversity, viability, and functionality of wetlands and riparian areas through the displacement of native species. Noxious weeds recorded in the wetlands of the Park include Canada thistle, poison hemlock, curly dock, musk thistle, yellow toadflax, and smooth brome.
- Erosion – Naturally erosive soils combined with high visitation, cattle grazing upstream of the Park, and potential for extreme thunderstorms increases the potential for sediment laden runoff to pollute surface waters.
- Wildfire and Sedimentation - Wildfire ignitions are always a possibility and large scale high intensity wildfires can clear all vegetation to lay bare highly erosive soils, which can lead to increased sedimentation toward and into the waterways.

Water Resources

Description

Golden Gate Canyon is in the southwestern portion of the South Platte River watershed. Ralston Creek flows are intercepted and regulated for irrigation and domestic use in Ralston Reservoir, approximately seven miles east of the park. Macy Gulch drains into Smith Hill Gulch, then into Clear Creek. In addition to Ralston, Deer and Nott creeks and Sawmill and Macy gulches, significant surface water resources in the Park include the Ranch Ponds, an unnamed pond in Forgotten Valley, Slough Pond, Kriley Pond and Duce's Fishin' Hole. Figure 9 displays water resources data for the Park. Knowledge of water resources in the Park are mostly a result of background research, although one survey has been conducted (Table 16). Section 5 discusses future survey and monitoring effort needs for the Park based on those that have been conducted.

Table 16. List of Surveys and Monitoring Conducted for Water Resources at Golden Gate Canyon State Park.

Resource	Description	Years	Performed by
Rapid Assessment Report for geophysical/hydrological resources at Golden Gate State Park	Characterized and assessed the extent, condition and/or primary or most significant issues or concerns with the hydrological and geological/soil features at the Park.	2002	Curt Harvey

Prior to human settlement in the Park and along the Front Range, research has shown that ponderosa pine stands were more open, with large areas dominated by grasses, sparsely populated with ponderosa trees spaced approximately one tree per ¼ acre (Veblen & Lorenz 1986). These open meadows were maintained by relatively low intensity grass fires, burning an area on average once every 30 to 50 years (Goldblum & Veblen 1992). In the mixed conifer systems, infrequent fires kept a higher degree of forest patchiness- which means that small fires usually burned one to 150 acres, keeping the forested landscape more of a patchwork of recently burned areas, and other areas in various stages of recovery from previous fires.

With less dense forests on the landscape, and more precipitation, more water was available in streams and creeks. Additionally, man-made structures ranging from spring developments and stock tanks up to large dams and trans-basin diversions were absent. These conditions would have created streams and creeks with higher runoffs during the spring, which dropped to levels below what we see today. This is because current water storage reservoirs are designed to capture much of the early spring runoff, and slowly release these waters over the course of the summer in order to supply crops and other agricultural uses with a consistent water supply during the growing season.

All of the suitable meadows with a nearby source of surface water were homesteaded in the late 1800's- early 1900's. As seen in the meadows in Green Ranch, shallow irrigation ditches were constructed to channel water out of the creeks, and across the fields. Large piles of rocks are visible in these areas where farmers removed rocks from their fields for easy hay production. Since agricultural production of these meadows have stopped, the meadows and the streams that were diverted for so long are slowly recovering from these disturbances. These agricultural water developments, including the pond constructed throughout the park, is relatively nothing compared to the extreme disturbances to the watershed around Black Hawk.

The western settlement history of the area has been one of a heavy hand on the landscape, with widespread mining around Black Hawk that produced large amounts of tailings piles, erosion and acid mine drainage into creeks and streams. The areas around these mountain mining towns were denuded of trees for mining timbers, fuelwood, and general construction. Much of southern Green Ranch was logged off for these purposes. Most of the area within Golden Gate Canyon State Park escaped with intact watersheds, leaving high quality water and riparian ecosystems. Compared to the industrial mining activities around Black Hawk, the ranching and agricultural uses

in Golden Gate have left little impact to the water resources. As the area around Golden Gate Canyon lacked enough valuable gold, the area was spared from the environmental destruction so near it in Black Hawk, Central City, Nederland, and the other gold-mining towns in the area. An excerpt taken from a Black Hawk history web site affirms the impacts to the impacts to watersheds around Golden Gate Canyon and how unique the Park is in escaping these impacts.

Major Water Systems

- Deer Creek flows at around .5 cfs (cubic feet per second) during the summer but can flow as high as 3 cfs during heavy thunderstorm events. As this stream drains warm south facing slopes, it is mainly driven by summer thunderstorm events, instead of spring snowmelt.
- Nott Creek flows at around 2 cfs during the summer but can flow as high as 5 cfs during peak runoff or during thunderstorm events. It drains approximately 2.75 square miles, mostly on the Park, but some from private land and the Arapaho & Roosevelt National Forest.
- Ralston Creek flows at around 4 cfs during the summer but can flow as high as 10 cfs during peak runoff. It drains approximately 3 square miles, but with an impressive elevation drop of two-thousand feet. Almost all of this drainage is on Golden Gate Canyon State Park. Erosion upstream threatens long term sustainability of ponds on the creek.
- Macy Gulch flows at around 2 cfs during the summer but can flow as high as 4 cfs during peak runoff. It drains approximately two square miles of steep, but heavily wooded country, owned almost entirely by Golden Gate Canyon State Park.
- Smith Hill Gulch flows around 3 cfs during the summer but can flow as high as 8 cfs during peak runoff. This creek catches a lot of sediment from the Smith Hill Road.

Ponds and Other Structures

There are several ponds in the Park. On Ralston creek, Kriley pond is the largest pond in the park, with a surface area of approximately 4 acres. It is heavily fished during the summer and stocked with Rainbow trout by CPW. It currently receives significant sediments from upstream stream degradation. Grazing occurs upstream but is not considered the main contributor to erosion issues. Slough pond has a surface area of approximately ½ acre and is also stocked with Rainbow trout by CPW. It too receives quite a bit of sedimentation from off-park erosion. The Show pond next to the Visitors' Center has a surface area of approximately 1/3

Photo 17. **Dude's Fishing Hole.**

Source: Harvey 2002

acre. Dude's fishing hole has a surface area of approximately 1.3 acres and was built by the original homesteaders to the area, and now provides year round water for wildlife. The dam and areas around the edges are somewhat lacking riparian vegetation but seem to be functioning properly. Forgotten Valley pond has a surface area of approximately 1.5 acres and is very similar to Dude's fishing hole. A more detailed assessment of these resources can be found in the "Rapid Assessment Report for geophysical/hydrological resources at Golden Gate State Park" report by Curt Harvey (Appendix).

Groundwater

Groundwater is present at various depths throughout the Park, with depth and yield depending on soil and subsoil characteristics, and the amount of area upstream and gradient available to supply water for infiltration into the aquifers. Numerous springs and seeps are present at the Park, resulting in isolated microhabitats that vary from immediate surrounding areas. The quality of the groundwater is expected to be good throughout the park.

Sewage treatment

Golden Gate has 19 dry vaults scattered throughout the Park, and are pumped out as needed. Reverends Ridge Campgrounds has its own water treatment facility to treat wastewater. Kriley, Harmsen, Works, the Upper and Lower Shops, and the Visitors Center are all serviced by septic tanks and leach fields.

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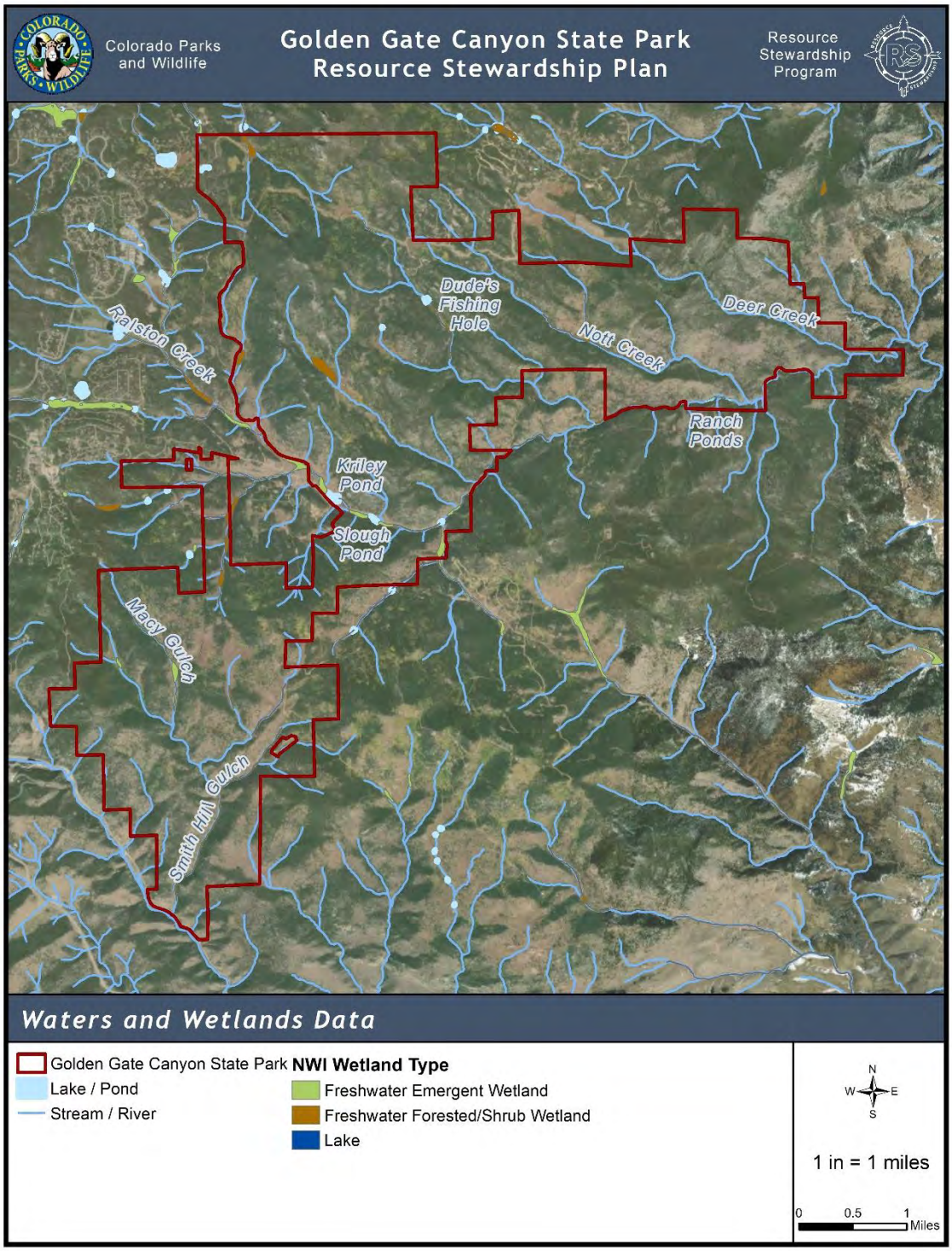
Figure 9. Water and Wetland Resources Map



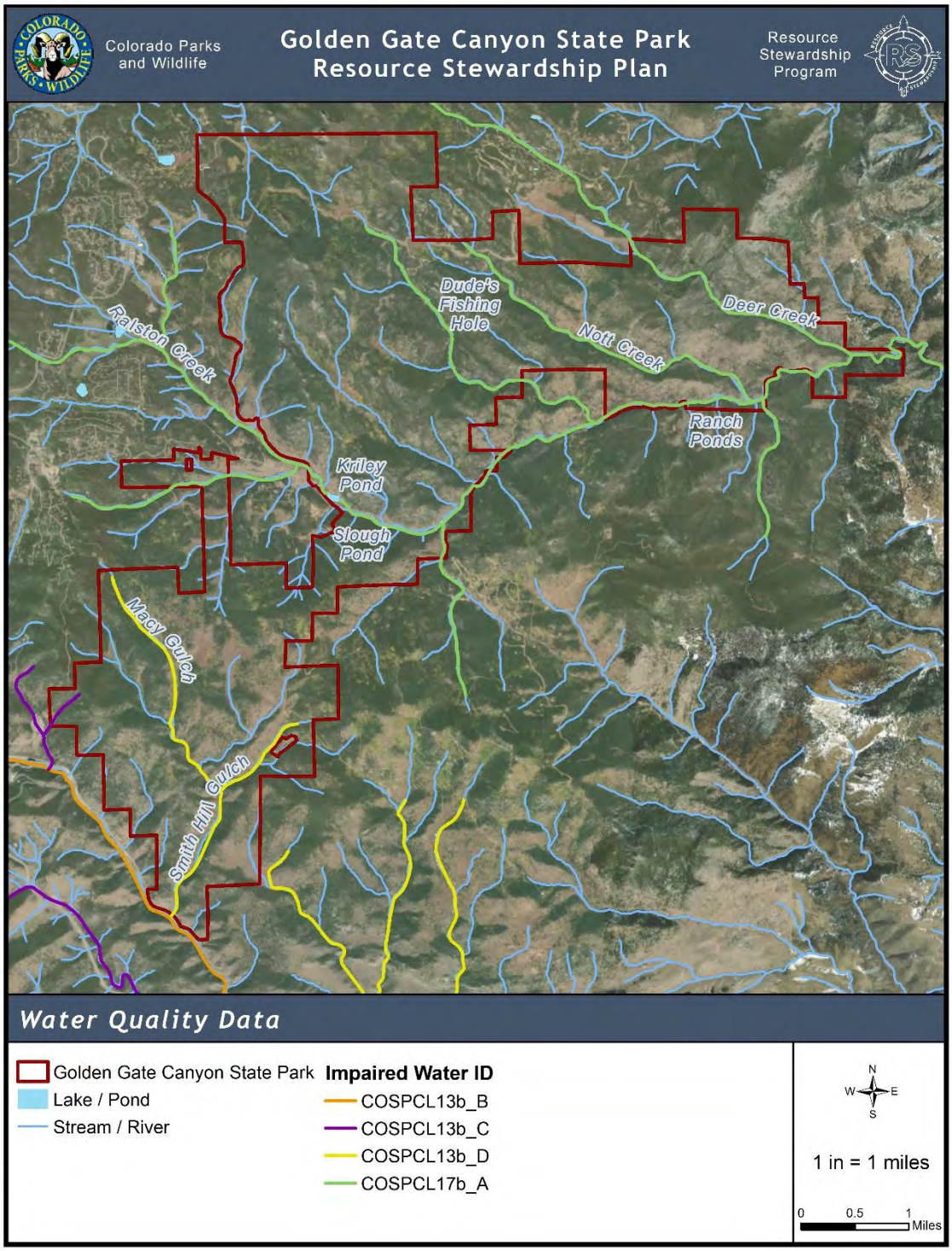
Resource Conditions

A review of Colorado Department of Public Health and Environment (CDPHE) data found that many of the drainages in the Park are listed on Colorado's Section 303(d) list of impaired waters and monitoring and evaluation 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. Table 17 provides information on the impaired waters in the Park and Figure 10 displays corresponding data about contaminated streams.

Table 17. List of Impaired Waters at Golden Gate Canyon State Park.

Name	Listed Portion	Contaminants / Issues
COSPCL13b_B	Mainstem of N. Clear Creek from a point just below the confluence with Chase Gulch to the confluence with Clear Creek, except for the specific listings in Segment 13a.	Cadmium, Temperature, Macroinvertebrates
COSPCL13b_C	Gregory Gulch, Russell Gulch, and Silver Gulch, including all tributaries and wetlands, from their sources to their confluences with North Clear Creek.	*pH, Lead, Copper*, Cadmium
COSPCL13b_D	All tributaries and wetlands to North Clear Creek from a point just below the confluence with Chase Gulch to the confluence with Clear Creek, except for specific listings in Segment 13a, and excluding those tributaries specifically identified in portion.	Cadmium
COSPCL17b_A	Mainstem of Ralston Creek, including all tributaries and wetlands, from the source to the inlet of Arvada Reservoir.	Manganese, Copper
Bold Contaminants - Impaired without a TMDL completed *Italic Contaminants* – Insufficient data to make a determination (Monitoring and Evaluation List) *Source: (CDPHE 2020)*		

Figure 10. Water Quality Data Map.



Aside from chemical contaminants listed above, the following may contribute to water quality degradation:

- Sedimentation from existing roads and trails.
- Sedimentation from upstream private land grazing and riparian degradation.
- Sedimentation from current forest management activities.
- Pollutants from automobiles utilizing roads and campgrounds.
- Herbicides from noxious weed control measures.

Sedimentation from logging activities would only occur in the event of an intense precipitation event. There is always a concern of accidental or intentional dumping of septic tanks from RV's, or possible automobile accidents on major roads involving septic, gasoline, or other spills that could contaminate Ralston Creek. Contamination from herbicides for noxious weed control should not occur if herbicides are applied correctly.

The ponds at Golden Gate Canyon State Park are one of the main attractions and centers of activity for visitors to the park. Because of this, they will always have very high levels of activity around the ponds. The park has done a good job of developing these resources to protect vegetation and the shores from erosion. Raised walkways, piers and armored trails focus impacts and protect wetland resources, as well as decrease potential erosion into ponds (and streams). However, due to sedimentation entering the park from private lands, the ponds in the park are often cloudy with suspended sediments.

Table 18. List of Water Resource Conditions at Golden Gate Canyon State Park.

Resource	Condition / Status	Description
Erosion and Sedimentation		Erosion and sedimentation of waters (streams and ponds) have been documented in the Park for many years as a result of cattle grazing and visitation. This continues to be an issue for the Park and with increased visitation in the future, it is likely to increase in severity. Proactive measures, such as shoreline restoration or limiting visitor access to eroded areas could increase the condition of water resources. Working with neighbors to limit cattle access to waterways that enter the Park may be another possibility.
Water Quality		Many of the drainages in the Park are listed on Colorado's Section 303(d) list of impaired waters and monitoring and evaluation list for various contaminants. Water quality in the area has largely been impacted by historic and current mining operations upstream of the Park. It is uncertain if

		these water quality issues are worsening without an assessment of waters in the Park.
Fishery		Many of the ponds in the Park are stocked every year with several species of fish. Visitors come to the Park specifically to fish because this resource is in good condition. Sedimentation of waters in many of the ponds threatens the viability of this resource.

Discussion and Conclusions

The hydrologic systems in the Park are in a relatively stable condition. The trajectories of creeks, streams, ponds, and springs are likely to continue in a stable self-perpetuating cycle. There are two main causes for a possible change in this trajectory:

- Wildfire - with the current fuel loading in the Park, and the continuity of fuels, a large wildfire in the Park may occur. This would especially be a higher possibility if drought conditions continue or worsen. A large scale wildfire in the Park could have dramatic changes in water resources, although somewhat temporary, and not as destructive as the mining activities along Clear Creek. Actual burning of riparian areas is possible, but the more significant impact would be the loss of vegetation in the watershed, and formation of hydrophobic, or water repelling, soils. These hydrophobic soils can cause increased water delivery, and thus erosions and sedimentation to streams in burn areas. However, the streams would recover from such a disturbance, but the hotter the fire, the more likely severe erosion would occur, and the longer recovery would be.
- Development of the Park and Green Ranch - A critical component that must be addressed in the development of the Park, including Green Ranch, is the highly erosive soils. The granitic soils of Golden Gate Canyon State Park are notoriously erosive. Trails will have to be carefully planned, with a large number of structures designed to reduce erosion of system trails. Roads within the Park will also need to be paved or re-surfaced with less erosive materials. Stormwater design must take into consideration the impacts of concentrating large amounts of water from parking lots and roads onto highly erosive soils and will require water energy dissipating structures.

With proper trail construction and road design, the trajectory of the water resources in the Park should be on a stable trend. Golden Gate Canyon is fortunate that it is starting with a healthy system, and with proper development planning, resources can be maintained with a minimal amount of maintenance.

Conditions (outside the park) impacting water resources of Golden Gate Canyon State Park, which park management has little or no control over include:

- Violations or standards within the control regulations for point source discharges or watershed background sources for nutrient loading from Non-Point Sources

- This includes activities in the Dory Lakes subdivision west of the park, which drains into Ralston Creek.
- Management activities on the Arapaho & Roosevelt National Forest.
- High severity wildfire events on the Arapaho & Roosevelt National Forest (small and medium-sized fires should have no impact).

Wetland Resources

Description

Wetland and riparian plant communities are variable, reflecting the complex interaction between hydrology, soils and vegetation. Wetlands are critical components of the landscape as they serve several particularly 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.

Knowledge of wetland resources in the Park are a result of conducting surveys and monitoring that serve as the foundation for this Stewardship Plan and for CPW's ability to conserve resources at Golden Gate Canyon State Park. Wetlands within the main Park were last inventoried in 1995 and the south side of Green Ranch was inventoried in 2004 (CPW 1995; Murphy 2004b). 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 9. Table 19 below lists the surveys that have been conducted related to Water Resources. Section 5 discusses future survey and monitoring effort needs for the Park based on those that have been conducted.

Table 19. List of Surveys and Monitoring Conducted for Wetland Resources at Golden Gate Canyon State Park.

Resource	Description	Years	Performed by
Wetland Resources of Golden Gate Canyon State Park	Wetland resources were mapped and evaluated for water quality.	1995	Colorado Parks and Wildlife
Golden Gate State Park Wetland Report for SLB Parcel gog047	Wetland resources were mapped and sampled on the State Land Board Parcel on the south side of Green Ranch.	2004	Patrick Murphy - Ecotone Corporation

Wetlands of the Park are of four major types: aquatic, emergent, shrub-scrub and forested. They occupy creeks, pond margins, seeps, gulches and other intermittent drainages within the Park and support a diversity of plant species. The major drainages in the Park (Nott Creek, Ralston Creek, Deer Creek, Macy Gulch, Sawmill Gulch) emergent wetlands with sedges, willows, and various forb species, scrub-shrub wetland and riparian areas with alder, aspens, birch, and willow species (CPW 1995).

There are many small springs and seeps in the Park, as noted in the Management Plan and in the Rapid Assessment Report for Hydrological Resources Report of 2004, many of these springs were developed at one time by settlers for either livestock use or home use. These springs and seeps may not contribute much to the available water in creeks, but they provide important plant and animal habitats. They also often have small infestations of noxious weeds (Murphy 2004b).

