Sweetwater Lake Property

Resource Stewardship Plan – *Public Version*

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Cover Photo Credit: Eagle Valley Land Trust

ACKNOWLEDGEMENTS AND DISCLAIMERS

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

Developing the Sweetwater Lake Property 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

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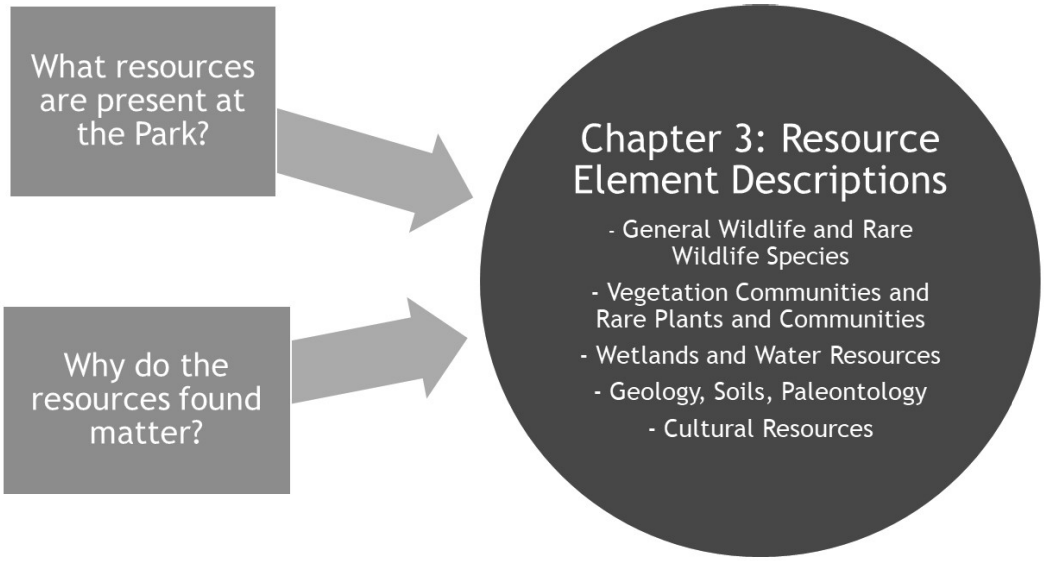
This User's Guide is a short introduction to how to use this Stewardship Plan. The User's Guide is meant for use by Property Managers, technicians, and other Property Staff.

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 Property 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 Property staff develop as a result of this plan.