Resource Conditions

Wetland resources at Golden Gate Canyon State Park were last inventoried in 1995 and a portion of Green Ranch was inventoried in 2004. As a result of the time that has lapsed since the last surveys, it is difficult to determine the quality of wetlands at the Park. At the time, the 1995 report documented the wetlands and riparian communities as in good condition. Common issues documented in wetland areas include noxious weeds and soil compaction and water sedimentation from cattle grazing. Noxious weeds found in the wetlands of the Park at the time included Canada thistle, poison hemlock, curly dock, musk thistle, yellow toadflax, and smooth brome. An update to the wetland inventory must be conducted in order to fully understand the condition, function, and extent of wetland areas at the Parks.

Vegetation was assessed throughout the Park in 2014, including wetland and riparian areas. Wetlands were generally healthy, and sedge and rush meadows and wetland areas were consistently documented as in good to excellent condition. Willow carrs were documented in many areas of the Park and were found to be in fair to excellent condition. Moose trampling and browsing were often noted as an impact to willow stands (Jones et al. 2015).

Table 20. List of Wetland Resource Conditions at Golden Gate Canyon State Park.

Resource	Condition / Status	Description
Noxious Weeds		Noxious weeds have been documented in the wetland and riparian areas of the Park. This is not uncommon, as wetland soils and water availability allow for easy establishment. Reports evaluating noxious weed populations and wetland vegetation condition do not appear to identify noxious weeds as an overwhelming issue in these areas. This is an indication that noxious weed control management techniques are working.
Erosion and Sedimentation		Similar to water resources, erosion and sedimentation of wetlands have been documented in the Park for many years as a result of cattle grazing and visitation. This continues to be an issue for the Park and with increased visitation in the future, it is likely to increase in severity. Proactive measures, such as restoring areas in especially bad conditions,

Resource	Condition / Status	Description
		could increase the condition of this aspect of wetland ecology at the Park.
Wetland and Riparian Habitat		Ample wetland and riparian vegetation are present at the Park and has been preserved well for wildlife species that depend on the important resource. Migratory birds, moose, and amphibian species have all been documented to use the readily available wetland and riparian habitat. A survey for wetlands and their condition has not been conducted for several years.

Discussion and Conclusions

Wetland and riparian communities of the Park function to provide water quality improvement fish and wildlife habitat, aquatic food chain support, flood attenuation and storm water detention, shoreline anchoring and erosion control, recreation, education, nature study, natural areas, ground water recharge and discharge and aesthetic values. 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 2017 Park Noxious Weed Management Plans (Appendix) will be essential in maintaining the health and condition of wetlands.

The most effective management approach to wetland and riparian communities include protection, education, weed control, avoidance of impacts and repair of incising drainages and eroding shorelines. Opportunities to increase or enhance these communities exist along Deer and Ralston creeks. Several opportunities to provide environmental education, information and interpretation services to the public are available in wetland and riparian areas.

Geology and Soils

Resource Summary

Significant Features

- Rock outcrops - The rock outcrops highlight the scenery and variety of terrain in the park.
- Unique geologic features - Areas of particular interest are the Ralston Creek Shear Zone and its associated fold, the Junction Ranch Shear Zone, the Hurricane Hill fault zone, and the sedimentary features preserved in the quartzite in the eastern part of the Park.
- Wetland soils – These specialized soils act as a filter between surface and groundwater and these soils play a key role in trapping sediments that would otherwise enter the lakes and in filtering water that percolates into groundwater sources.

Threats

- Susceptibility to erosion – Soils in the Park are very susceptible to erosion, particularly in the absence of vegetation. The steep slopes and the shallow soils create a strong potential for excessive erosion.
- Shallow and low quality soils – The depth to bedrock in many areas of the park is very limited, which can restrict water availability and create difficult conditions for revegetation projects.

Geology

Description

The majority of the Park was formed in the Precambrian Era, which dates back about 1.7 billion years. Although many subsequent geologic eras and processes have taken place in this area since then, most of the visible geology of Golden Gate State Park still dates back to the Precambrian Era. Periods of deformation occurred during the Precambrian Era to create the metamorphic gneisses, schists, granodiorite and quartz monzonite that are throughout the park. These metamorphic rocks were derived from deposits in a large subsiding basin consisting of volcanic tuffs and flows, sediments of eroded volcanic rock, shales and sandstones. As the basin continued to subside, these deposits were subjected to intense heat and pressure inside the earth and eventually became the metamorphic rocks that dominate the park today. Along with this metamorphosis of the deposited sediments was a period of folding of the earth's crust in a west to northwest direction. Folds of this era are about a mile apart from the Lake Fork of Clear Creek (southeast of Green Ranch) to Junction Ranch (the intersection of Golden Gate road and Smith Hill Road). The Junction Ranch Fault flows through Guy Gulch along Golden Gate Canyon, through the visitor's center and along the west side of Promontory Ridge.

Later in the Precambrian Era, large bodies of igneous rocks were injected into the metamorphosed rocks. This created the Boulder Creek batholith. A batholith is a large volume of molten rock forced upward from deep within the earth; the liquid rock then slowly cools and solidifies to form igneous rock, most commonly granite. Another period of folding followed the emplacement of the Boulder Creek batholith. This northeast trending fold zone runs directly through the park from the junction of Smith Hill Gulch and North Clear Creek to the Visitors Center and on to the northeast along Ralston Creek.

Many landforms were created in the Paleozoic and Mesozoic eras in this area (as well as much of Colorado). At the end of the Mesozoic era (about 70 million years ago), a major uplift event began called the Laramide Orogeny. Earth movements broke loose the igneous and metamorphic rocks, and the earth's crust experienced a major uplift. The uplift bent the more pliable Paleozoic and Mesozoic sedimentary rocks. Subsequent erosion washed away much of the sediments of the Paleozoic and Meszoic Eras. At Golden Gate State Park, none of the sedimentary layers that dominated much of the Paleozoic and Mesozoic eras remain.

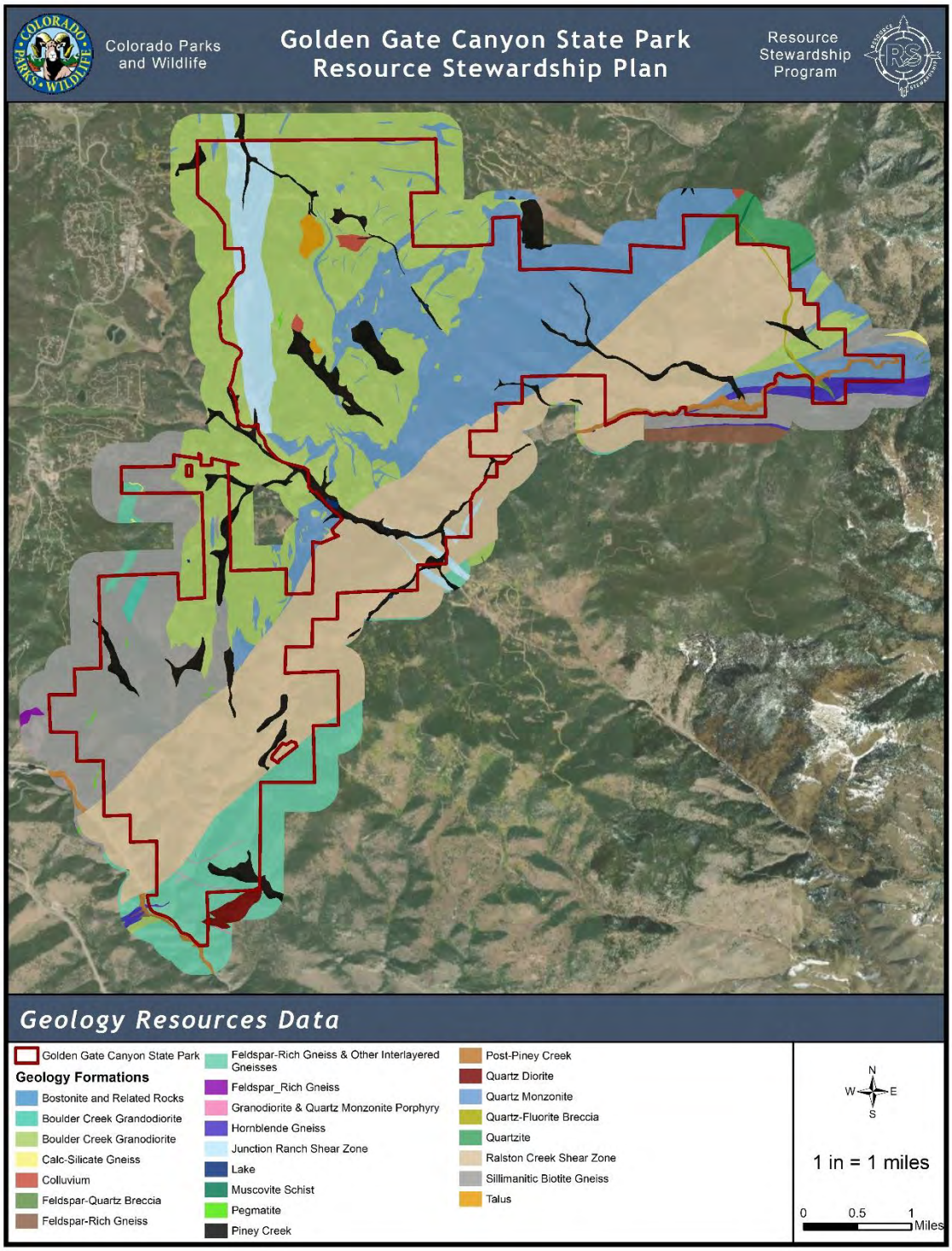
Glaciers and subsequent glacial melt during the Quaternary Period generated the youngest deposits of sediments, rock fragments in the park. The high erosive power of streams and creeks swollen with glacial melt carved the mountains and foothills. Clear Creek and Ralston Creek are two examples of the erosive power of the abundant glacial melt.

Golden Gate Canyon is fortunate to have a variety of interesting geological features. Knowledge of the geology that is present in the Park is a result of conducting surveys and monitoring that serve as the foundation for this Stewardship Plan and for CPW's ability to conserve resources Golden Gate. Table 21 below lists the surveys and monitoring efforts that have been conducted related to Geology. Sections following provide information about specific communities identified in the Park based on these efforts. Chapter 5 discusses future survey and monitoring effort needs for the Park based on those that have been conducted.

Table 21. List of Surveys and Monitoring Conducted for Geologic Resources at Golden Gate Canyon State Park.

Resource	Description	Years	Performed by
Geology at Golden Gate Canyon State Park Report and Inventory	Literature review and survey were conducted for geologic resources.	2015	Karen Houck
Geologic Hazards at Golden Gate Canyon State Park Report and Inventory	Literature review and survey were conducted for geologic hazards.	2015	Karen Houck

Figure 11. Geology Resources Map



Resource Conditions

Geologic features in the Parks are relatively undisturbed and in good condition. Trail use is the most significant impact of Park activity on geology. Social trail development should be of concern, especially in campgrounds, and as visitation increases this heightening the chances of erosion becoming a major problem.

The current geology and soil conditions are likely similar to those that existed 300 years ago. Possible changes to soils and/or geology would include stream channels becoming a bit more incised or altering their course within their floodplain and further development of soil from the granitic bedrock. Additionally, excess sediment has likely been deposited in the waterways in the park from accelerated erosion along trails, roads and weakened stream banks. Other than these few changes to the soil and geology, it is likely that these abiotic characteristics pose similar challenges to those who wish to settle in this area. These challenges include the lack of gently sloping land on which to build and an abundance of exceedingly shallow soils that are susceptible to erosion.

Table 22. List of Geology Resource Conditions at Golden Gate Canyon State Park.

Resource	Condition / Status	Description
Geology Resources		Geologic resources are in relatively good condition and undisturbed by visitors. This resource is also a major attraction of the Park for visitors. Some disturbance may occur to resources from social trail creation.
Geological Hazards		Geologic hazards are present in the Park and include radon, faults, flooding, and rockfall. Although these issues are present, they is unchanging and not much can be done as a result of it other than avoiding potentially hazardous areas.

Discussion and Conclusions

Golden Gate Canyon State Park is fortunate to have so many interesting geologic features. Local colleges and universities take field trips to the Park, as do out-of-state schools such as Pennsylvania State and Louisiana State universities. Geology professional societies also take field trips to the Park, and at least two published guidebooks include these trips (Shaw et al. 2002; Caine et al. 2010). Geologists are particularly interested in seeing and studying the features in the three large fault zones. They are also interested in the 1.7 billion-year-old rocks because these rocks provide information about Colorado's earliest geologic history. The 60-65 million-year-old dikes and mineral deposits are of interest because they provide information about how Colorado's ore deposits formed (Houck 2015a).

It is recommended that some of this interesting information that is available to geologists be interpreted for the public. Areas of particular interest are the Ralston Creek Shear Zone and its associated fold, the Junction Ranch Shear Zone, the

Hurricane Hill fault zone, and the sedimentary features preserved in the quartzite in the eastern part of the Park. The Park's diverse geological features provide a window into the very early history of Colorado, as well as understanding of the state's unique and economically important mineral resources. An interpretive brochure or signs could be developed for the geological features along existing trails in the eastern part of the park. The Burro and Mountain Lion trails have some very good features. An exhibit about the geology of the mineral deposits and the mining history of the area could be developed for the camper services building at Reverend's Ridge (Houck 2015a).

Significant geological hazards at Golden Gate Canyon State Park include radon, faults, flooding, and rockfall. Landslides present a minor hazard. It is recommended that the Park avoid building major structures on faults or in shear zones, in floodplains, or in rockfall hazard areas. Any new campgrounds should be located away from floodplains and rockfall hazard areas (Houck 2015b).

The Park's steep slopes and rockfall hazard areas will be a challenge for further growth and development. The Green Ranch parcel in the southern part of the park is beautiful, scenic, and historic, but is also valuable for its large tract of rockfall-free land. That tract would probably be the Park's best option if they wanted to build facilities away from rockfall hazard areas (Houck 2015b).

Photo 18. Rock formations that formed in the Mesozoic Era, about 60-65 million years ago. These are dikes that occur in the southern part of the park, near Smith Hill Road.

Source: Houck 2015a

Soils

Description

According to the custom soil survey report for the Park (NRCS 2021), there are 48 soil types at Golden Gate Canyon State Park (Figure 12, Table 23). Attributes in the table are of interest to better understand the nature of soils at Golden Gate Canyon with respect to future planning and management. This information is only a general guide, applicable to undisturbed soils. Characteristics can and will change as the soil depth changes or as lands are disturbed or vegetation denuded.

Soils in the park reflect the underlying geology typical of the Colorado Front Range. Generally, soils are shallow sandy loams or loamy sands that have developed from the underlying gneiss, schist and grandiorite. These shallow soils are susceptible to erosion, particularly where vegetation cover is sparse. Wide differences in slope, aspect and elevation throughout the park provide for corresponding differences in the degree of soil development. Loamy alluvium and colluvium soils have developed in flood plains associated with drainages as well as in upland meadows. The Management Plan states there are several locations on the Green Ranch with peat accumulations, which is very rare for the Front Range of Colorado (1997).

Table 23. Soil Types Present at Golden Gate Canyon State Park.

MUSYM (MUKEY)	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard[1]
3	Breece gravelly sandy loam, 3 to 40 percent slopes	Mountain slopes, drainageways, alluvial fans	Alluvium and slope alluvium derived from igneous and metamorphic rock	Severe
5	Cathedral-Rock outcrop complex, 30 to 70 percent slopes	Ridges, mountain slopes	Micaceous residuum weathered from igneous and metamorphic rock	Severe
6	Cumulic Cryaquolls, 0 to 3 percent slopes	Drainageways	Alluvium derived from igneous and metamorphic rock	Slight
9	Grimstone-Bullwark family complex, 30 to 60 percent slopes	Ridges, mountain slopes	Micaceous colluvium over residuum weathered from igneous and metamorphic rock	Severe
10	Grimstone-Hiwan-Rock outcrop complex, 30 to 60 percent slopes	Mountain slopes	Noncalcareous, stony, gravelly, and loamy colluvium or Acidic, stony, gravelly, and sandy residuum over weathered from igneous and metamorphic rock	Severe

MUSYM (MUKEY)	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard[1]
11	Grimstone-Peeler-Rock outcrop complex, 15 to 30 percent slopes	Mountain slopes	Micaceous colluvium and/or slope alluvium over residuum weathered from igneous and metamorphic rock	Severe
13	Herbman-Rock outcrop complex, 9 to 15 percent slopes	Mountain slopes, ridges, cliffs	Micaceous sandy residuum weathered from igneous and metamorphic rock	Moderate
14	Herbman-Rock outcrop complex, 15 to 30 percent slopes	Ridges, mountain slopes, cliffs	Micaceous sandy residuum weathered from igneous and metamorphic rock	Severe
19	Kittredge-Guanella complex, 3 to 9 percent slopes	Alluvial fans, mountain slopes	Micaceous alluvium, Micaceous colluvium, and slope alluvium derived from igneous and metamorphic rock	Moderate
20	Kittredge-Guanella complex, 9 to 30 percent slopes	Alluvial fans, mountain slopes	Micaceous colluvium or alluvium and/or slope alluvium derived from igneous and metamorphic rock	Severe
21 (512694)	Legault very gravelly sandy loam, 5 to 15 percent slopes	Mountain slopes, ridges	Micaceous sandy residuum weathered from igneous and metamorphic rock	Slight
21 (497463)	Cryofluvents, 0 to 5 percent slopes	Terraces, flood plains	Stratified, sandy, loamy & gravelly alluvium derived from igneous and metamorphic rock	Moderate
22 (512693)	Legault very gravelly sandy loam, 15 to 30 percent slopes	Mountain slopes, ridges	Micaceous sandy residuum weathered from igneous and metamorphic rock	Slight
22 (497464)	Cumulic Cryoborolls, loamy, 0 to 5 percent slopes	Valley floors, terraces, drainageways	Gravelly, loamy alluvium derived from igneous and metamorphic rock	Moderate
23	Legault-Rock outcrop complex, 30 to 80 percent slopes	Mountain slopes, ridges	Micaceous sandy residuum weathered from igneous and metamorphic rock	Severe

MUSYM (MUKEY)	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard[1]
24	Lininger-Breece gravelly sandy loams, 3 to 12 percent slopes	Ridges, drainageways, alluvial fans	Micaceous colluvium and/or slope alluvium over residuum weathered from or derived from igneous and metamorphic rock	Moderate
34	Ohman-Legault very gravelly sandy loams, 15 to 30 percent slopes	Ridges, mountain slopes	Sandy residuum, micaceous colluvium and/or slope alluvium over residuum weathered from igneous and metamorphic rock	Severe
35	Ohman-Legault very gravelly sandy loams, 30 to 60 percent slopes	Mountain slopes, ridges	Micaceous colluvium over residuum or sandy residuum weathered from igneous and metamorphic rock	Severe
37	Earcree gravelly sandy loam, 9 to 15 percent slopes	Alluvial fans, mountain slopes	Gravelly and loamy alluvium and/or colluvium derived from granite	Moderate
41	Redfeather-Legault complex, 30 to 70 percent slopes	Mountain slopes, ridges	Micaceous residuum weathered from igneous and metamorphic rock	Severe
44	Resort very gravelly sandy loam, 10 to 30 percent slopes	Mountain slopes, ridges	Micaceous sandy residuum weathered from igneous and metamorphic rock	Moderate
45	Resort very gravelly sandy loam, 15 to 30 percent south slopes	Mountain slopes, ridges	Micaceous sandy residuum weathered from igneous and metamorphic rock	Moderate
46	Resort very stony sandy loam, 30 to 50 percent slopes	Mountain slopes, ridges	Micaceous sandy residuum weathered from igneous and metamorphic rock	Severe
48	Resort-Cathedral-Rubble land complex, 30 to 60 percent slopes	Mountain slopes, ridges, talus slopes	Micaceous sandy residuum weathered from igneous and metamorphic rock	Severe

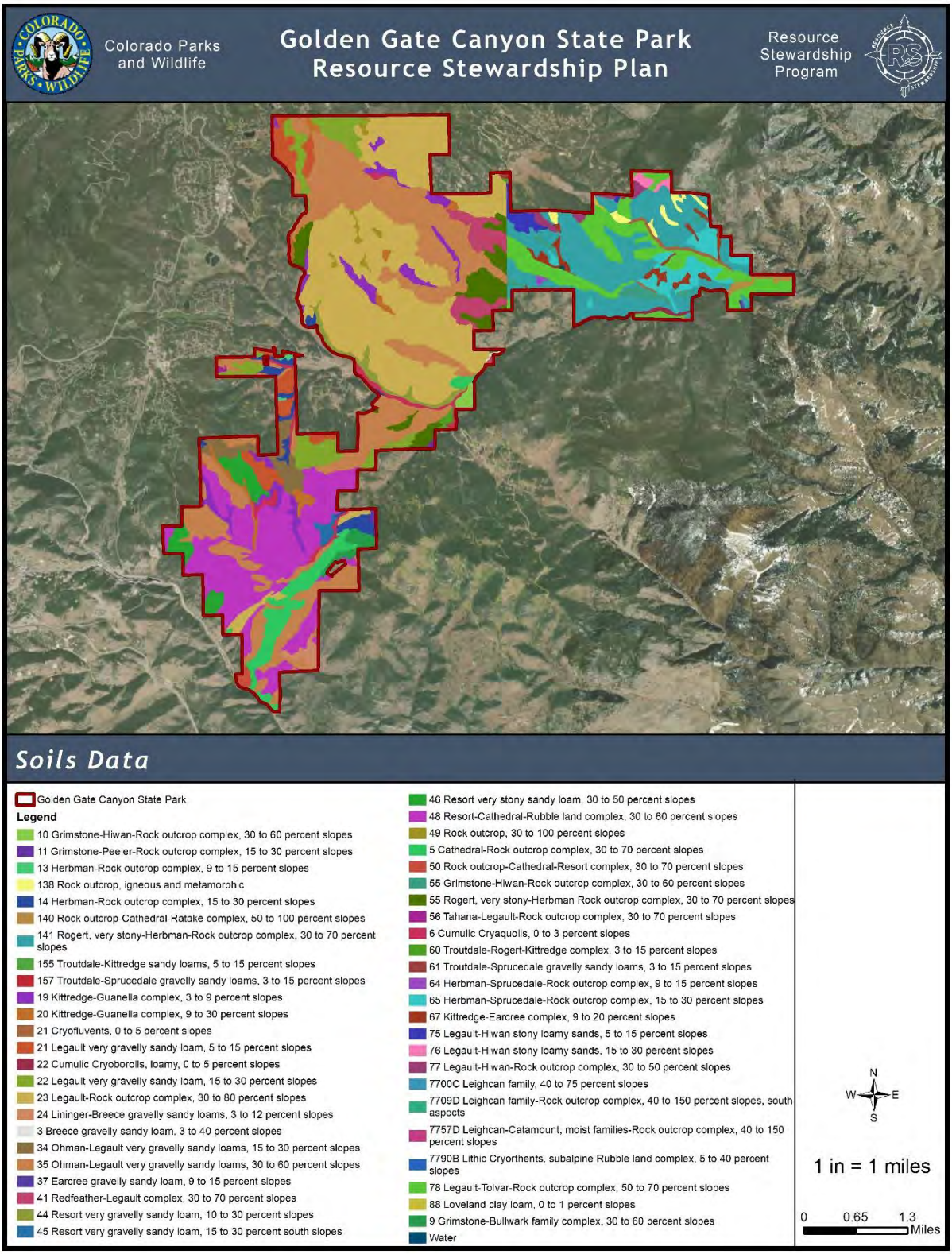
MUSYM (MUKEY)	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard[1]
49	Rock outcrop, 30 to 100 percent slopes	Cliffs, mountain slopes, ridges	Igneous and metamorphic rock	Not Rated
50	Rock outcrop-Cathedral-Resort complex, 30 to 70 percent slopes	Cliffs, mountain slopes, ridges	Micaceous residuum weathered from igneous and metamorphic rock	Severe
55 (512727)	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
55 (497500)	Grimstone-Hiwan-Rock outcrop complex, 30 to 60 percent slopes	Mountain slopes	Noncalcareous, stony, gravelly, and loamy colluvium over residuum weathered from igneous and metamorphic rock	Severe
56	Tahana-Legault-Rock outcrop complex, 30 to 70 percent slopes	Mountain slopes	Micaceous sandy colluvium over residuum weathered from igneous and metamorphic rock	Severe
60	Troutdale-Rogert-Kittredge complex, 3 to 15 percent slopes	Mountain slopes, ridges	Micaceous colluvium over residuum, residuum, or alluvium weathered from igneous and metamorphic rock	Moderate
61	Troutdale-Sprucedale gravelly sandy loams, 3 to 15 percent slopes	Mountain slopes, ridges	Micaceous colluvium over residuum or residuum weathered from igneous and metamorphic rock	Moderate
64	Herbman-Sprucedale-Rock outcrop complex, 9 to 15 percent slopes	Mountain slopes, ridges	Noncalcareous, stony, gravelly, micaceaous, and loamy residuum or colluvium weathered from igneous and metamorphic rock	Moderate
65	Herbman-Sprucedale-Rock outcrop	Mountain slopes, ridges	Noncalcareous, stony, gravelly,	Severe

MUSYM (MUKEY)	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard[1]
	complex, 15 to 30 percent slopes		micaceaous, and loamy residuum weathered from igneous and metamorphic rock	
67	Kittredge-Earcree complex, 9 to 20 percent slopes	Terraces, mountain slopes	Loamy alluvium and/or colluvium derived from igneous and metamorphic rock	Moderate
75	Legault-Hiwan stony loamy sands, 5 to 15 percent slopes	Mountain slopes	Acidic, gravelly, stony, and sandy residuum weathered from igneous and metamorphic rock	Moderate
76	Legault-Hiwan stony loamy sands, 15 to 30 percent slopes	Mountain slopes	Acidic, gravelly, stony, and sandy residuum weathered from igneous and metamorphic rock	Severe
77	Legault-Hiwan-Rock outcrop complex, 30 to 50 percent slopes	Mountain slopes, ridges	Acidic, gravelly, stony, and sandy residuum weathered from igneous and metamorphic rock	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	Severe
88	Loveland clay loam, 0 to 1 percent slopes	Flood plains, valley floors, terraces	Calcareous, loamy alluvium	Slight
138	Rock outcrop, igneous and metamorphic	Mountain slopes	Exposed bedrock, talus, and large boulders of igneous and metamorphic rock	Not Rated
140	Rock outcrop-Cathedral-Ratake complex, 50 to 100 percent slopes	Canyons, mountain slopes, ridges	Rock outcrop, talus, and large boulders of igneous and metamorphic rock or stony, gravelly, and loamy colluvium over residuum weathered from igneous and metamorphic rock	Not Rated
141	Rogert, very stony-Herbman-	Mountain slopes	Colluvium over residuum weathered	Severe

MUSYM (MUKEY)	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard[1]
	Rock outcrop complex, 30 to 70 percent slopes		from igneous and metamorphic rock	
155	Troutdale-Kittredge sandy loams, 5 to 15 percent slopes	Mountain slopes	Gravelly, loamy residuum or loamy alluvium weathered from igneous and metamorphic rock	Moderate
157	Troutdale-Sprucedale gravelly sandy loams, 3 to 15 percent slopes	Mountain slopes	Gravelly, loamy residuum weathered from igneous and metamorphic rock	Moderate
7700C	Leighcan family, 40 to 75 percent slopes	Mountain slopes	Residuum and/or slope alluvium derived from igneous and metamorphic rock	Severe
7709D	Leighcan family-Rock outcrop complex, 40 to 150 percent slopes, south aspects	Mountain slopes	Residuum and/or slope alluvium derived from igneous and metamorphic rock	Severe
7757D	Leighcan-Catamount, moist families-Rock outcrop complex, 40 to 150 percent slopes	Mountain slopes	Residuum and/or slope alluvium derived from igneous and metamorphic rock	Severe
7790B	Lithic Cryorthents, subalpine Rubble land complex, 5 to 40 percent slopes	Mountain slopes / sides	Glaciofluvial or Colluvium deposits and/or residuum derived from igneous and metamorphic rock	Severe

Source: (NRCS 2021)
[1]Erosion hazard ranking given for roads, trails

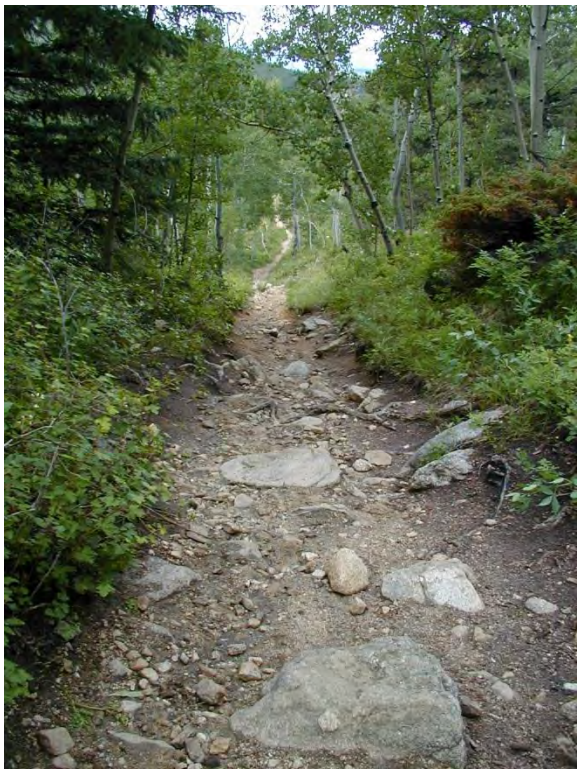
Figure 12. Soils Map



Resource Conditions

The current geology and soil conditions are likely similar to those that existed 300 years ago. Possible changes to soils and/or geology would include stream channels becoming a bit more incised or altering their course within their floodplain and further development of soil from the granitic bedrock. Additionally, excess sediment has likely been deposited in the waterways in the park from accelerated erosion along trails, roads and weakened stream banks. Other than these few changes to the soil and geology, it is likely that these abiotic characteristics pose similar challenges to those who wish to settle in this area. These challenges include the lack of gently sloping land on which to build and an abundance of exceedingly shallow soils that are susceptible to erosion.

Photo 19. Excessive erosion of the Raccoon Trail in the Junction Ranch shear zone.



Source: Houck 2015b

Soil conditions may be inferred based on what is seen in the Park, but it is difficult to assess as no surveys have been conducted on soil health. Increased visitation, especially within the year 2020, has led to more people recreating at the Park. An increase in people using designated and social trails leads to soil compaction, erosion, and vegetation trampling. These impacts negatively affect soil health and quality and subsequently affect other resources at the Park, such as vegetative growth. Shallow soils present in the Park are susceptible to erosion, particularly where vegetation cover is sparse.

Soil erosion resulting from within the Park and outside the Park is likely depositing disproportionate amounts of sediment into the waterways and impoundments in the Park. Historic erosion deposits have been documented in Dude's Fishing Hole, Kriley Lake, and Ralston Creek.

Table 24. List of Soil Resource Conditions at Golden Gate Canyon State Park.

Resource	Condition / Status	Description
Trail Erosion		Trail erosion has long been an issue in the Park and has recently increased in severity due to the influx of visitors over the past year. Soils in the Park are naturally susceptible to erosion and conditions are made much worse when combined with high visitation.

Shoreline Erosion		Shoreline erosion surrounding the ponds and along the streambanks of creeks has been an issue for several years. Erosion surrounding the ponds is likely due to visitors trampling vegetation to access fishing spots. Creek shoreline erosion is likely due to the modified landscape (lack of beavers, upstream development activities) which affects the Park. These issues will continue to be a problem if proper mitigation is not implemented, such as check dams, revegetation, and area closures.
Upland soils		Soils in upland areas are in relatively good condition except for areas where trail use is high and soils may be eroded from foot traffic.
Wetland Soils		Wetland soils are in relatively good condition in the Park and lack disturbances.

Discussion and Conclusions

Soils in the Parks have long been documented to be problematic given the information available on the resource. No official surveys have been conducted to assess soil condition or erosion in the Parks. The NRCS soils data for the Park indicates there are several highly erosive and shallow soils present, and these areas should be avoided for development purposes. It is always good practice to review soil properties before any development is to take place, ranging from a foot trail to a full service building with facilities. Best Management Practices (BMPs) for erosion control should always be implemented during any management or improvement activities. Trail use is the most significant impact of Park activity on soils. Social trail development should be of concern, especially in campgrounds and around ponds, and as visitation increases this heightening the chances of erosion becoming a major problem.

A proper assessment of sediment sources and movement within and outside the Park should be instigated as soon as possible. This assessment should examine all trails, roads and waterways to identify any problem areas as well as any potential problem areas. Remedies for excessive erosion may include trail and/or road realignment, construction of various structures within trails, paving of roads, streambank stabilization, and working with adjacent landowners and other agencies (e.g. CDOT) to address erosion problems. Once the excessive erosion issues have been addressed, it then may be possible to dredge Kriley Lake to regain the storage volume of that water body.

The areas of peat accumulation stated in the Management Plan should be investigated by a specialist and potentially relocated and protected. Peat accumulation is extremely rare on the Front Range of Colorado and thus these areas should be protected from any development or proposed improvements.

Cultural Resources

Resource Summary

Threats

- Visitation and Resource Degradation - 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.
- Hazardous fuels reduction / Wildland fire - The threat of fire is present at the State Park and has the potential to damage sites, including historic wooden cabins.
- 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.

Cultural Resources

Description

Knowledge of the past and cultural resources and conditions that are present in the Park are a result of archaeological surveys and monitoring that serve as the foundation for this Stewardship Plan and for CPW's ability to conserve resources at Golden Gate Canyon State Park. Table 25 below lists the surveys and monitoring efforts that have been conducted related to the Cultural Resources. The sections that follow provide information about specific cultural resources identified in the Park based on these efforts (Table 25). The section on resource management discusses future survey and monitoring efforts needed for the Park based on those that have been conducted.

Table 25. List of Surveys and Monitoring Conducted for Cultural Resources at Golden Gate Canyon State Park.

Survey Number (Document ID)	Description	Years	Performed by
MC.DP.R3	A Class III Cultural Resource Inventory Of 1,930 Acres Within Seven Colorado State Parks; Larimer, Boulder, Jefferson, Gilpin, Park, Douglas, Teller, And El Paso Counties (214605)	2010	SWCA: A Class III Cultural Resource Inventory of 1,930 Acres within Seven
	Archaeological Sensitivity Analysis and Reconnaissance Surveys of Seven Colorado State Parks: Cheyenne Mountain, Eldorado Canyon, Golden Gate, Lory, Mueller, Roxborough, and Staunton		

Previous cultural resource survey within the Park's boundaries has amounted to about 743 acres of intensive (Class III) pedestrian survey (Williams 2010) and 2,999 acres of reconnaissance-level survey (Burnett et al. 2006). These cultural resource surveys and targeted documentation of known cultural resources has resulted in the recording of 31 cultural resources, 14 of which are considered isolated finds or features that do not represent meaningful activity by themselves (prospect pits, agricultural fields, corrals, and trash dumps). The remaining 17 cultural resources are exclusively farming and ranching complexes and transportation-related resources These sites provide insight on the peoples that were historically living on the land now occupied by the Park.

Additionally, previous research by ERO on behalf of CPW identified potential resources which should be further documented and assessed. While not officially documented, these resources still help inform our understanding of the park and should be treated in the same as documented resources.

Many groups have called the lands now part of Golden Gate Canyon State Park home. These include the Ute, Cheyenne, and Arapaho. Intensive surveys of other parts of the Foothills, such as large-scale surveys on the Pike National Forest to the south of the Park (e.g., Engleman et al. 2015), is what has indicated that aboriginal archaeological sites are relatively rare in the Foothills, often limited to temporary hunting camps. In explanation of this phenomenon, archaeologists have suggested that the Foothills zone was largely "passed through" by Native Americans traveling between the Hogbacks along the edge of the eastern Plains and the High Country, the destination, where game such as elk and bighorn could be hunted using elaborate game-drive systems (Benedict 1996). The Hogbacks were an attractive area for winter camps due to the warming effect of Chinook winds and the many rock shelters for protection from the elements. The Foothills, then, standing between the Hogbacks winter camps and the High-Country destination, were probably traveled through rather quickly with no need for a formal camp; any overnights for hunting purposes would have left little trace.

Despite the limited settlement of the Foothills by Native Americans, the larger region has a well-documented prehistory spanning at least the last 12,000 years (Gilmore et al. 1999). And while no prehistoric archaeological sites have been documented in the park, it does not mean that their presence did not play significant role in the history of this region. Additionally, there are likely more resources yet to be recovered in the park.

The history of these lands follows that of the history of all Native Americans. Conquest, broken treaties, land cessations, often forcible relocation, and the on attack on cultural lifeways plays a significant role in the history of the peoples who inhabited these lands. The history starts with the arrival of peoples into the Americas some 12,000 years before present (maybe even as far back as 14,000+). Archaeologically, Golden Gate Canyon falls in the convergence of the Plains and Mountains within the Platte River Basin cultural region. The following is a cultural summary of this region (from Gilmore et al. 1999).

Photo 20. A clovis point.

Prehistoric

Paleoindian Era (11,5000-7500 BP)

People first arrived in the Americas during the Pleistocene and early Holocene epochs; a time when Colorado was generally cooler and wetter with megafauna and abundant lush grasses. This cultural period is known as the Paleoindian. It is here that the culture history of Colorado starts.

While the Paleoindian can be broadly defined as the stage when nomadic or semi-sedentary groups were hunting (mainly bison) and gathering their food, using stone tools, and likely participating to some degree in trade and exchange, there are variable features across the stage which allow us to define three periods within the Paleoindian. The earliest, called the Clovis period (12,000-11,000 BP) (Photo 20) denotes the time when large fluted lanceolate points were typically used to hunt Megafauna. Next, the Folsom period (11,000-10,000 BP) denotes the time when peoples used lanceolate and stemmed dart points, often hunting a new species of bison (Bison antiquus) as the Megafauna had become extinct. Third, the Plano period (10,000-7,500 BP) denotes the time after the Clovis and Folsom (Chenault 1999). Plano peoples hunted the modern form of bison (Bison bison) that replaced Bison antiquus sometime between 9,000 and 11,000 years ago. During this time period, there is increasing evidence that Plano peoples in the foothills and mountains began diversifying their lifeways.

Archaic Stage (7500-1800 BP)

While little is known about the Archaic for the region, it is possible to generalize. The changing environmental conditions following the end of the Pleistocene, resulted in broadening subsistence. In particular, groups tended towards exploitation of large and

small game as well as increasing reliance on plants. For the foothills and mountains, in which the survey area is located, there appears to be greater reliance on small game as larger game was generally restricted to the plains. Stone tools, as well as ground stone, toolkits diversified as well, tending towards smaller and stemmed or notched points (Photo 21). There is also evidence for stone boiling, stage cists, and architectural features, suggesting a less-mobile lifestyle (Tate 1999:91).

The Archaic is typically divided into the Early (7,500-5,000 BP), Middle (5,000-3,000 BP), and Late (3,000-1,800 BP). While no sites from any of these periods have been located within the park, the Hogback and Mountain regions do show increasing evidence of occupation during the Middle Archaic, including open and sheltered camps and butchering sites. For places like the park, evidence of human occupation mainly consists of open camps (often short-term hunting), occasional stone circles, stone tool maintenance and repair, and faunal processing (Tate 1999).

Photo 21. Archaic point.

Source: http://www.projectilepoints.net/Points/McKean.html

Late Prehistoric Stage (1800 BP- 1540 CE)

The Archaic stage is followed by the Late Prehistoric (also occasionally called the Early and Middle Ceramic). This period is marked by the introduction of pottery (in some places), the use of smaller, side or corner notched points (likely associated with the bow-and-arrow), horticulture practices, elaboration of burials, and larger populations. Like the preceding stages, there is increasing differentiation between the Plains and the foothills/mountains of the Platte River Basin. However, the paucity of sites and cultural remains currently inhibits the defining of different cultural groups in the region (Gilmore 1999).

Protohistoric Period Stage (1540-1860 CE)

The Protohistoric period marks the time between the arrival of Europeans and the permeant settlement by European colonizers (following the discovery of gold in the region). This was a time of rapid change, marked by shifting technology and subsistence practices as well as extensive demographic fluctuations. For this region, European contact was sparse and is poorly documented, with Indian groups remaining in control. However, while the Spanish arrived in the American Southwest in 1540, it took another 150 years before Euro-American trade goods (including the horse and metal goods) and disease significantly altered Native American life on the eastern Plains and Foothills of Colorado.

This is the time period during which historically recognized tribes can be distinguished for the region. Historical accounts of the French and Spanish identify Ute, Arapaho, and Cheyenne in what is now the Denver and Front Range area. The Arapaho and Cheyenne primarily stayed on the Plains, but they often made seasonal hunting trips into the mountains where they encountered and often battled with the Ute, the

primary occupants. The Shoshoni and Comanche may have also made forays into the region, following big-game (Clark 1999).

Photo 22. **"**A young Native American (Ute) stands next to a horse and holds a saddle in one hand. A shelter, made of tree **boughs arranged like a tepee, a wickiup, is behind him."**

Source: Image X-30353 from Denver Public Library.

There are a range of site types as well as variation in material culture present during this period, reflecting the diversification of culture-groups in the region. Focusing on the Foothills where the park is located, a range of material culture is present reflecting increased interaction (often forcibly) between the Ute and the Spanish to the south. In addition, Ute's began to use and rely on horses, allowing greater access to inter-regional trade (Photo 22). Pottery is common during period, in particular the Uncompahgre Brown type, as are Wikiups, Cottonwood Triangular projectile points and Desert Side-Notched points (Clark 1999:323). Other material culture indicators of the Ute include scarred or peeled trees. Site types for this period are often lithic scatters or open camps. Ethnohistoric documentation indicates that the lower valleys of this region were heavily used by Indian groups. Evidence of communal hunting and ceremonial practices have also been documented in the mountain region.

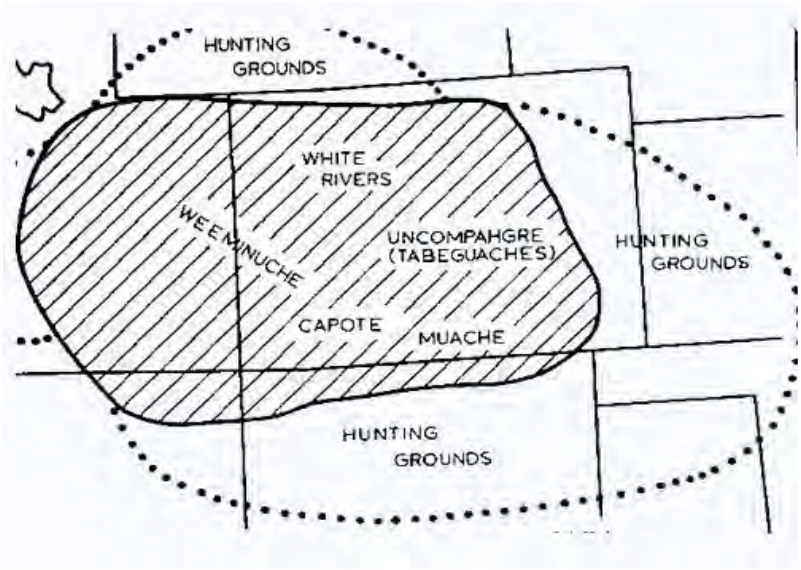
Historic 1540-1880 CE

The Historic Period marks a dramatic transition in the history of the region.

The following historical themes follow those defined under Colorado History: A Context for Historical Archaeology, published by the Colorado Council of Professional Archaeologists (Church et al. 2007).

Indian Removal

Photo 23. Map of Ute Lands, Southern Ute Indian Tribe.



To review the historic period of Golden Gate Canyon State Park we must start with the lands indigenous inhabitants. Prior to the arrival of Europeans, Colorado was part of the traditional homelands of the Ute (Photo 23). Today, the Ute hold lands in southwestern Colorado (the Ute Mountain Ute and Southern Ute Reservations), the only indigenous group to do so. However, Spanish and Europeans incursions into America's started a cascading series of impacts, the reverberations of which are still felt today. This includes forced relocations of many groups, including the Ute, Cheyenne, and Arapaho who called the Colorado Plains and Foothills home in the 19th century.

With the American victory in the Mexican-American War (1846-48) came increasing encroachment on traditional native lands in Colorado. Subsequently, treaties with the US government started to be implemented. The 1849 Calhoun Treaty recognized Ute lands in western Colorado and secured "customary" use of the area's mountains for the tribe (Mehls 1984:15). In 1851, the Arapahos secured their access the north-eastern plains of Colorado through Treaty of Fort Laramie (Colorado Encyclopedia 2020).

Despite these treaties, Euroamerican mining prospectors and settlers encroached on treaty lands as they searched for gold in Colorado throughout the 1850s and 1860s. The 1858/9 Gold Rush and subsequent massive influx of people marks the start of broken treaties and eventual removal of native peoples. Lands were reduced to make room for prospectors and farmers in the Treaty of 1868, again with the Brunot Cessation of 1873.

Tensions between these new settlers and the Ute 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, declaring "The Ute's Must Go!" This resulted in the Ute Removal Act of 1880/1, which reduced Ute Lands in Colorado to the small parcels present today in Southern Colorado (Colorado Encyclopedia 2020).

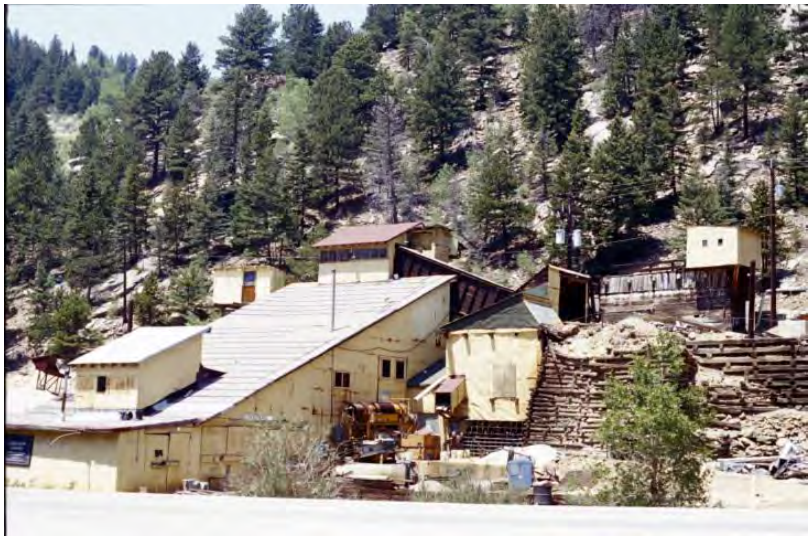
For Arapaho's and Cheyenne's the story is the same. The timeframe between the Treaty of Fort Laramie and the Medicine Lodge Treaty of 1867, which ceded land in central Kansas to the Cheyenne, marked another period of forced removal, broken treaties, and genocide in Colorado (National Park Service 2018). After years of violent

encroachment by whites 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 Golden Gate Canyon today, it is worth nothing 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.

Photo 24. Golden Gilpin Gold Mill, Black Hawk, Colo.



Source: Photo AUR-3169 from Denver Public Library

Settlement

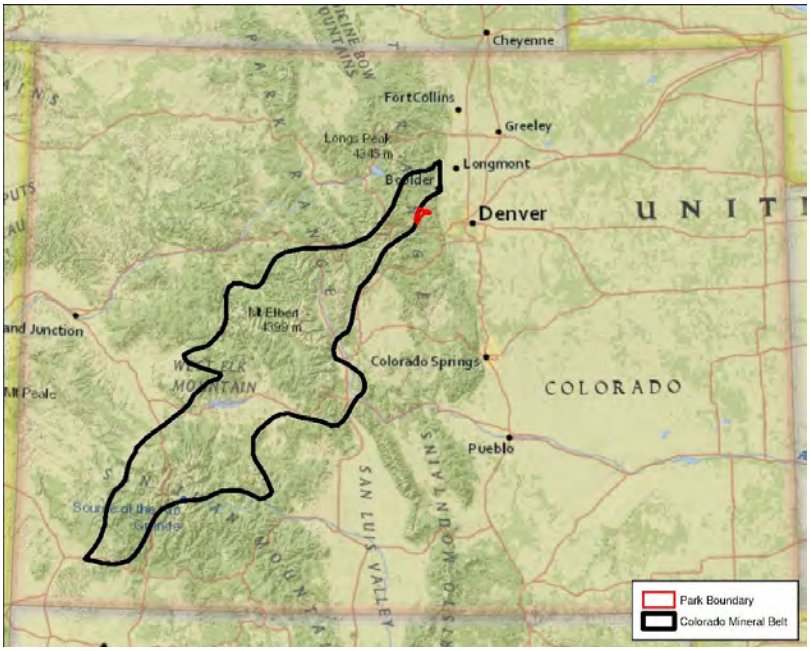
The land known today as Golden Gate Canyon State Park was first settled in 1859-1860 by Euro-Americans flocking to the newly established Black Hawk-Central City Mining District. It is important to note that these settlements were illegal as these lands were still legally part of Ute territory.

Interestingly, despite being close to the mining district and within the Mineral Belt, prospecting endeavors in what is now the Park proved unsuccessful. Some of the earliest settlers of the Park were unsuccessful miners who turned to making a different living by providing timber, beef, and vegetables to those working in the mining industry. It was the Homestead Act of 1862, allowing a household to take up to 160 acres "for improvement" — for setting up farming or ranching, typically — that encouraged people to permanently settle in that area. However, finding suitable land was challenging, but successful homesteading often meant farms and ranches that lasted for generations.

Gold and Silver Mining and Settlement

When gold was discovered near the North Fork of Clear Creek in 1859, the prospect of wealth brought thousands to the area (Photo 25). Productive mines were concentrated to the west of Golden Gate Canyon State Park around Gregory Gulch, which led to the formation of the communities of Central City, Black Hawk, and Nevadaville. These towns grew steadily as the Civil War increased the demand for precious metals (Hendricks and Corona 1990). After a small decline in production following the Civil War, advances in the smelting process spurred production again. In 1872, the Colorado and Southern narrow-gauge railroad was completed to Black Hawk, improving accessibility and reducing ore transport costs (Hendricks and Corona 1990). The mining boom of the 1870s continued into the 1880s, but discovery of gold in other areas of the state such as Leadville and Cripple Creek in the 1890s took away labor and capital from Gregory Gulch. By 1927, ore production plummeted and many of the mining camps were abandoned. Many former miners and other residents of the mining towns moved east to the land that is now Golden Gate Canyon State Park and established agricultural settlements.

Photo 25. **Colorado's Mineral Belt in relation to the Park**.



Although the Park lies directly east of the Black Hawk-Central City Mining District, minimal prospecting and mining occurred on current Park land because the area is just east of the Colorado Mineral Belt. Only four cultural resources related to mineral prospecting are within the boundaries of the Park (5GL.1585, 5GL.2007, 5GL.2021, and 5JF.4881).

Agricultural Settlement

This section provides an overview of settlement, please refer to "In the High Country: Settlers on the Land at Golden Gate Canyon State Park" (Birdwood Press, Colorado) for more detail and information. Farming and ranching were the significant economic pursuit over the Park's history. As the mining industry to the west tapered off, homesteads quickly appeared. Farming in the dry and rugged region of Colorado proved difficult for settlers. A 160-acre plot in Colorado often did not supply adequate land suitable for farming, so many families added a few head of cattle or chickens to supplement their income and provide additional food for the family. Selling produce or meat was exceptionally difficult when transportation routes were no more than rugged wagon roads. Small, steam-powered sawmills were constructed for personal use, many of which appear on historical maps from 1936 (CSHD 1936a; CSHD 1936b). Rural electricity reached this area in the 1950s, and the Guy Hill Telephone Company, privately owned and maintained, began to serve the Ralston Creek Ranch and its

neighbors along the creek. Shortly thereafter, the Mountain Bell Telephone Company took over operations (Stevenson 2009).

Approximately 61 families improved land within what is now Golden Gate Canyon State Park (Stevenson 2009). Notable homesteads include the Belcher Ranch (5GL.669), John Frazer Homestead (5GL.700), Hugh McCammon Ranch (5GL.701), Ralston Creek / Kriley Ranch (5GL.1382), Reverend Tippett's Cabin (5GL.2019), Tallman / Forgotten Valley / Wickstrom Ranch (5JF.999), and the Phillips Ranch (5JF.1004). Many homesteaders are immortalized by prominent Park areas such as Frazer Meadow, Kriley Pond, Forgotten Valley, Bootlegger Bottom Picnic Area, and Reverend Ridge Campground.

Photo 26. Gap Ranch in 1945, owned by the Belcher family .

Source: Photo courtesy of Denver Public Library, Western History Collection

The Belcher Ranch (5GL.699) was established in 1907 by Thomas Belcher. According to the original homestead filing, the ranch consisted of a main house, blacksmith shop, barn, and chicken coop (Photo 26). Thomas was a skilled mechanic and originally lived in Black Hawk repairing equipment for the miners. Thomas Belcher's sons also acquired these mechanical skills, evidenced by the steam-powered sawmill Thomas Junior constructed in order to build his own homestead. The Belchers have resided within the Park since 1873; the last member of a long line of Belchers left the area in 2000 (Stevenson 2009).

John Frazer moved to Black Hawk in 1883 following the gold rush. In 1886, Frazer left Black Hawk and established a homestead to the south of Tremont Mountain, an area now known as Frazer Meadow. When John Frazer died in 1894, his property was sold to Thomas Belcher Jr., who renovated the original cabin (Stevenson 2009). Remains of the cabin (5GL.700) are still visible in Frazer Meadow to this day (Photo 27).

Photo 27. **John Frazer's Cabin in 2010**.

Source: Photo courtesy of Atlatl Industries.

Many of the original homesteads left very limited evidence of early ranching. For instance, all that remains of the Hugh McCammon Ranch (5GL.701) is two barns; evidence of the house and stable is no longer visible. Mr. McCammon owned the land from 1868 until his death in 1893 (Stevenson 2009). Despite preferring farming to the ranching lifestyle, he slowly expanded his small homestead into a large ranch: Mountain Ranch grew to more than 1,000 acres. Mr. McCammon was one of the original four founders of the silver mine at Caribou Hill in Boulder County, served on the Colorado Territorial Council, contributed to the founding of the University of Colorado at Boulder, founded a bank in Central City, and also owned property in both Tennessee and Missouri (Stevenson 2009).

William Kriley of the Kriley Ranch, also known as the Ralston Butte Ranch (5GL.1382), originally worked in the mines of Central City before he purchased the land in 1883 from Dennis Maloney and Mr. Michler (Stevenson 2009). William and his wife Katherine named their ranch for the two rocky outcrops across the road. The ranch ran a few head of cattle and also grew peas, potatoes, and rutabagas. Although their original homestead burned down in a fire in 1903, the house that replaced the original homestead remains today. Kriley Pond, located across from the ranch, is named in memory of William Kriley.

The land that is now the Reverend Ridge Campground was owned by Joseph Beaman beginning in 1875 and later purchased by William and Billy Floyd in 1918. The Floyds then sold the land to Donald Tippett in 1924. Reverend Tippett was a Methodist

minister from Denver who lived in the cabin with his wife and two sons from 1924 to 1926. The Reverend served several churches over the years and was well known for his speaking engagements and his sermons concerning Prohibition (Stevenson 2009). Reverend Tippett's Cabin (5GL.2019) remains in excellent condition and is surrounded by the modern camp amenities of the Reverend Ridge Campground (Photo 28).

Photo 28. **Reverend Tippett's Cabin in 2010**.

Source: Photo courtesy of Atlatl Industries.

The landmark within the Park known as "Forgotten Valley" was home to the Tallmans, Swedish-American immigrants, beginning in 1882. In 1908, Anna Tallman, daughter of the original homesteader Anders Tallman, inherited the entire 400-acre ranch after the death of her father and brother. The ranch was passed down to her son Rudolph in 1913 and eventually to his widow Ruth, who boarded teachers who served the surrounding areas. Ruth remarried John Wickstrom and lived on the ranch until her death in 1978, when the ranch was sold to the State of Colorado (Stevenson 2009). Today listed on the State Register, the remains of the Tallman / Forgotten Valley / Wickstrom Ranch (5JF.999) represent three generations of immigrant ranchers and farmers in Golden Gate Canyon State Park (Photo 29).

Photo 29. Tallman / Forgotten Valley / Wickstrom Ranch in 1994.

By the 1930s, much of the suitable land had been claimed for farming and ranching, leaving little suitable land for newcomers. The Phillips family was the last to settle on Park lands. Instead of farming and ranching the family tried to make a living selling timber. The limited market coupled with the onset of the Great Depression proved daunting to the Phillips, who often borrowed food from the neighbors to make ends meet. The Philips family endured, however, continuing life on the Philips Ranch (5JF.1004) until the land was sold to a developer who in turn sold it to the State of Colorado in 1970 (Stevenson 2009).

The Ralston Creek Ranch is located across from the present-day Red Barn Group Picnic Campground and was the location of the original homestead of Sylvester Nott (circa 1869), later purchased by the Strang family in the 1930s, who also constructed a sawmill farther up Nott Creek (Stevenson 2009). During the winters, the Strang family cut their own ice from their private ponds, placing the blocks in sawdust which lasted late into the summer. The ranch hosted 15 to 20 students in cabins during the summers. Steve Strang tutored students all summer and provided room and board in exchange for help on the ranch. The Strangs, who were appreciated for their positive impact on rural education, lived on the ranch for 40 years until 1968 until their famous "White House" burned down. Son Mike Strang served in the Colorado Congress in the 1970s (Associated Press 2014).

Nelson Meadow (5JF.245), north of Nott Creek, provided gentle slopes suitable for both ranching and farming. It was purchased by the Skankee Family in 1940. In addition to growing potatoes, lettuce, and grazing cattle, the Skankees mined peat moss during the early 1960s (Raymond 1979). While the previously documented

Photo 30. **Bootlegger's Cabin after stabilization work,** May 2015.

portion of this site lies on private property (5JF.245), the operation extended into what is now park property and recently documented by ERO (5GL.698).

Not quite all of the cabins within the Park were related to farming and ranching. Prohibition provided economic opportunity even in rural settings with the illegal production of alcohol. Bootlegger's Cabin (5GL.697) is an excellent example. Bootlegging operations were small-scale, situated near water, and usually hidden in an isolated location (Photo 30). The succession of cabin owners include Hugh McCammon until 1922, Clarence Beach until about 1925, and finally the Murphy Family who owned the parcel during the Prohibition years (1920 to 1933). There is currently no information as to who rented the property during the Prohibition years.

Documentation of the cabin prior to listing on the state register describes barrel remains and barrel hoops, both strong evidence for a distillery, and a bread truck to transport 55-gallon barrels to Denver for consumption (Childs 1995). The cabin is one room, measures 16 feet by 24 feet, and is built entirely of logs, with corrugated tin roofing, and tongue and groove boards on the inside.

Recreation

Around the same time, recreational development became increasingly common in the area. Eldorado Springs Resort, a few miles away, opened in 1905 and quickly became a popular tourist destination (Photo 31). This resort was known as the "Coney Island of the West," the Eldorado Springs Resort and the Eldorado Hotel were renowned for the entertainments they offered western tourists, all made possible by the labor of those employed in Colorado's burgeoning tourist industry. Shortly thereafter the Crags Hotel also opened, further expanding recreational opportunities.

While these and other resorts provided recreational activity in the region, who could participate was racially segregated. This was the time of 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.

Photo 31. New Eldorado Hotel, circa late 1930s. Eldorado Springs: New Eldorado Hotel, photograph, 701-1-6, Carnegie Library for Local History, Boulder, CO.

Source: https://localhistory.boulderlibrary.org/islandora/object/islandora%3A37638

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. Lincoln Hills was located just north of the park today, about 10 miles due west of Eldorado Springs.

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.

Photo 32. Teenage campers and their counselors from Camp Nizhoni pose by Denver & Rio Grande Western Railroad tracks and a railway stop near the entrance to Lincoln Hills, Colorado.

Source: Photo courtesy of Western History and Genealogy Department,

Lincoln Hills provided Black people with treasured memories of the Colorado Mountains (Photo 32). 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).

Transportation

Wagon roads were first developed to access Black Hawk and Central City and later improved to serve the ranches and farms in the area. Unimproved roads were often no more than repeated travel routes and two-track roads — many of which appear as recreational trails within the Park — used by local farmers.

Photo 33. Golden Gate Toll Road (5GL260) between 1860 and 1880.

Source: Photo courtesy of Denver Public Library, Western History Collection.

The Golden Gate Toll Road (Photo 33), now State Highway 46 (5GL.260.1), operated between 1860 and 1871 through Guy Gulch and into the Ralston Creek drainage (Pearce 1982a). Several early stagecoach roads are also located within the Park and include the Ralston Road (5GL.265), which follows Ralston Creek, and the Smith Hill / Black Hawk-Golden Road (5GL.266), which climbs Smith Hill and descends into Smith Hill Gulch, where it intersects the North Fork of Clear Creek. Because the route up the North Fork of Clear Creek Canyon was not suitable for wagons, these alternate routes were established to provide access to the mining districts (Pearce 1982b). The toll road and the two stagecoach roads were the primary access routes to the mining districts until the Colorado and Southern Railroad was completed along the North Fork of Clear Creek in 1872 (Baldwin 2007).

Two-tracks provided access from major transportation arteries to individual homesteads. For instance, after John Frazer relocated to the area now known as Frazer Meadow, he constructed a wagon road across the shoulder of Tremont Mountain (Stevenson 2009), a route that would eventually connect Golden Gate Toll Road (5GL.260.1) to the Gap Road to the north. Some of these roads were substantial enough for retaining walls (5JF.4879), although most roads were often constructed quickly and with no engineering.

The Park

Golden Gate Canyon State Park was designated a state park in 1960, becoming the Colorado's second state park. The park has seen increasing visitors since its opening. In 1991, limited stakes gambling was legalized in Central City and Black Hawk, bringing a major influx of day use tourists to the area. Further growth and development have only further increase park use.

Resource 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.

  Graffiti is found on some of the rock faces within the park, most notably inside of Rockshelter 2 at site 5HF2178. 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. The park is interestingly not terribly impacted by development, aside from park infrastructure improvements such as roads, campgrounds, trails, etc.

- 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.

Identifying and Minimizing Resource Impacts and Hazards

Potential threats to cultural resource are due to the incremental effects of public visitation, natural deterioration of resources such as wooden buildings, Park infrastructure development, or natural resource enhancement such as hazardous fuels treatment.

Public Visitation and Recreation

The visiting public often represents that most pervasive effect to cultural resources from the incremental impact over time of thousands of visitors interacting with the cultural resources. Visitor impacts range from the inadvertent effect of simply walking along a trail and thereby increasing erosion to outright vandalism of resources and the collection of artifacts. Public education — providing the proper etiquette — is the best means to mitigate against the effects of visitation to cultural resources. Reminding visitors to not pick up artifacts and to not lean against the walls of historical buildings is the most effective long-term mitigation against cultural resource deterioration. Those reminders can be included in brochures that highlight significant cultural resources or as part of interpretive signs. Most visitor impacts to cultural resources occur simply from a lack of understanding of how to properly experience different kinds of resources.

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. Recreational impacts are mostly preventable through fencing, interpretation/signage, periodic monitoring by park volunteers or staff, and outreach to park visitors.

Natural Deterioration

All cultural resources are affected by the inevitable effects of natural deterioration, whether through simple neglect or catastrophic loss from a natural event such as a windstorm or heavy snow (Photo 34). The many farming and ranching buildings and structures are most susceptible to natural deterioration, given their age and fragile wooden composition. Monitoring and selective stabilization efforts are the most effective means to mitigate against the loss of fragile resources.

Natural impacts cannot be fully prevented. Erosion and time are consistently acting upon sites. Rock fall, wind or water induced erosion, vegetation growth, and wildfires are all natural factors that can critically affect 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 resource. In cases where erosion threatens a sensitive site, efforts should be made to determine proper treatments by consulting an archaeologist who can recommend mitigations of the effects.

Photo 34. Phillips Ranch in May 2015: an example of structural collapse likely due to heavy snow and decay.

Park Infrastructure Development

Prior to implementing ground-disturbing projects, the Park should undertake a reasonable effort to identify unknown cultural resources within the area of the activity and subsequently take into account potential effects to them. The Park should refer to the sensitivity maps (Error! Reference source not found.) to gauge whether identification efforts are necessary prior to an undertaking that could affect cultural resources.

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. Please consult the Appendix for when consultation with OAHP is required.

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 Resource Enhancement

Hazardous fuels reduction, specifically mechanical- or hand-thinning of vegetation and prescribed fire treatment, has the potential to adversely affect significant cultural resources. The Park should undertake cultural resource surveys in areas of proposed fuels treatment (guided by sensitivity models) prior to implementation.

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

Refer to the Appendix for laws and regulations pertaining to cultural resources.

Interpretive Opportunities

In addition to the specific cultural resource signs, it is strongly recommended that 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.

The settlement of the Park under the authority of the Homestead Act, ultimately to improve the land for farming and ranching, is the most significant cultural-historical development in the Park's history. Park visitor experience would be enhanced, therefore, by the development of public interpretation of selected farming and ranching complexes. In addition to the Frazer Homestead (5GL.700), which appears to be the only formally documented historical structure depicted on the Park's trails map, resources with potential for public interpretation include:

- Bootlegger's Cabin (5GL.697)
- Belcher Ranch (5GL.699)
- McCammon Ranch (5GL.701)
- Phillips Ranch (5JF.1004)

This is based on their visible, standing structures and their proximity to existing trail systems. Prior to incorporation into any public interpretation program, each cultural resource should be documented for existing conditions under a monitoring program, and any significant artifacts susceptible to collection by the public should be mapped in place and removed by the Park.

Interpretation if often accomplished by installing signs or kiosks near or adjacent to significant cultural resources. An interpretive sign would include a narrative explaining the history and significance of the resource(s) in question, as well as historical photographs. The ranching sites would be most amenable to interpretive signs. Kiosks are best suited for trailheads and before visitors encounter multiple cultural resources of the same theme along a given trail. Volunteers involved in a monitoring program could also be recruited to provide interpretive walks. The Park website would also be a suitable format to highlight cultural resources worth visiting. A visitor center would also be the appropriate venue to provide a brochure explaining cultural resource visitation etiquette and a kiosk explaining the larger culture history of the Park.

Sensitivity Zoning and Management

The sensitivity zones have been established for the park in order to aid in planning and implementing future park activities (Error! Reference source not found.). A careful and considered approach during future development can prevent problems from occurring due to accidental discoveries. The sensitivity model for Golden Gate 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.

A site sensitivity model for Golden Gate Canyon State Park was previously developed by SWCA Environmental Consultants (SWCA) (Burnett et al. 2006). The model used cultural resource data from seven state parks with similar topography and vegetation, all of which are located between the Front Range and the eastern Plains within what is referred to as the Foothills region. It is important to note, however, that any model designed to predict the location of cultural resources is dependent on the quality of the data, including the overall number, diversity and robustness of the dataset, and the type of environmental variables.

The seven parks included under the SWCA sensitivity model total 30,827 acres (of which Golden Gate is the largest), but it remains unknown how many acres within those Parks had been subject to cultural resource survey at the time the model was generated. A total of 152 cultural resources among the seven parks were included in the SWCA model, but there is no stated differentiation between prehistoric and historical sites or a breakdown of historical sites under important research themes such as farming and ranching or mining. The SWCA model incorporated a single environmental variable: degree of slope. SWCA's model identified high cultural-resource-sensitivity areas as those with slopes less than 11 degrees (76 percent of resources) and medium-sensitivity areas as those between 12 and 17 degrees (20.4 percent of resources). Only 3.3 percent of sites were located on slopes over 23 degrees (Burnett et al. 2006).

Refining SWCA's sensitivity model specifically for Golden Gate is hindered by the dearth of intensive cultural resource survey within the Park's boundaries and by the lack of resource diversity within the previously documented cultural resource dataset. Within the dataset of the 14 previously documented cultural resources within the Park (excluding those previously documented cultural resources considered isolated finds and the two eliminated site numbers from the file search), only two historical research themes are represented: farming and ranching, and transportation. A third theme, hard-rock mining, is represented by the few prospecting locations documented, but these would be considered isolated finds given their ubiquity within Colorado's Mineral Belt and proximity to the Black Hawk-Central City Mining District. To increase the robustness of the dataset, potential cultural resources identified through archival sources were included as well.

The sensitivity model generated as part of this stewardship plan used the slope sensitivity results from the 2006 model but also incorporated two new variables that would have influenced where farming and ranching homesteads would have been established: distance to water (greater or less than ¼ mile) and distance to major transportation routes (greater or less than ¼ mile). (Recent large-scale cultural resource surveys conducted within the Pike-San Isabel National Forests (e.g., Engleman et al. 2015) have demonstrated that distance to water is an important variable when predicting cultural resource locations.) The sensitivity model addresses only historical period cultural resources, however, given the complete lack of documented prehistoric archaeological sites within the Park.

Please note-Ideally, all sites within the (Golden Gate Canyon) 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.

The remainder of this chapter provides recommendations regarding how to manage these areas and the resources within them (see Appendix A for sensitivity zones). Note, parks should always seek to avoid and minimize effects prior to any park activities.

- High Sensitivity – Prior to any ground disturbing projects taking place in high sensitivity areas, Resource Stewardship should be contacted so that proper consultation can take place. Any ground disturbing projects should be conducted at least 100ft away from significant sites and consultation with Resource Stewardship initiated (Resource Stewardship will then engage with OAHP).
    - 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 – In addition to reviewing sites in moderate zones, all ground-disturbing projects in moderate sensitivity areas should be evaluated. Resource Stewardship should be alerted so that a review of the project area can be initiated. In addition, 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 and Resource Stewardship should be alerted.

- 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 material.

Data Management and Management Practices

The best management practices for preserving the prehistoric/historic legacy of ---- State Park for future generations to enjoy and learn about are the continued maintenance of the sites, 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 sites 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.

Significant Sites - are "Eligible" or "Listed" sites that should be avoided at all times.

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. These sites should be re-visited and the new findings of eligibility be consulted with OAHP. 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 --- State Park are small and 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, resource Stewardship should be contacted immediately to complete the documentation (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.

Inadvertent Finds and Human Remains

Please see Appendix 7.x and 7.x for references on what to do in the case of inadvertent discoveries and human remains. Inadvertent discovery means the unanticipated encounter or detection of human remains, funerary objects, sacred objects, or objects of cultural patrimony found under or on Federal or tribal lands. If the inadvertent discovery occurred in connection with an on-going activity on Federal or tribal lands, the person, in addition to providing the notice described above, must stop the activity in the area of the inadvertent discovery and make a reasonable effort to protect the human remains, funerary objects, sacred objects, or objects of cultural patrimony discovered inadvertently.

Work on Park Resources

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 (see Appendix 7.x for List of Project Review Exemptions). Only qualified professionals are able to make permanent changes to stabilize the structure.

Identification and Evaluation

Targeted documentation and evaluation of those potential cultural resources identified through archival resources would provide the most return for the financial effort. The cost-benefit of implementing additional cultural resource surveys is considered minimal, despite the very little cultural resource survey actually undertaken within the Park (about 6 percent of the total acreage): identification of additional historic properties through formal pedestrian survey is unlikely, given the documented cultural resources and those identified through archival research, and identification of prehistoric archaeological resources is unlikely given the lack of ground visibility from vegetation cover. Consequently, therefore, any new survey should be limited to areas of proposed ground disturbance, in compliance with the State statute that protects significant cultural resources.

Many of the already documented cultural resources were recorded and evaluated more than 10 years ago and should be considered for reevaluation for the following reasons:

- Documentation standards have changed considerably in the last 10 years.
- Changes may have occurred to the physical integrity of previously documented resources.
- New perspectives (i.e., historical contexts) on significance should be considered.

Note: Major historical transportation arteries that extend through the Park, while significant to the Park's historical trends, are not actually managed by the Park. However, a network of secondary transportation arteries that provided access to individual homesteads are evident through archival resources and should be documented as important elements of the historical record.

Note about potential future actions recommended. The high number of historical sites, including roads, cabins associated homesteads, and ranches, suggests that they constitute a Rural Historic Cultural Landscape and should be designated as such. Documentation requires intensive survey and documentation. This should be completed by a Cultural Resource Management Firm or other qualified contractor(s). CPW-Resource Stewardship can help with the contacting as can History Colorado. You can read more about the designation here. There are many benefits to designating a Historic Cultural Landscape and the park would benefit from such as a designation.

Avoidance

All cultural resources that have been recommended or determined eligible for listing on either the State or National Registers of Historic Places (including those cultural

resources that have not yet been assessed for significance or have been designated as "needs data") should be avoided during Park activities that have the potential to adversely affect those resources. An adverse effect includes any action that "may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the NRHP" (36 CFR 800.5, Protection of Historic Properties). Actions that could affect known and unknown historic properties include:

- Infrastructure development such as roads, trails, utilities and facilities;
- Changes to buildings and structures that alter their historical integrity (such as replacing windows or a roof with dissimilar architectural style)
- Hazardous fuels treatment via hand and mechanical thinning or prescribed fire

The most common management recommendation for historic properties (those cultural resources listed or eligible for listing on the NRHP) is avoidance. Avoidance is usually recommended for archaeological properties that contain significant information in the form of archaeological deposits. However, in the case of Golden Gate Canyon State Park, none of the historic properties are primarily archaeological. Rather, all of the potential historic properties are buildings and structures ranging in condition from stabilized to heavily deteriorated. For safety considerations, avoidance is recommended for those sites that have not undergone stabilization measures. In those cases, a 25 foot avoidance buffer is recommended.

Monitoring

Many of the significant cultural resources within the Park, such as farming and ranching complexes, are built from materials such as wood that degrade over time through natural processes or through human agency. Monitoring is an effective means to evaluate existing conditions of historic properties over time to identify on-going deterioration and as a means to mitigate against unintended effects to historic properties during actions that have the potential to adversely affect them. Monitoring would provide information to measure natural- and human-caused deterioration as a precursor to accessing or applying for funding to mitigate those effects. A monitoring program would first establish existing conditions of significant cultural resources and then monitor changes against those existing conditions. Monitoring may be accomplished by volunteers without formal training. Some upfront training would be required to orient volunteers in the recording of information and to recognize significant changes to particular sites. There are other monitoring programs in the region that could be used as a template for the park, including a standardized form on which to document visits. Stewardship can also provide a monitoring form to aid in site record keeping.

Stabilization

Stabilization of buildings and structures prevents further deterioration from natural and/or human processes. Stabilization is intended to preserve a resource's existing condition and is not intended to enhance or reconstruct a resource. Those significant cultural resources that would benefit from stabilization include farming and ranching complexes with standing buildings and structures and isolated landscape features such as corrals. The Park would need to engage an architectural historian to determine

which cultural resources require stabilization and an appropriate approach. Without future stabilization a number of cultural resources will continue to deteriorate from neglect, decay, and natural forces such as high winds and snow load. State Historical Fund grants are available to offset the costs of structural assessments and stabilization measures. A structural assessment would determine the feasibility of stabilization and the measures required to achieve stabilization. Heavily deteriorated structures may be too far along to warrant stabilization.

Two significant cultural resources, Tallman Ranch and Bootlegger's Cabin, already have been stabilized through grants funded by History Colorado's State Historical Fund. Other Park buildings and structures susceptible to deterioration over time may benefit from stabilization efforts, and evaluation should be considered.

Discussion and Conclusions

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 Golden Gate Canyon State Park 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. The best possible future includes responsible stewardship, where impacts to significant sites will be avoided whenever possible. When not possible, possible mitigations should be identified, and then proper consultation initiated. Some sites 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 structures, in many cases may require structural stabilization, including the maintenance of roofs, foundations, and possibly site re-grading (developing positive slopes away from the structures).

Golden Gate 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 for Historic Preservation Laws and Regulations).

Future Goals and Objectives

- Continue resource monitoring and preservation
- Explore becoming a Rural Historic District
- Continue site documentation
- Improve/add signage by all Officially Eligible and important park cultural resources, themes, and history
    - Sites
        - Bootlegger's Cabin (5GL.697)
        - Belcher Ranch (5GL.699)
        - McCammon Ranch (5GL.701)
        - Phillips Ranch (5JF.1004)
    - Themes
        - Gold Rush
        - Agriculture
        - Recreation

        - Transportation
    - History
        - Native Lands, Ute Removal

This chapter highlights the influences affecting the condition of the natural resources at Golden Gate 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

Population Growth and Development

Colorado's population as of 2019 was estimated to be 5.764 million people, which increased almost 70,000 from 2018 (CDLA 2021). Most of the population growth in the state is in the Front Range, with 95 percent of population growth between 2010-2018 occurring in the area and 64 percent being concentrated in the Denver Metro Area. In 2018, Colorado's population grew by 1.4 percent, which was twice that of the nation as a whole and ranked Colorado as having the 7th highest growth in the U.S (CDLA 2019).

Population trends and predictions are provided in Table 26 for Gilpin and Jefferson Counties. As of 2019, Jefferson County was the 4th fastest growing County in the state and Gilpin was the 47th out of 64 counties (CDLA 2021). Growth is expected to slow down in the near future. Gilpin County's population is expected to decrease by the year 2050, but Jefferson County is expected to continue to grow. Overall, Colorado's growth is still much faster than the rest of the country.

Table 26. Population Estimates for Gilpin and Jefferson County.

Year	2019	2020	2021	2022	2023	2030	2040	2050
Gilpin County Pop.	6,215	6,192	6,179	6,169	6,160	6,097	6,205	6,187
Jefferson County Pop.	583,081	585,341	587,617	590,865	593,926	618,093	644,363	654,853

Source:(CDLA 2021)

Adjacent and Nearby Land Uses

Several different private and public entities own and manage land surrounding the Park. The following are a list of nearby landowners to the Park (Colorado Forest Management, LLC 2014):

- United States Forest Service: Arapaho National Forest- North

- Ralston Creek State Wildlife Area- Southeast
- Bureau of Land Management- Southwest of Green Ranch
- Black Hawk and Central City- West of Green Ranch
- Jefferson County Open Space – Douglas Mountain Study Area, Coal Creek Canyon Study Area, White Ranch Open Space, and Centennial Cone Park to the east
- Thorn Lake- Northwest
- Thorodin - Northeast
- Golden Gate Park Estates- East
- Forest Hills, Dory Hill Road, Jan's Area, Braecher Lake, North Dory Lakes, and South Dory Lakes- West of Mountain Base Road
- Geneva Glen, Drew Hill, and Bear Paw- South
- Various private landowners not affiliated directly with a specific subdivision also border the park.

Land uses adjacent to the Park can create increased pressure on the natural resources of the Park as different land management practices can create inconsistencies. However, the close proximity of lands conserved by public agencies (BLM, Jefferson County Open Space) better helps to protect contiguous habitat for wide-ranging wildlife species.

Working and coordinating with neighboring landowners is the key to good landscape scale natural resource management. The Golden Gate Canyon State Park manager and staff have maintained good communication with the USFS and neighbors and have also completed some joint projects with neighboring landowners. One successful project includes a youth corps project on the Clinton property across Gap Road from the Reverend Ridge Campground. Approximately nine of the surrounding individual landowners are in the Forest Agricultural Program administered through the Colorado State Forest Service. These landowners are also actively completing forest management activities decreasing wildfire hazards and improving forest health.

As it will be unlikely that adjacent landowners will be selling any large tracts of land, or that the Arapaho & Roosevelt National Forest will be selling any of its lands, staff at Golden Gate Canyon State Park management should be aware of any adjacent properties for sale to add to wildlife corridors, watershed protection, and other natural resource conservation efforts. The Bureau of Land Management land at the southern end of Green Ranch is very steep and rugged, and CPW does not need to be concerned about development or selling of this land to private entities.

The vicinity of the Park has seen an increase in residential development in every direction of the Park. These residential areas are in rural zones of Jefferson and Gilpin Counties and thus the density of houses is not likely to exceed one house per 5-35 acres as per County planning and zoning codes. There are some issues with neighbors using the Park and trespassing.

A steady increase in traffic along Highway 46 has been caused by this continuing development around the Park as well as an increase of drivers using this alternate

route to the towns of Black Hawk and Central City. Most of the individuals traveling to the two towns are doing so to visit the casinos and do not stop at the park to visit, only to use the bathrooms at either the Visitor's Center or at the Kriley Pond area. A widening of Highway 119 is under consideration and may reduce the 'gambler traffic' along Highway 46.

Natural Impacts and Influences

Chronic Wasting Disease

Chronic Wasting Disease (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 2017c). CWD has been documented within over 20 percent of harvested mule deer from GMU 38 and in 10-20 percent of harvested elk in GMU 38 (CPW 2021b, 2021c).

Chronic Wasting Disease is a disease that affects deer, elk, and moose and has been found in elk and deer in the game management unit that overlaps with the Park.

Drought

Extended drought is one of the most serious of the environmental conditions facing Golden Gate Canyon forests. Lack of moisture may contribute to tree stress inviting insect or disease problems. Lack of seasonal precipitation especially adequate snow pack is critical to runoff levels.

The portions of Jefferson and Gilpin County where Golden Gate Canyon State Park is located are currently classified as being in a D1 Moderate Drought area according to the US Drought Monitor (The National Drought Mitigation Center 2021). Potential impacts of Moderate Drought include:

- Rangeland growth is stunted; very little hay is available
- Dryland crops suffer
- Wildfires increase
- Pheasant population declines; ski season is limited

Southern portions of Jefferson County are currently in Severe Drought and other areas of the state are classified as in Extreme to Exceptional Drought. These more severe drought categories predict even worse outcomes, such as an extended wildfire season with larger wildfires, impacts to recreational activities like rafting and fishing, and fish kills occurring among other issues (The National Drought Mitigation Center 2021). Drought caused by increased temperatures and less winter precipitation are likely to worsen as climate change continues. Climate change impacts are discussed in more detail below.

Forest 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 horizontal and vertical arrangement of fuels on the Park increases the wildfire risk. Vertical fuels are considered ladder fuels, which can lead a fire from the ground into overstory trees facilitating crown fires. Horizontal fuels refer to the density and continuous nature of untreated forests where fire can move from tree to tree due to the close proximity of the tree crowns. This allows dangerous crown fires the ability to continually move through a forest without interruption. The effects of a potential fire on the Park could be significant. In the event of a fire during a period of drought, high winds and low humidity, a fast moving surface and/or crown fire could be experienced across the property especially as the fire moves uphill from the west towards the east. Such an event could result in detrimental effects to the Park's structures, forest resources, water quality, wildlife habitat, aesthetics and value of the property. In the last two decades, multiple large

Photo 35. Pitch tubes on a lodgepole pine from a mountain pine beetle attack.

Source: Colorado Forest Management

wildfires have occurred in the region around Gate Canyon State Park (Lower North Fork, High Meadows, Buffalo Creek and Hayman) (Colorado Forest Management, LLC 2014).

A Forest Management Plan was created in 2014 that assessed the current conditions of forests in the Park, provided recommendations for future actions including wildfire hazard reductions and improvements, and evaluated past projects to identify any improvements or maintenance actions that could be implemented in order to reach identified goals (Colorado Forest Management, LLC 2014). Since the plan was written, several projects have been completed:

- A 50-acre hand project was completed in 2017 in the Nott Creek area. This project reduced ladder fuels and thinned ponderosa pine woodlands. Several hundred piles of debris were constructed and the Park has been working on

burning them since 2017. The project also included cleanup of some blowdown along Gap Road.

- In 2019-2020, the Park completed a 42-acre project in Green Ranch, in the area between the two big meadows in the central part of that parcel and extending south. This was primarily an aspen promotion project that aimed to remove competition, create some aspen regeneration and thin ponderosa pines.
- Work is currently planned for later this year along the east entrance to Gap Road and to the south (called Big Sweep). The project will probably include approximately 100 or more and involves mostly patch cuts in lodgepole pine.

Coordination between the Colorado State Forest Service and CPW has occurred on the Park since the 1980's, however the park has seen a significant increase in the frequency and size of forest management activities in the past 10 years. Over the past decade, 400 acres of fuelbreak thinning, 150+ acres of fuels reduction, and 30+ acres of patch cut treatments have occurred. An additional 125+ acres of prescribed fire and 125+ acres of prescribed fire burn preparation have been completed (Colorado Forest Management, LLC 2014). More information about these efforts is provided in the Forest Management Plan (Appendix).

Mountain pine beetle, *Ips* beetle, dwarf mistletoe, and western gall rust were all found on the property at varying levels. Mountain pine beetle as a part of the most recent Colorado epidemic has caused tree mortality in the northwest portion of the Park. The Park has been preventatively spraying high value campground trees while also removing accessible active trees. The populations of mountain pine beetle seem to have subsided in the area, but could spring back up at any time. Western Gall Rust (WGR) was found on lodgepole pine trees on the property. Table 27 describes the pests found at the Park during the 2014 forest survey.

Table 27. List of Insects, Disease, and Pests with Potential to Occur at Golden Gate Canyon State Park.

Common Name	Scientific Name	Target Species	Signs of Infestation	Historically Present?
Douglas-fir beetle	*Dendroctonus pseudotsugae*	Douglas-fir	Small groups of dead and dying Douglas-fir trees, fading needles from green to red-brown.	No
Dwarf mistletoe	*Arceuthobium vaginatum*	Ponderosa pine	Swelling of branches and "witches brooms" (an abnormal abundance of foliage on a single branch), weakening the tree.	Yes
Ips beetle	*Ips sp.*	Logging slash piles,	yellowish- or reddish-brown boring dust,	Yes

Common Name	Scientific Name	Target Species	Signs of Infestation	Historically Present?
		pine, spruce	presence of woodpeckers,	
Mountain pine beetle	*Dendroctonus ponderosae*	Lodgepole pine	Trees that turn red all at once or pitch tubes.	Yes
Spruce Beetle	*Dendroctonus rufipennis*	Spruce species	Reddish brown boring dust at the base of the tree, streaming sap, and pitch tubes	No
Western gall rust	*Endocronartium harknesii*	Lodgepole pine	Spherical galls on the branches of pines of all ages, trunk or hip cankers.	Yes
Source: (CPW 2005; Colorado Forest Management, LLC 2014; CSFS 2021).				

Noxious Weeds

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

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.

Photo 36. Canada thistle (left) and houndstongue (right) were two species found in Golden Gate Canyon State Park. They are both listed as B species in the State Noxious Weed List.

Photo Source: iNaturalist

As identified in the resource element description sections, weeds are having significant negative impacts on riparian, wetland, and upland communities at the Parks 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.

A noxious weed survey and management plan (Appendix) was completed in 2017 (CPW 2017b). All exotic plant species documented at the Park throughout the 2017 weed survey are compiled in Table 28 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 plan also provides treatment options tailored to the noxious weed species and populations sizes present in the Park.

Table 28. List of Noxious Weeds Found at Golden Gate Canyon State Park During the 2017 Survey.

Common Name	Scientific Name	Noxious Weed List
Bull thistle	*Cirsium vulgare*	List B
Canada thistle	*Cirsium arvense*	List B
Dalmatian toadflax	*Linaria dalmatica*	List B
Diffuse knapweed	*Centaurea diffusa*	List B

Downy brome (cheatgrass)	*Bromus tectorum*	List C
Field bindweed	*Convolvulus arvensis*	List C
Hoary cress	*Lepidium draba*	List B
Houndstongue	*Cynoglossum officinale*	List B
Leafy spurge	*Euphorbia esula*	List B
Mullein	*Verbascum thapsis*	List C
Musk thistle	*Carduus nutans*	List B
Oxeye daisy	*Leucanthemum vulgare*	List B
Pennycress	*Thlaspi arvense*	-
Poison hemlock	*Conium maculatum*	List C
Wild caraway	*Carum carvi*	List B
Yellow toadflax	*Linaria vulgaris*	List B
Sources: (CPW 2017b)		

Human Impacts and Influences

Human influences at Golden Gate Canyon State Park are pervasive and will increase over time. Effective resource management requires identification of the sensitive aspects within each resource and the ability to predict how human use may affect the resource. A discussion of the most common sources of human based influences and potential outcomes is intended to provide insight into considerations for resource protection.

Carrying Capacity

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

Visitation is expected to increase as the growth of Routt County continues. This increase 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 the Parks are relatively high impact uses, including high volume of people, dogs, boating, 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 the Parks 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.

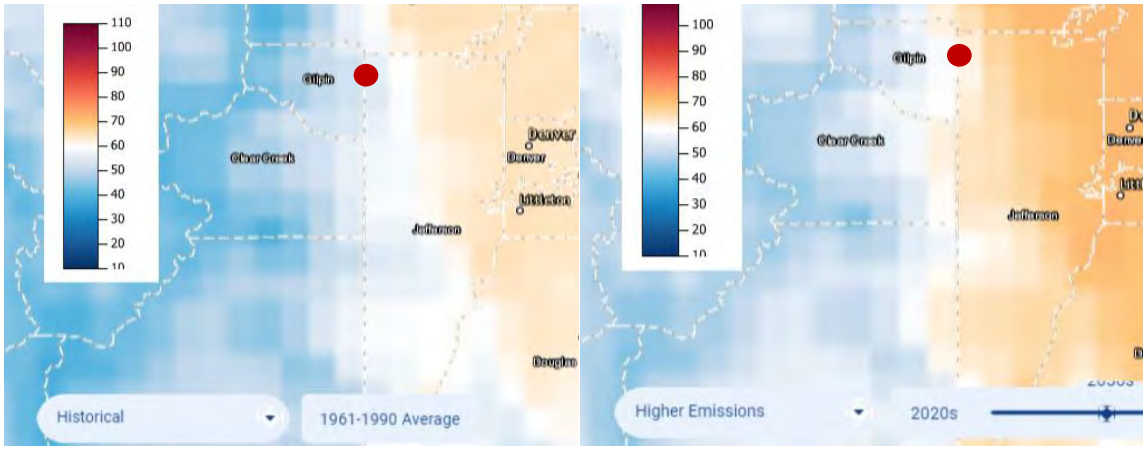
The determination of carrying capacity should not be based solely on visitor safety issues nor on parking space available. Staff should consider resource impacts in the determination of carrying capacity or limits on visitation.

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). 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 Golden Gate Canyon State Park's natural resources.

The Climate Explorer is a tool that offers graphs and maps of climate projections for temperature, precipitation, and related climate variables for two possible future climate scenarios resulting from climate change. One scenario, in which humans make a significant attempt to reduce global emissions of heat-trapping gases, and one in which the rate of global emissions continues rising through 2100 (U.S. Climate Resilience Toolkit 2021). Photo 37 displays data for Jefferson County and Gilpin County where the Park is located on average daily maximum temperatures predictions under the scenario where emissions continue to rise into the year 2050. Average daily temperatures are expected to increase five to ten degrees Fahrenheit under this scenario by 2050 (NOAA 2021).

Photo 37. Average daily maximum temperature changes predicted for the continued high emissions scenario for the Park location (red dot). The historical average temperature from 1961-1990 (left) and the predicted average temperatures for 2020-2050 (right).



Source: NOAA 2021

In response to climate change, Parks may implement adaptation strategies. Adaptation strategies are practical solutions to help land managers adapt ecosystems to changing conditions resulting from climate change. Suggested sources for climate change adaptation are provided in the Best Management Practices Section. These resources provide extensive adaptation strategies for recreational opportunities, forests, watersheds, carbon management in forests, and wetlands. Some specific adaptation strategies that relate to resources found at the Park or existing issues with resources at the Park include:

- Forests (NIACS 2021a):
    - Sustain fundamental ecological functions
        - Reduce impacts to soils and nutrient cycling
        - Maintain or restore hydrology
        - Maintain or restore riparian areas
        - Restore or maintain fire in fire-adapted ecosystems
    - Reduce the impact of biological stressors
        - Maintain or improve the ability of forests to resist pests and pathogens
        - Prevent the introduction and establishment of invasive plant species and remove existing invasive species
        - Manage herbivory to promote regeneration of desired species
    - Reduce the risk and long-term impacts of severe disturbances
        - Alter forest structure or composition to reduce risk or severity of wildfire
        - Establish fuelbreaks to slow the spread of catastrophic fire
        - Promptly revegetate sites after disturbance

- Forested Watersheds (NIACS 2021b):
    - Maintain and enhance water quality
        - Reduce export and loading of nutrients and other pollutants
        - Reduce soil erosion and sediment deposition
- Non-forested Wetlands (NIACS 2021c):
    - Maintain and enhance water quality of wetland habitats
        - Reduce export and loading of nutrients and other pollutants
        - Reduce soil erosion and sediment deposition
    - Maintain and restore wetland vegetation
        - Maintain and restore wetland structure.
        - Maintain and enhance diversity of plant species and their life histories, ecological niches, morphologies, and phenologies

Dogs and Domestic Pets

The presence of dogs accompanying their owners while at the Park creates certain concerns. Dogs off leash and dog waste bags are common issues observed in the Park. Citations are issued for both, but it is difficult to enforce with limited staff and millions of visitors every year.

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.

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.

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.

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.

Picnic Areas and Other Developed Areas

Golden Gate Canyon State Park has 125 picnic sites, seven cabins/yurts, two group facilities, 24 primitive campsites, 73 basic campsites, and 59 electrical campsites (CPW 2020a). Picnic and camping areas modify areas of natural habitat and often create an unnatural source of food for area wildlife. Carelessness with the use and disposal of food may attract wildlife and create conflicts between visitors and wildlife. All trash cans in the Park are wildlife-proof but the dumpsters are not. Obtaining wildlife-proof dumpsters should be a goal for the future.

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.

Fires in the campground may also impact Park resources. As campers scavenge for firewood, they often remove limbs from trees. This may injure the tree, making it more susceptible to insects and disease. Understory plants may also be trampled, creating erosion and soil compaction problems. Campfires have the potential to ignite wildfires and endanger visitors, Park staff and resources.

Instruct visitors to collect only down wood for fires or restrict this practice entirely.

Roads

Roads are a critical component of any Park facility, however, roads also impact Park resources in several ways. Road construction and maintenance often creates areas of bare, disturbed ground that invites the establishment of unwanted weeds. Roads may also fragment wildlife habitats or movement corridors. Slope failures from road cuts and other erosion issues may also be important to consider. Depending upon the type of use for each road in the park, park management may want to consider paving some roads with a material less erosive than the natural soils, yet permeable enough so as to not allow polluted runoff from the road to enter into adjacent vegetation communities.

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.

Road Maintenance

Currently, sand but no chemicals are used on the roads during winter due to costs and impacts to the environment. Roads need regular maintenance due to high visitation at the Park.

Trail Use

Golden Gate Canyon State Park includes approximately 42.4 miles of biking, hiking, equestrian, cross country skiing, and snowshoeing trail (CPW 2020a). Most trails at Golden Gate Canyon are multiple use, as mountain biking, hiking and horseback riding are all extremely popular activities on the Front Range and all appropriate uses for the goals of the Park. Trail use by visitors often provides the best means of experiencing the natural resources of the Park firsthand and up close. Well-designed trails, whether for horse, foot or bicycle travel, should meet three objectives:

1. To protect the environment in which it is located.
2. Meet the needs and desires of its users.
3. Require little maintenance.

Trail use may have implications on wildlife productivity, vegetation health and distribution, soil condition, mitigation requirements, and maintenance costs. 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. Table 29 offers possible considerations regarding the natural resources with particular types of trail use or activities.

Table 29. Considerations regarding Park resources and management issues by types of trail use or activities.

Type of trail use	Considerations relating to resource conditions
Hiking	Proper routing, construction, and maintenance of trails is important to maximize visitor experiences while limiting stress on wildlife, social trail development, and excessive erosion.
Equestrian	Without consistent maintenance, horse trails can create erosion problems particularly on more erodable soil types, moisture-rich soils, and areas of steep terrain. Horses may provide a source for weed introduction and weed seed dispersal, as well.
Mountain Biking	The appropriateness of available terrain based on gradient, soil types, vegetation cover, wildlife corridors, added trail width and design requirements to accommodate this user-type.

Golden Gate Canyon State Park is currently pursuing Leave No Trace Gold Standard Certification. Gold Standard Site designation is the highest level of recognition by the Leave No Trace Center for Outdoor Ethics for parks and protected areas. Resources for

encouraging visitors to stay on the trail and leave no trace are provided in the Best Management Practices Section.

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.

Many non-designated "social trails" exist in the Park. These are mostly developed around campgrounds, where people take "shortcuts" to facilities or to nearby official designated trails. They are also present along the shoreline of the lakes where people go off trail to find a good fishing or sightseeing spot. The riparian and wetland 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. 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. In the developed parts of the Park, it may be difficult to change this policy.

Trail maintenance is especially important as visitation numbers increase to the Park. Golden Gate Canyon State Park saw a 60 percent increase in visitation in the year 2020 due to the COVID-19 pandemic. However, numbers were already increasing as the population grows on the Front Range. A study found that hiking increased by approximately 171.36 percent in 2020 compared to 2019 (Ronto 2021). Any increase in hikers, bikers, and equestrians on trails will result in degradation of the trails. The numbers seen in 2020 are alarming for trail maintenance reasons, vegetation trampling, noxious weed spread, and wildlife disturbance.

Visitation

Regional population figures continue to increase dramatically, which puts the Park under considerable pressure due to its proximity to the Denver metro area. As a result of the coronavirus outbreak in 2020, the Park saw a massive increase in visitation during the year, as Front Range residents sought outdoor activities more than usual. Visitation was documented to increase by 60 percent compared to 2019, and a total of 1.6 million people visited the Park. Golden Gate Canyon State Park is currently staffed by eight full time employees (FTEs), 18 temporary employees, and 254 volunteers. The number of staff are not enough to properly enforce rules and maintain the Park resources.

Continued increased visitation will significantly affect vegetation, wildlife and scenic values. A visitation study, documenting the numbers of visitors, would be a highly valuable study that could assist in better understanding visitor trends and how to better protect resources in the future. Addressing how to continue to absorb increased visitation projected in the future, setting capacity limits, and protecting Park resources is a top priority.

Resource Summary

Resource Condition Summary

The summary table below provides a summary of resource conditions discussed in Chapter 3 of this report. Overall, Park resources are in good condition. The largest threats to the condition of resources at the Park include increased visitation, population growth, fire, disease, and infestations, noxious weeds, and drought.

Table 30. Summary of Resource Condition Status, Trend, and Confidence Ratings.

Priority Resource or Value	Condition Status / Trend	Rationale
Vegetation Communities		Overall, vegetation communities in the Park were documented to be in good condition with the exception of a few vegetation community types. Forest habitats are improving with active forest management activities. Climate change and noxious weeds are the biggest threat to the current condition of vegetation in the Park.
Sensitive Plants and Communities		Habitat for several sensitive plants and communities exists in the Park and is in good condition. Additionally, occurrences of sensitive plants and communities have occurred in the past. However, protocol-level surveys have not been conducted in the Park recently. It is uncertain what the current condition of sensitive vegetation is in the Park without surveys or monitoring being conducted.
General Wildlife		The Park provides ample forest, montane meadows, and wetland and riparian habitats along perennial creeks for a wide variety of wildlife species. Vegetation condition has been documented as good to excellent which translates into good wildlife habitat. Aquatic, wetland, and riparian habitats raise the largest concern due to noxious weeds, water sedimentation, and vegetation trampling.

Sensitive Wildlife Species		Increased surveying and monitoring for bats, small mammals, and amphibians would help to fully understand what sensitive wildlife species are present at the Park. Overall, habitats are in good condition for sensitive wildlife species, but threats include noxious weed spread, climate change, and vegetation trampling. Bird populations and habitats are in good condition and several sensitive species have been documented in the Park.
Wetlands		The Park contains ample emergent wetland marsh and willow carr habitat that provides important habitat for a variety of plants and wildlife species. Noxious weeds and sedimentation of waters currently affect the quality of wetlands. An evaluation of the wetlands has not been conducted for several years.
Water Resources		Erosion and sedimentation are the largest impacts to water resources in the Park. Measures such as dredging ponds, potentially installing check dams, and reintroducing beavers could help to improve water conditions at the Park. An evaluation of the water bodies has not been conducted for several years.
Geology		The overall condition of geology in the Park has remained constant and is considered good. Some geologic hazards exist in or near the Park.
Soils		Erosion on trails and along pond and creek shorelines has long been an issue in the Park. Additionally, the soils in the Park are naturally susceptible to erosion, making issues more severe. Addressing erosion and sedimentation issues in the Park is a priority.
Cultural Resources		The Park has high cultural resource value and many of the sites are well-preserved. Additional interpretation and education opportunities exist and should be pursued. Structure stabilization should also be considered in the future.

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. Table 31Table 31 outlines attributes that should be considered in the delineation of ecological sensitivity zones, and the necessary scrutiny associated with each attribute.

Table 31. Attributes to be Considered when Delineating Park Ecological Sensitivity Zones.

Resource	Summary	Questions
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 CPW 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?
Vegetation	Community Type and Condition	• Are there threatened or endangered species or potential habitat for these species present? • What vegetation community types are there? • How much of the vegetation is native? • What is the condition of the vegetation?
Soil and Geology	Soil health and condition, erosion	• 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? • How does snow load and melt exist in the Park?
Acreage and Surrounding Areas	Wildlife corridors, connectivity, development, private vs. public lands	• 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?

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, cryptogrammic 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 (2015 vegetation communities data).
2. Rare plant historical occurrences buffered by 50 feet (CNHP data).
3. Vegetation in excellent condition (2015 vegetation communities data).
4. Aquatic habitat, including streams and ponds (National Wetlands Inventory Data).
5. USFWS Preble's meadow jumping mouse designated critical habitat.

**Note- raptor nest data was not included. Last active raptor nest documented in 2017. Recent raptor nests should be considered high sensitivity if found.*

The moderate sensitivity zones in the Park include:

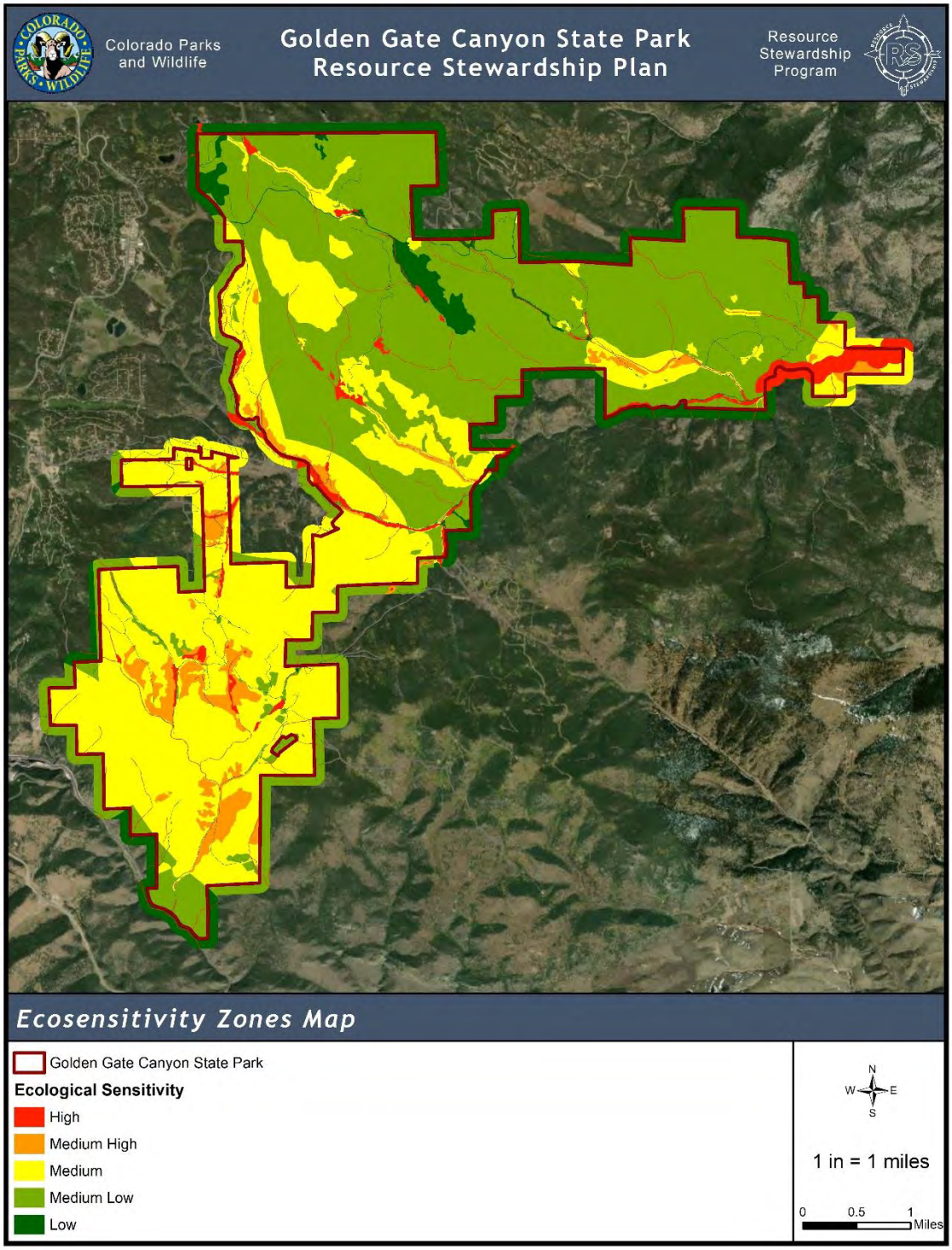
1. Vegetation in good condition (2015 vegetation communities data).
2. Elk severe winter range, elk production area, elk winter concentration area, moose winter range, moose concentration area, black bear fall concentration, black bear summer concentration, and mule deer winter concentration area (CPW SAM Data).
3. Rare vegetation community occurrences (CNHP polygon data).

**Note - Typically, soils with severe erosion hazards that would be vulnerable if exposed to high use would be considered moderate, but almost the entire park falls into this category, so this data was left out for this Park.*

The low sensitivity zones in the Park include:

1. Developed areas such as roads and other Park infrastructure (Various park road line files buffered by 7 feet).
2. Areas dominated by non-native species (Weed inventory polygons).
3. Vegetation in fair condition (2015 vegetation communities data).

Figure 13. Ecosensitivity Zones Map



Stewardship Goals and Objectives

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

Wildlife

- Maintain use of the park by general and sensitive wildlife species. Restore and improve habitat for sensitive wildlife species that are not currently present in the Park, such as Canada lynx, Preble's meadow jumping mouse, and the many bird species that could occur.
- Continue raptor monitoring efforts at the Park. Raptor monitoring efforts are an important stewardship effort, and an understanding of raptor populations helps to better understand the overall ecosystem health of the Park.
- Protect and encourage the nesting of the wide-variety of raptor species within the Parks, including northern goshawk, which successfully nested in 2017. Maintain populations of all existing bird species that currently nest in the Parks. Continue to survey for bird species at least every five years in the Parks. Implement appropriate trail route closures to protect nesting bird species.
- Evaluate the feasibility of restoring beaver populations to the Park. This species is native to the Colorado Front Range and could greatly improve water quality and wetland and riparian habitats in the Park.
- Improve fish habitat in the Park by dredging ponds and removing excess sediment. Continue to offer fishing opportunities for visitors by stocking ponds with a variety of fish species.
- Document wildlife species and taxa that have not been inventoried for or inventories are out of date for. Specifically, implement monitoring programs for raptors, amphibians, and reptiles. Complete surveys for bats and small mammals and breeding and migratory birds to document what species are present in the Parks. Regular monitoring will continue for amphibians, raptors, and breeding birds present in the Parks, in addition to consistent communication with the Park Manager to share information regarding wildlife management and sightings.
- Promote a healthy forest ecosystem exemplifying more characteristics of forests subject to natural thinning processes. Follow recommendations provided in the Forest Management Plan (Appendix). The approach to forest management most beneficial to wildlife over the long term is the restoration of proper forest functioning that maintains biodiversity and sustains natural processes. Resulting forests should provide better conditions for use by mammals, insects, and birds.
- Control and reduce the spread of noxious weed species to maintain and improve wildlife habitat quality. Continue to implement the Noxious Weed Management Plan (Appendix).

- Protect wildlife corridors and large tracts of contiguous habitat through collaborative programs and decisions with the USFS and their managed lands adjacent to the Parks.

Vegetation

- Maintain the existing diversity and improve the condition of plant communities, including mountain meadows/shrublands, wet meadows/shrublands, deciduous aspen forest, riparian willow carrs, and coniferous forests by encouraging a high diversity of native species and minimizing disease and infestations. Vegetation community improvements that can be made include:
    - Mountain Meadows and Shrublands – These areas in the Park are unique and in relatively good condition. Maintenance of diversity and control of non-native grass species, such as smooth brome, should be a priority for these areas.
    - Riparian Willow Carrs – Maintain these areas and potentially monitor in the future if drought becomes a bigger issue and affects the health of willows.
    - Coniferous Forests - Active, ongoing management of the forest resource is a necessary and critical part of achieving the future desired condition, and this is particularly true in campgrounds and other developed recreation areas. Continue to carry out recommendations provided in the 2014 Forest Management Plan (Appendix).
    - Aspen Woodlands – These communities are in decline due to being shaded and encroached upon by coniferous forests. Elk barking is also an issue in the Park. Continue to carry out recommendations provided in the 2014 Forest Management Plan (Appendix).
    - Wet Meadows and Shrublands - Maintain these areas and potentially monitor in the future if drought becomes a bigger issue.
    - Ruderal Communities - Control non-native communities from spreading to nearby healthy communities by implementing the Noxious Weed Management Plan. Additionally, use of native seed mixes should be implemented for restoration projects. In the past, non-native seed mixes have been used in the Parks and have likely contributed to the presence of ruderal communities. A suggested seed mix for the Parks is provided in the Appendix.
- Hire a contractor to conduct protocol-level surveys in habitat areas for the many sensitive plants species that could occur in the Park to help conserve populations. Additionally, survey for the species prior to construction in habitat zones. Enhance habitat for rare plant species and communities by reducing non-native species cover.
- Preserve and protect the rare plant communities identified in the Park. Survey and identify updated locations. Avoid planning new trails in these communities and reclaim social trails that form as a result of existing trails in these communities.

- Keep Park development activities (new buildings, trails, Parking lots, roads, etc.) out of native plant communities and wetlands to the extent possible.
- Contain, suppress or eradicate occurrences of other noxious weeds, as appropriate for each species and in compliance with the Noxious Weed Management Plans (Appendix). Prevent the establishment of noxious weed species that are not already present in the Parks.

Water and Wetland Resources

- Maintain and potentially improve the water quality of the ponds and streams in the Park. The ponds often contain high amounts of sediment and the cause of the issue is not fully understood. Dredging the ponds to remove suspended sediments is a possible solution. Streams have also been documented to have sedimentation issues and some are considered impaired in the state.
- Limit visitors using areas that are severely eroded and devoid of vegetation near waterways and ponds.
- Restore and maintain riparian vegetation along the many streams and the ponds to reduce erosion and subsequent sedimentation of water.
- Reduce the spread of noxious weeds in wetlands and riparian areas by continuing to implement the Noxious Weed Plan (Appendix).
- Wetlands were last delineated and assessed for condition and health in the Park in 1995 and at Green Ranch in 2004. Water and wetland resources should be revisited and documented. 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.

Geology and Soils

- 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.
- Limit sediment-laden runoff from Park roads and parking lots. This will decrease sedimentation into the ponds and other Park drainages and reduce damage to road surfaces and embankments.
- Construct and maintain trails 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.

Cultural Resources

- Limit public access to six eligible cultural sites within Park to preserve cultural artifacts.

- Avoid impacts to all cultural resources that have been recommended or determined eligible for listing on either the State or National Registers of Historic Places.
- Educate Park visitors about cultural resources through signage and interpretative materials. Distribute signs around the Park explaining the history of cultural resource features. Additionally, create signage 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.
- Maintain and preserve cultural resource sites and mitigate natural- and human-caused deterioration.

Prioritized Stewardship Actions

Prioritized Stewardship Actions are created from assessing current resource impacts, potential threats, resource conditions, and resource knowledge gaps. Prioritized Stewardship Actions aim to maintain resources in good condition, improve those in bad condition, and obtain information about resources that have not been evaluated or where a substantial amount of time has passed since they were last evaluated. Prioritized Stewardship Actions ultimately aim to provide ways Park Managers, staff, and Resource Stewardship staff can help to achieve outlined goals and objectives. This section focuses on what should or needs to be done. Resources for how to implement the suggested actions are provided in Chapter 6: Implementation.

Resource Management and Conservation Actions

Resource management and conservation action items are on-the-ground actions that should be completed to help sustain natural and cultural resources in the Park. They are resource issues that should be addressed in the near future, but do not require monitoring or surveys.

Table 32. Resource Management and Conservation Actions Priority List.

Resource	Description of Action Item	Priority
Implement the Noxious Weed Management Plan	• Follow instructions in the plan, specifically, what species and individual populations to prioritize for treatment. • Follow instructions in the plan for how to treat various species of noxious weeds with chemical, biological, or mechanical controls. • Review Noxious Weed Management Prescriptions. • Review the Noxious Weed BMPs before development projects.	High

Resource	Description of Action Item	Priority
Implement Forest Management Plans	• Follow instructions in the plan on what to prioritize for treatment. • Review Forestry Management Prescriptions. • Review the Forestry BMPs. • Monitor forest health for regeneration, pests, and disease. • Create fuel breaks according the plan with the purpose of protecting park lands and infrastructure.	High
Seasonally close trails for raptors during nesting season	• If raptor nests are discovered, seasonally close trails within an identified buffer zone. • Review raptor nest buffer guidelines provided in Chapter 6 and the Appendix.	High
Trails / Leave No Trace (Erosion, Vegetation Trampling)	Apply for Leave No Trace Gold Standard Certification: • Review the Leave No Trace Certification Toolkit. • Review the Start-up Workbook. • Follow the implementation guide. • Complete the Leave No Trace Assessment.	Medium
Reclaim inappropriate social trails	Reclaim social trail areas: • Remove noxious weeds in these areas according to the Noxious Weed Management Plan (Appendix). • Use native wetland seed mixes provided in the Appendix. • Use BMPs and Management Prescriptions for trail restoration and trail closures.	Medium
Conduct wetland restoration around Dude's Fishing Hole to	Restore and improve wetlands in the Park, specifically surrounding Dude's Fishing Hole.	Medium

Resource	Description of Action Item	Priority
improve habitat for amphibians	• Close any social trails that exist and do not plan any new trails in wetland areas. • Remove noxious weeds in these areas according to the 2017 Noxious Weed Management Plan (Appendix). • Use native wetland seed mixes provided in the Appendix. Avoid planting cattails if possible (Triece et al. 2019). • Use BMPs and Management Prescriptions provided in Section 6 when working in these areas. • Vegetation cover from sport fish near the inflow and near banks with less fishing pressure would benefit both of these species, and particularly during breeding season(Triece et al. 2019).	
Identify the cause of Pond Sedimentation to improve fishing habitat and water quality	• Many of the ponds in the Park are filled with sediment, which impairs water quality and fish habitat. • The cause of sedimentation is not completely understood and further study of this issue should occur before action is taken to remedy the situation. • Ranch ponds were identified as ponds of particular concern for fish habitat and a priority for restoration by dredging them.	Medium
Improve and add cultural resource signage	Improve/add signage by all Officially Eligible and important Park cultural resources, themes, and history • Sites o Bootlegger's Cabin (5GL.697) o Belcher Ranch (5GL.699) o McCammon Ranch (5GL.701) o Phillips Ranch (5JF.1004) • Themes o Gold Rush o Agriculture	Medium

Resource	Description of Action Item	Priority
	o Recreation o Transportation • History o Native Lands, Ute Removal	
Stabilize historic structures	• Cultural resources that would benefit from stabilization include farming and ranching complexes with standing buildings and structures and isolated landscape features such as corrals. • Some actions to help stabilize structures include maintenance of roofs, foundations, and possibly site re-grading (developing positive slopes away from the structures).	Low
Remove unused plastic erosion control materials and barbed wire	• Remove plastic erosion control material and barbed wire (seen at Visitor Center and Kriley Pond respectively). • Use a biodegradable material and keep track if it is trapping wildlife. • Plastic-based mesh often traps snakes and other wildlife which may lead to their deaths. • Follow fencing guidelines provided in Fencing with Wildlife in Mind (Hanopy 2009)	Low
Nesting Platforms	• Install nesting platforms for raptors where appropriate. Some potential locations include Kriley Ponds overlook, on the edge of large meadows in Green Ranch, and the meadow behind the seasonal house in Kriley ranch.	Low
Cultural Site State Listing Review	• Review cultural sites for state listing status. All sites have been evaluated for federal listing status, but not state listing. Some sites that are not protected under federal regulations may be more protected under state regulations.	Low

Resource Plan and Report Actions

Resource plans and reports are documents that investigate a resource, an impact, or a threat to resources and provide a plan for addressing the topic researched. Many resource reports and plans were referenced to develop this Stewardship Plan and create provided Management Prescriptions, BMPS, and other management recommendations. These plans are often created with the help of experts in the field and require a significant amount of time to construct. Some resource reports require field surveys and monitoring, and others may only require research. Plans suggested in the table below are out of date or have never been completed for the Park and address an issue identified in this Stewardship Plan.

Table 33. Resource Plan and Report Actions Priority List.

Plan / Report	Description of Action Item	Priority	Suggested Contact	Desired Completion Year / Completion Year
Visitation Study	Visitation in the Park has increased significantly over the past 10 years, with a 60 percent increase in 2020 alone. A report analyzing and documenting Park visitation and potential impacts to resources should be created.	High	Jeff Thompson, Matt Schulz, Kacie Miller	2022
Assess Trail Conditions and create a Trail Management Plan	Evaluate the condition of trails in the Park and provide recommendations for trail restoration, closures, and reroutes based on natural and cultural resources present.	Medium	Statewide Trails Program Coordinator & Regional Trails Coordinator	2023
Beaver Reintroduction / Management Plan	Create a plan that assesses the feasibility of reintroducing beavers into the Park to improve the ecosystem and water resource health. Some resources include:	Low	Stewardship Team, District Wildlife Manager	2025

Plan / Report	Description of Action Item	Priority	Suggested Contact	Desired Completion Year / Completion Year
	• Management Prescription for beaver management (Appendix). • Review methods used for beaver reintroduction, including Scamardo & Wohl 2019. • Work with local land management agencies and District Wildlife Managers			

Resource Surveys and Monitoring Efforts

In order to verify that the stewardship goals and objectives in Chapter 5 are being met, a monitoring program should be created, and future surveys should be conducted. Monitoring and surveying are the most effective ways of identifying impacts and influences, minimizing threats by proactive observation, and tracking conditions of a dynamic ecosystem.

Surveys are a collection of data intended to answer specific questions about presence/absence, abundance, distribution, and/or ecology of a species or population. Surveys are usually conducted less frequently, are more focused, and most often require a biologist to conduct them. Monitoring involves the repeated collection of data to evaluate presence/absence and/or a change in resources. Monitoring includes frequently checking already identified resources and ensuring their presence continues and conditions remain stable or improve. Monitoring programs may be conducted by Park staff or volunteers, occur annually (ideally), and frequently (weekly, biweekly, or monthly).

Suggested methods for some of the monitoring and survey suggestions are provided in the Appendix. Resource Stewardship staff should be contacted for any other information about monitoring and survey efforts.

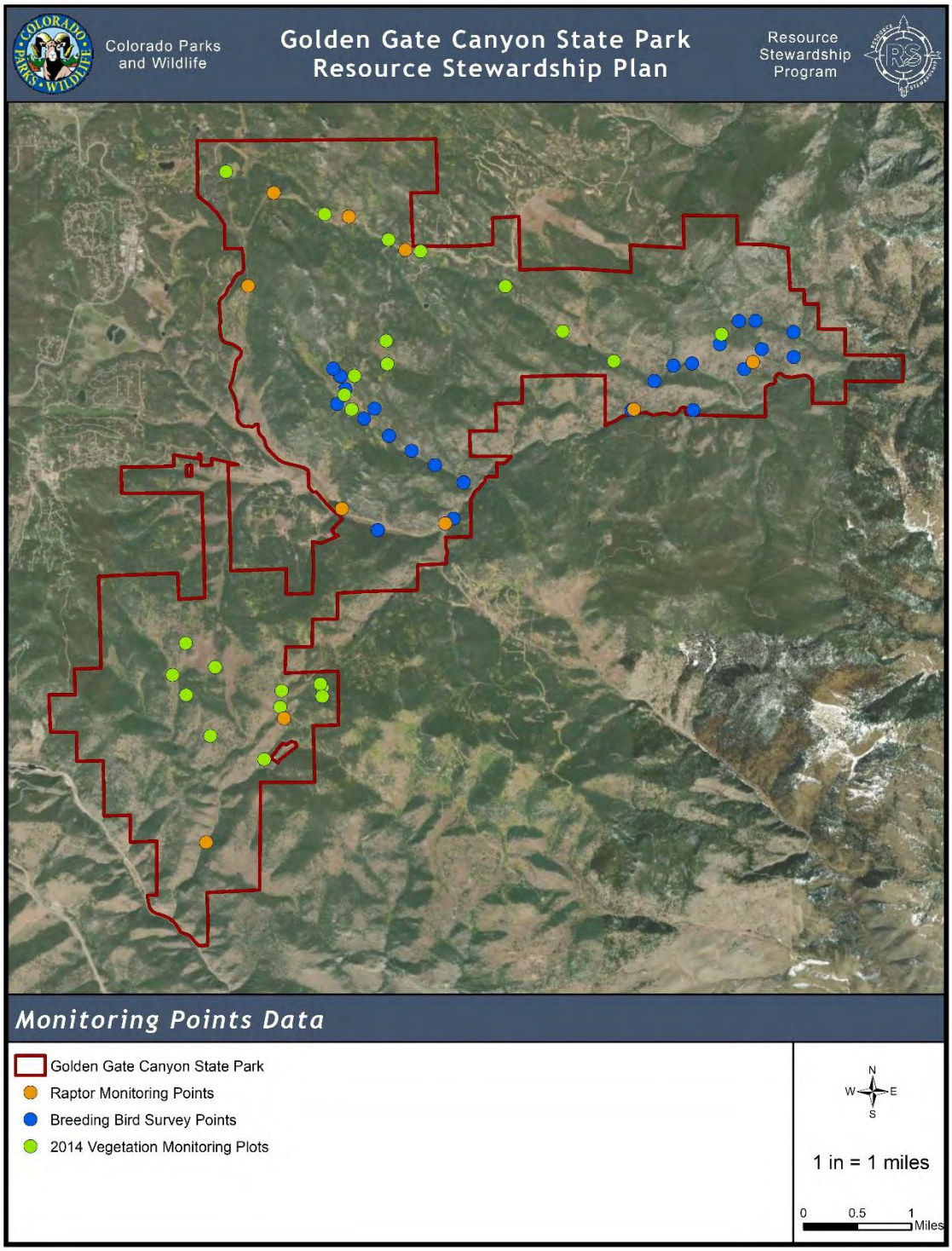
Table 34. Resource Surveys and Monitoring Effort Priority List.

Effort	Effort Type	Description	Priority	Suggested Contact	Desired Completion Year / Completion Year
Vegetation					
Rare Plant Surveys	Survey	Rare plant surveys have never been performed in the Park. There are numerous species that have been documented in the past by CNHP, and a more recent survey should be conducted for some or all of them in identified habitat areas. Qualified volunteers could potentially conduct the surveys.	High	Jeff Thompson	2022
Wildlife					
Conduct Breeding and Migratory Bird Surveys	Survey	Contact Stewardship Team to conduct breeding and migratory bird surveys at established points. This survey should be conducted at least every 5 years and the last survey was conducted in 2012.	High	Jeff Thompson	2022
Raptor Monitoring Program	Monitoring	Continue the raptor monitoring program in the Park.	High	Jeff Thompson	2022 and annually thereafter
Bat and Small Mammal Surveys	Survey	Many rare bat and small mammal species have the potential to occur	Medium	Resource Stewardship	2023

Effort	Effort Type	Description	Priority	Suggested Contact	Desired Completion Year / Completion Year
		and ample habitat exists in the Parks. However, no surveys have ever been conducted for either group.			
Invertebrate Surveys	Survey	Survey for or inventory invertebrate species in the Park to gain a better understanding of the diversity of species present.	Medium	Resource Stewardship	2025
Amphibian Monitoring Program	Monitoring	Surveys were conducted in 2019, but annual monitoring could uncover more cryptic species and help to better manage this taxon. Additionally, the rare species, boreal toad and northern leopard frog, could occur within the Park.	Low	Resource Stewardship	2022 and annually thereafter
Conduct focused flammulated owl and northern goshawk surveys	Surveys	Conduct focused surveys for flammulated owl and northern goshawk. Both species are sensitive and their current status is not known in the Park. Both have been historically documented. Call-back surveys for the species should be	Low	Resource Stewardship	2022

Effort	Effort Type	Description	Priority	Suggested Contact	Desired Completion Year / Completion Year
		conducted by a profession biologist.			
Wetlands and Water Resources					
Inventory wetlands and water resources	Survey	Hire resource specialist to spatially document all wetland and water resources and their conditions.	Medium	Resource Stewardship	2023
Geology / Soils / Paleontology					
Survey for peat accumulations at Green Ranch	Survey	Hire resource specialist to survey for peat accumulations at Green Ranch. The previous Stewardship Plan mentions their presence, but there is no documentation of them.	Medium	Resource Stewardship	2024
Cultural Resources					
Cultural Resource Monitoring	Monitoring	Visit cultural resource sites monthly to ensure natural- and human-caused influences are not affecting the condition of resources. Contact the Stewardship Team for more details.	High	Matt Schulz	2022 and annually thereafter

Figure 14. Survey and Monitoring Points Map



6.0 IMPLEMENTATION

This chapter provides resources for accomplishing recommendations provided in the Goals and Objectives and Prioritized Stewardship Actions sections. The resources provided in this chapter are specifically tailored to natural and cultural resources that may be found in the Park. Additionally, some references provided in this chapter may not be applicable at the time of this plan, but can be used for future resource concerns. In that case, Park Managers and staff should be able to access this chapter and find methods or contacts that can assist with addressing the issue at hand.

Best Management Practices

Best Management Practices (BMPs) are proactive, operational management techniques that avoid or limit adverse impacts to resources. Park staff, contractors, and volunteers should utilize these techniques to limit or prevent impacts to resources during development activities such as trail building, new infrastructure construction, forestry operations, etc. Measures for resource protection are provided as examples, but sources of information are provided that list additional measures that may be implemented.

Table 35. Best Management Practices Recommended for Golden Gate Canyon State Park.

Type	Reasoning / Description	Measures	Resources
Erosion and Sedimentation			
Erosion Control	Erosion can result from any type of soil disturbance, especially following construction activities that leave bare, exposed soils subject to the abrasive action of wind and water. Soil erosion can deteriorate soil quality and the environmental quality of surrounding areas. Erosion Control Measures limit the amount and rate of erosion occurring on disturbed areas.	• Review Park Soils and erosion hazards in Chapter 3 before beginning a construction project. • Schedule construction activities in order to minimize the total amount of soil exposed at one time. • Establish temporary or permanent covers on exposed areas as soon as soil is disturbed. • Use vegetation, rip-rap, or other materials to help stabilize erosion-prone areas. • Limit the velocity of water flow in disturbed areas.	• CDOT Construction Control Measures (CDOT 2002). • Fort Collins Construction Control Measures (City of Fort Collins 2018a). • Fort Collins Construction Control Measure Fact Sheets (City of Fort Collins 2018b).
Shoreline Stabilization	Shoreline erosion can impact water quality through the loss of soil to waterbodies from wave action, recreation, and grazing activities. Actions may be implemented to prevent and restore shoreline erosion areas.	• Reduce erosion on especially prone areas, such as bluffs. • Use vegetation, rip-rap, or other materials to help stabilize shorelines.	• Shoreline Stabilization BMP (Appendix). • Alternative Techniques to Rip-rap Bank Stabilization (FEMA 2009).
Sedimentation Control	Erosion of soils and rocks caused by construction and other activities can enter waterways and cause sedimentation of waters, reducing water quality and potentially causing negative impacts to wildlife and plants. Sediment Control Measures attempt to capture the soil that has	• Review Park Soils and erosion hazards in Chapter 3 before beginning a construction project. • Schedule construction activities in order to minimize the total amount of soil exposed at one time.	• CDOT Construction Control Measures (CDOT 2002). • Fort Collins Construction Control Measures (City of Fort Collins 2018a). • Fort Collins Construction Control Measure Fact

Type	Reasoning / Description	Measures	Resources
	been eroded before it leaves the project.	• Establish temporary or permanent covers on exposed areas as soon as soil is disturbed. • Use vegetation, rip-rap, or other materials to help stabilize erosion-prone areas. • Limit the velocity of water flow in disturbed areas. • Remove sediment from waters before water leaves project area.	Sheets (City of Fort Collins 2018b).
Vegetation Removal and Revegetation			
Reseeding Vegetation	Revegetation is often required following any soil disturbing activities that occur in the Park, such as construction or wildfire. Revegetation of these areas prevents soil erosion, noxious weed spread, and repairing scarring.	• Revegetate impact areas with native species with seed mixes provided in the Appendix. • Prepare soils for reseeding by loosening compact soils or adding soil amendments. • Use mulch to keep seeds in place and prevent moisture evaporation. • Develop a revegetation plan in collaboration with the Resource Stewardship Team.	• -- State Park Native Seed Mix (Appendix). • Native Plant Revegetation Management Prescription (Appendix). • Native Plant Revegetation Guide for Colorado (CNAP 1998). • Boulder County Revegetation (BCLUD 2020).
Tree Planting	Tree planting may be required to assist with restoring areas affected by noxious weed invasions, fires, or insect outbreaks.	• Contact CPW Forest Management Staff to coordinate with on species and site selection. • Store any seedlings in a cool, dark and damp location. • Water seedlings frequently if storing before being planted. • Remove any weeds from the planting site.	• Low Water Tree Planting Standard Operating Procedure (Appendix). • Planting Trees for Conservation (CSFS 2020a).

Type	Reasoning / Description	Measures	Resources
Tree Removal	To reduce impacts to wildlife and other natural and cultural resources, ensure that proper planning is in place for construction, ground disturbance and tree/vegetation removal projects	• Consider avoiding projects between April 15th and July 15th to reduce impacts to breeding birds, elk calving and other sensitive wildlife. This also avoids mud season and excessive soil damage when using mechanical equipment. • If a project must occur between April 15th and July 15th, contact CPW Resource Stewardship to obtain input on mitigation measures and/or consider reducing the project scale. • Coordinate with CPW Resource Stewardship and Forest Management Team to identify significant natural and cultural resources so that proper mitigation measures can be put in place.	• Construction, Ground Disturbance, and Tree/Vegetation Removal Projects Standard Operating Procedure (Appendix). • Wildlife Habitat Standard Operating Procedure (Appendix).
Wetlands and Riparian Areas	Wetland and riparian areas provide habitat for a wealth of wildlife species. These areas also provide numerous environmental benefits to wildlife, plants, and people. Following disturbance (construction, vegetation trampling, trail construction, etc.) wetlands and riparian areas are easily infested with noxious weeds.	• Avoid construction or disturbance in wetland and riparian areas to the extent possible. • Reseed disturbed wetland and riparian areas with native seed mixes provided in the Appendix. • Remove or treat aggressive noxious weeds that infest wetland and riparian areas. • Use biodegradable mesh for fencing off areas. Plastic-based mesh often traps snakes and other wildlife which may lead to their deaths.	• City of Boulder Wetlands Protection Program Best Management Practices (City of Boulder 1995). • CWIC Wetland Best Management Practices (CWIC 2020). • Restoring and Creating Wetlands: A Handbook for the Rocky Mountain West (EPA 1993).
Aquatic Areas	Aquatic plants play a major role in maintaining the integrity of lakes, ponds, streams, and rivers for fish,	• Avoid construction or disturbance near aquatic areas to the extent possible.	• Aquatic herbicide Management Prescription (Appendix).

Type	Reasoning / Description	Measures	Resources
	wildlife, other organisms, and human enjoyment.	• Reseed disturbed aquatic and nearby areas with native seed mixes provided in the Appendix. • Remove or treat aggressive noxious weeds that infest aquatic areas.	
Grasslands and Prairies	Native grassland and prairie are rapidly being loss due to habitat conversion to developed areas and agriculture. Many species depend on these areas and are subsequently being impacted by habitat loss.	• Avoid construction or disturbance in native grassland and prairie areas to the extent possible. • Reseed disturbed grassland and prairie areas with native seed mixes provided in the Appendix. • If disturbance is necessary, try to maintain large blocks of land and do not create fragmented habitat with roads and trails.	• Best Management Practices for Grassland Birds (BCR 2016). • Grassland Ecosystem Management Plan (BOSMP 2010).
Noxious Weeds and Aquatic Nuisance Species			
Weed Identification	Noxious weeds are present in most parks, and their presence can be exacerbated by construction activities and increased visitation.	• Hold a training for Park staff on weed identification. • Report any new or particularly aggressive populations of noxious weeds to the Stewardship Team. • Review the Noxious Weed Management Plan (Appendix).	• Colorado Weed Management Association Booklet (CWMA 2020). • Colorado Department of Agriculture (CDA 2020). • Colorado Noxious Weed App. • Noxious Weed Management Plan (Appendix)
Weed-free Construction Practices	Construction at the Park will create a prime opportunity for new weeds to become established and existing populations to spread. However,	• Inspect construction vehicles for weed and soil contamination prior to the commencement of work on-site and wash if necessary.	• Weed Prevention BMP (Appendix). • Weed Management Techniques and

Type	Reasoning / Description	Measures	Resources
	diligence and foresight on the Park of the Park manager can significantly reduce the threat of these unwanted pests.	• Request that all construction equipment be thoroughly cleaned prior to arriving on site. • Avoid driving vehicles off road, or through weed infested areas. After driving off road, power wash vehicles. • Cover dirt piles with a tarp or seed with native plants. Treat dirt piles for weeds if present before moving to another area of the Park.	Prevention BMP (Appendix). • Off-Road Vehicle Usage in Parks Standard Operating Procedure (Appendix). • Weed Free Dirt and Gravel Piles Standard Operating Procedure (Appendix).
Post-construction Weed Management	The greatest potential of introducing new noxious weed infestations into the Park often occurs after a construction project is complete.	• Restrict activity in weed-infested areas. • Clean clothing and equipment. • Limit driving, hiking or camping outside of designated areas. • Revegetate temporary impact areas with native species with seed mixes provided in the Appendix. • Install boot brushes at trail heads and construction sites to prevent seed dispersal.	• Best Management Practices to Prevent Noxious Weeds During Forest, Range and Residential Projects (CDOT 2016). • Weed Prevention BMP (Appendix). • Weed Management BMP (Appendix) • Weed Management Techniques and Prevention BMP (Appendix). • Cleaning Shoes and Shoe Laces Between Sites Standard Operating Procedure (Appendix).
Aquatic Nuisance Species	Aquatic Nuisance Species (ANS) are aquatic plants and animals that invade lakes, reservoirs, rivers and	• Operate an ANS check station at the Park to inspect all watercraft entering the Park.	• Aquatic Invasive Species of Concern and Methods of Control (USFS 2010).

Type	Reasoning / Description	Measures	Resources
	streams. Aquatic nuisance species wreak havoc on ecosystems, outdoor recreation, hydroelectric power equipment, and the economy.	• Decontaminate any boats or require boats to decontaminate if not previously decontaminated when ANS are suspected or when coming from out of state. • Check all boats for ANS stamp before launching in Park waters. • Provide educational materials to visitors on ANS and how they threaten the environment. • Follow all other rules and regulations mandated by the state of Colorado.	• CPW ANS Fact Sheet (CPW 2020b). • Colorado ANS Regulations
Forestry and Fire Management			
Fire Prevention and Suppression	Knowledge of how to prevent and management fires is essential to the safety of Park personnel and visitors.	• Follow guidelines provided in the Forest Management Plan (if available, Appendix). • Develop a Forest Management/Wildfire Management Plan. • Identify potential areas with wildfire hazards. • Stock tools necessary to extinguish fires in the Park. • Have staff complete fire suppression trainings. • Implement fuel mitigation projects.	• Fire Prevention and Suppression Standard Operating Procedure (Appendix). • Colorado Division of Fire and Control Website (CDFPC 2016). • Colorado State Forest Service Wildfire Mitigation Website (CSFS 2020b). • Gambel (Scrub) Oak Maintenance Standard Operating Procedure (Appendix).
Prescribed Fires	Prescribed fires are an important management tool that the Park may use.	• Create a burn plan for any prescribed fire.	• Prescribed Fire Preparation and Planning

Type	Reasoning / Description	Measures	Resources
		• Ensure staff have necessary training and certifications before performing a prescribed fire. • Coordinate with the Division of Fire Prevention and Control and CPW Forest Management Program.	Standard Operating Procedure (Appendix). • Colorado Division of Fire Prevention and Control (CDFPC 2018).
Hazardous Tree Removal	Hazardous trees pose a threat to Park visitors and staff. Proactive management of hazardous trees will reduce the likelihood of accidents in the Park.	• Follow guidelines provided in the Forest Management Plan (Appendix, if available). • Develop a Forest Management Plan that addresses hazardous tree locations and how to properly remove them. • Evaluate trees for hazards such as insect or disease presence, cracks/conks/wounds, decay, dead limbs, or complete mortality.	• Hazard Trees: Identification, Removal, and Pruning Standard Operating Procedure (Appendix). • Scheduled Periodic Evaluation of Trees Standard Operation Procedure (Appendix).
Trails			
Trail Routing	Preventive measures should be taken when planning trails to avoid natural and cultural resources. This will reduce the likelihood that a temporary trail closure or permanent trail reroute is needed to protect resources.	• Trails should avoid traveling through or near sensitive natural and cultural resources. • Trails should avoid traveling through sensitive riparian, wetland, aquatic, and grassland areas if possible. Existing trails in these areas should be rerouted when possible. • Trails should be seasonally closed when an active raptor nest is present within a no disturbance buffer distance (see Raptor Nest Buffers below). • Review Soils Section information and avoid areas with highly erosive soils.	• Ecological Best Management Practices for Trail Planning and Design, Construction, Maintenance, and Closure (BOSMP & Land Stewardship Consulting 2013). • Planning Trails with Wildlife in Mind (American Trails 2020). • Recreational Forest Trails: Plan for Success (NCSU 1996).

Type	Reasoning / Description	Measures	Resources
		• Review all measures provided in "Ecological Best Management Practices for Trail Planning and Design, Construction, Maintenance, and Closure."	• Guide to Sustainable Mountain Trails (NPS 2007).
Trail Construction and Maintenance	Trails should be carefully planned and well-engineered prior to construction.	• Avoid constructing trails during wet or muddy days. • Install proper erosion prevention and control materials. • Monitor trails regularly to document degradation and erosion, or any other issues that should be addressed. • Review Soils Section information and avoid areas with highly erosive soils. • Review all measures provided in "Ecological Best Management Practices for Trail Planning and Design, Construction, Maintenance, and Closure."	• Ecological Best Management Practices for Trail Planning and Design, Construction, Maintenance, and Closure (BOSMP & Land Stewardship Consulting 2013). • Planning Trails with Wildlife in Mind (American Trails 2020). • Recreational Forest Trails: Plan for Success (NCSU 1996). • Guide to Sustainable Mountain Trails (NPS 2007).
Social Trail Closure	Social trails commonly develop in all Parks and can detrimentally impact natural and cultural resources. Social trails should be closed when possible.	• Install barriers (rocks, logs/branches, fence) and/or signs that indicate a social trail is closed. • Revegetate social trails with native species with seed mixes provided in the Appendix. • Review all measures provided in "Ecological Best Management Practices for Trail Planning and Design, Construction, Maintenance, and Closure."	• Ecological Best Management Practices for Trail Planning and Design, Construction, Maintenance, and Closure (BOSMP & Land Stewardship Consulting 2013).

Type	Reasoning / Description	Measures	Resources
Recreation and Visitation			
Stay on the Trail / Leave No Trace	Hiking off trail can encourage the creation of undesignated social trails, spread non-native plants, and disturb wildlife.	• Use "Stay the Trail" signs throughout the Park. • Use directional signs and trail system map at main trailheads and in other strategic locations as dictated by trail routes, use, and to ease navigation of the trail system. • Use Park staff to enforce rules regarding staying on the trail.	• Stay the Trail Colorado • Leave no trace
Dog Management	Dogs off leash can harass wildlife present in the Park. Harassment can lead to changes in wildlife behavior, bird nest failure, and stress among many other impacts. Dogs can also negatively impact water quality and vegetation condition.	• Require visitors to keep dogs on a leash 6 ft long or less. • Use signs to remind visitors to keep dogs on leash or in areas where dogs are not allowed. • Consider seasonally closing trails with high wildlife activity that could be negatively impacted by off leash dogs. • Use Park staff to enforce rules regarding dogs off leash. • Provide information to visitors about CPW's dog off-leash parks.	• Dog Etiquette (CPW 2020c) • Dog Off-leash Pass (CPW 2020d) • Why I should keep my dog on a leash in a State Park (CPW 2020e)
Visitor Education	Providing educational resources for visitors on the importance of natural and cultural resources will encourage visitors to appreciate and respect	• Create educational and interpretative material in the Park describing plant and wildlife resources at the Park. Explain the importance of native species, keeping dogs	• National Environmental Education Program

Type	Reasoning / Description	Measures	Resources
	resources. This will help to curb undesirable behaviors such as dogs off leash, resource destruction, and walking off trail.	on leash, and how social trails fragment habitat and subsequently affect wildlife. • Provide educational programs to the public about the park and its natural and cultural resources.	• North American Association for Environmental Education
Park Infrastructure and Development			
Park Development	Keeping the Park's footprint small will help in an effort to keep remaining tracts of contiguous habitat as unfragmented as possible.	• Concentrate Park development, buildings, and visitor activities near existing Park facilities. • Keep development away from sensitive areas such as wetlands, riparian zones, rare plant habitat, or nesting birds.	
Area of Disturbance	If development is required for a project, the disturbance limits should be kept to a minimum	• Install temporary fencing along the limits of the disturbance area to prevent construction equipment from impacting other areas.	
Wildlife-Safe Fencing	Wildlife must travel across landscapes and fences, coupled with human development and loss of habitat, can contribute to needless wildlife death. Fences act as a barrier to daily movement and seasonal migration of wildlife. Also, animals and birds can be injured or killed when they collide with fences or get tangled in wires.	• Build new fences according to standards provided in Hanopy 2009. • Remove old, unnecessary fences. • Replace fences that do not meet the standards in Hanopy 2009. • Use biodegradable mesh for fencing off areas. Plastic-based mesh often traps	• Fencing with Wildlife in Mind (Hanopy 2009)

Type	Reasoning / Description	Measures	Resources
		snakes and other wildlife which may lead to their deaths.	
Natural and Cultural Resources			
Raptor Nest Buffers	Nest buffers are an effective way to reduce impacts to nesting migratory birds and are commonly applied during construction projects and in public recreational lands within the State. Nest buffers are most commonly used for raptor species. Raptors often will return to nest locations and planning a trail next to an active raptor nest could cause a continued need for trail closures or nest failure. Raptors, or birds of prey, and the majority of other birds in the United States are protected by the Migratory Bird Treaty Act, 16 U.S.C. 703 (MBTA). Eagles are also protected by the Bald and Golden Eagle Protection Act, 16 U.S.C. 668 (BGEPA).	• If raptors are present and nesting in the Park near a trail, recreation area, or proposed construction project, consider seasonally closing the area within the recommended buffer zone to avoid disturbance or potential nest failure.	• Recommended Buffer Zones and Seasonal Restrictions for Colorado Raptors (CPW 2020f).
Construction and Vegetation Removal During Migratory Bird Nesting Season	Construction projects can cause direct and indirect harm to migratory birds. Construction should be avoided during critical life events to the greatest extent possible.	• Complete all project activities (trail building, vegetation clearing, mowing, etc.) that could result in migratory bird take outside the complete migratory bird nesting season (early January through late August) to the greatest extent possible.	• Migratory Bird Conservation Actions for Projects to Reduce the Risk of Take during the Nesting Season (USFWS 2014)

Type	Reasoning / Description	Measures	Resources
	The majority of birds in the United States are protected by the Migratory Bird Treaty Act, 16 U.S.C. 703 (MBTA). Eagles are also protected by the Bald and Golden Eagle Protection Act, 16 U.S.C. 668 (BGEPA).	• If this is not possible, then avoid any habitat alteration, removal, or destruction during the primary nesting season for migratory birds (April 15 to July 15).	• Nationwide Standard Conservation Measures (USFWS n.d) • Construction, Ground Disturbance, and Tree/Vegetation Removal Projects Standard Operating Procedure (Appendix). • Wildlife Habitat Standard Operating Procedure (Appendix).
Preconstruction Bird Surveys	Construction projects can cause direct and indirect harm to migratory birds. Construction should be avoided during critical life events to the greatest extent possible. The majority of birds in the United States are protected by the Migratory Bird Treaty Act, 16 U.S.C. 703 (MBTA). Eagles are also protected by the Bald and Golden Eagle Protection Act, 16 U.S.C. 668 (BGEPA).	• Where project work must occur during the migratory bird nesting season, a qualified biologist should conduct nesting bird surveys prior to activities that will temporarily or permanently impact nesting birds or associated habitat (grassland, riparian, cliffs, or otherwise) to determine if migratory birds are present and nesting in those areas. These bird surveys should occur no more than five to seven days prior to when work actually begins on the project site	• Migratory Bird Conservation Actions for Projects to Reduce the Risk of Take during the Nesting Season (USFWS 2014) • Nationwide Standard Conservation Measures (USFWS n.d)
Tree Snags and Woody Debris	Tree snags and downed woody debris provide valuable habitat for wildlife species. Tree snags and woody debris may provide nesting sites, attract insects that are essential food sources, act as perches for wildlife.	• Leave tree snags and large woody debris to the extent possible in areas being developed to maintain wildlife habitat.	• Dead and Dying Trees: Essential for Life in the Forest (USFS 1999)

Type	Reasoning / Description	Measures	Resources
Rare Plants	Rare plants are sensitive to ground disturbing activities, noxious weeds, and treatments to noxious weeds. Special care should be taken in areas where they are present.	• Do not plan trails near rare plant populations. • Temporarily close trails when rare plant populations are nearby and are in bloom. • Fence off rare plant populations with construction fencing when near construction zones. • Contact the Stewardship Team to develop a plan for treating noxious weeds near rare plant populations.	• Recommended Best Management Practices for Managing Noxious Weeds on Sites with Rare Plants (Appendix). • Colorado Rare Plant Initiative Information (CNAP 2020).
Cultural and Paleontological Resources	Cultural and paleontological resources are important components of any Park and their preservation is of utmost importance.	• Use education and enforcement to ensure people do not remove artifacts from the Park. • Initiate law enforcement actions if someone is found removing an artifact.	• Do Not Remove Artifacts or Fossils Standard Operating Procedure (Appendix).
Climate Change Adaptation	Adaptation strategies are practical solutions to help land managers adapt ecosystems to changing conditions resulting from climate change.	• See resources for detailed measures that are related to the Park. • Strategies are available for wetlands, forests, recreation, and forested watersheds.	• Climate Change Response Network Adaptation Strategies (NIACS 2021d).

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 are included in the Appendix to help manage Park resources:

- Bat Boxes – This prescription provides information about how to build bat boxes and appropriate locations to place them.
- Beaver Management – This prescription provides information and advice about how to manage beaver activities for conservation purposes while addressing visitor safety and property damage.
- Frog and Toad Survey Protocol – This prescription provides a protocol for how to determine where breeding populations of frogs and toads may occur in the lands under their management.
- Cottonwood and Willow Management – This prescription provides information on how to manage viable cottonwood and willow stands, how to encourage their natural recruitment, and the latest methods on planting and maintaining these species.
- Creating Wildfire Defensible Zones – This prescription outlines how to manage land to prevent wildfires from impacting development.
- Ips Beetle (Engraver beetle) Management- This prescription provides information on how to manage the Ips beetle.
- Large Predator Stewardship Prescription – This prescription contains information on issues associated with potential conflicts between certain wildlife species and people.
- Native Plant Revegetation – This prescription contains guidance necessary for successful completion of a revegetation project.
- Nesting Platforms – Instructions of where to install osprey nesting platforms based on habitat and presence of other species and how to build a platform.
- Preble's Meadow Jumping Mouse – This prescription provides information of how to protect, preserve, and enhance habitat and comply with federal regulations associated with the species.
- 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.

Funding Sources

Effective implementation is contingent on the Parks maintaining adequate financial and human resources necessary to initiate and follow through with recommendations

outlined in this section. Funding sources that may be available to the Parks for developing monitoring programs or completing recommended projects are provided in the Appendix. It is important to note that these funding sources were identified in 2021 and could be out of date in future years. Please contact Resource Stewardship Staff for any questions about funding sources.

Volunteer Sources

Volunteers are essential for documenting resources in State Parks. Some volunteer program ideas specifically for Golden Gate Canyon State Park are provided below. Additionally, some non-profits will provide volunteers to help with projects.

Internal Park Volunteer Programs

Golden Gate Canyon State Park already has several volunteer and staff based monitoring programs in the Parks. These programs have been successful at documenting numerous important natural resources in the Parks. These programs and additional programs the Park may add are listed below.

- Raptor Monitoring – This program has been in place since 2012, with a lapse in monitoring some years due to a lack of volunteers, but has been active recently. Continuing this program with new volunteers or with the help of seasonal Resource Stewardship Staff is recommended. Efforts should follow the Raptor Monitoring guidelines provided in the Appendix.
- Amphibian Monitoring – An amphibian monitoring program has not been developed for the Park yet. Surveys for amphibians were conducted in 2019 and several species and habitat areas were documented. The rare species, boreal toad and northern leopard frog, were not documented in 2019 but habitat for the two species is present at the Park. A consistent monitoring program would help to document habitat use, species composition, and potentially an occurrence of rare species. Contact the Resource Stewardship group to develop this program.
- Rare Plant Monitoring – If a survey for any of the rare plant species that could occur in the Park is completed and individuals or a population is found, monitoring of the populations should occur regularly throughout the active period for the plant. Contact the Resource Stewardship group to develop this program.
- Noxious Weed Monitoring – Noxious weed monitoring would help to track the spread of existing populations of noxious weeds and document any new species. This monitoring could focus on areas that are especially sensitive, such as wetlands or rare plant habitat areas. Contact the Resource Stewardship group to develop this program.

External Park Volunteer Programs

Colorado Field Ornithologists

CFO is the state's premier organization devoted to the study, conservation and enjoyment of Colorado's birds. Staffed entirely by volunteers, we provide important

resources that serve Colorado's birding community as well as visitors from out of state.

Website: https://cobirds.org/CFO/

Colorado Native Plant Society

Founded in 1976, the Colorado Native Plant Society (CoNPS) is dedicated to furthering the knowledge, appreciation and conservation of native plants and habitats of Colorado through education, stewardship and advocacy.

Website: https://conps.org/volunteer/

Southwest Conservation Corps

Southwest Conservation Corps (SCC) provides young women and men with structured, safe and challenging service and educational opportunities through projects that promote personal growth, the development of social skills, and an ethic of natural resource stewardship.

Website: https://sccorps.org/

Volunteers for Outdoor Colorado

VOC works with conservation and land agencies and relies on thousands of people annually to provide a volunteer workforce for outdoor stewardship projects.

Website: https://www.voc.org/

Western Colorado Conservation Corps

The Western Colorado Conservation Corps (WCCC) is a program of Mesa County Partners, a nonprofit organization based in Grand Junction, Colorado. We work closely with land managers in scenic western Colorado including, Mesa, Delta, Montrose, and Gunnison Counties to collaborate on land improvement projects.

Website: https://www.cyca.org/youth-corps/western-colorado-conservation-corps/

Wildlands Restoration Volunteers

Wildlands Restoration Volunteers (WRV) is a Colorado nonprofit 501(c)(3) that organizes thousands of volunteers each year to complete more than 150 conservation projects throughout Colorado.

Website: https://www.wlrv.org/

Revisiting the Stewardship Plan

This Stewardship Plan is expected to remain current for ten years. After ten 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.

7.0 CONCLUSION

Protecting and preserving the natural resources within Golden Gate 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 Parks appears to be in excellent condition, though the impacts to these resources continue to intensify. These impacts to the ecological health of the Park include the following: increased visitation, population growth in the vicinity of the Park, noxious weeds, potential catastrophic wildfire, and drought. 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

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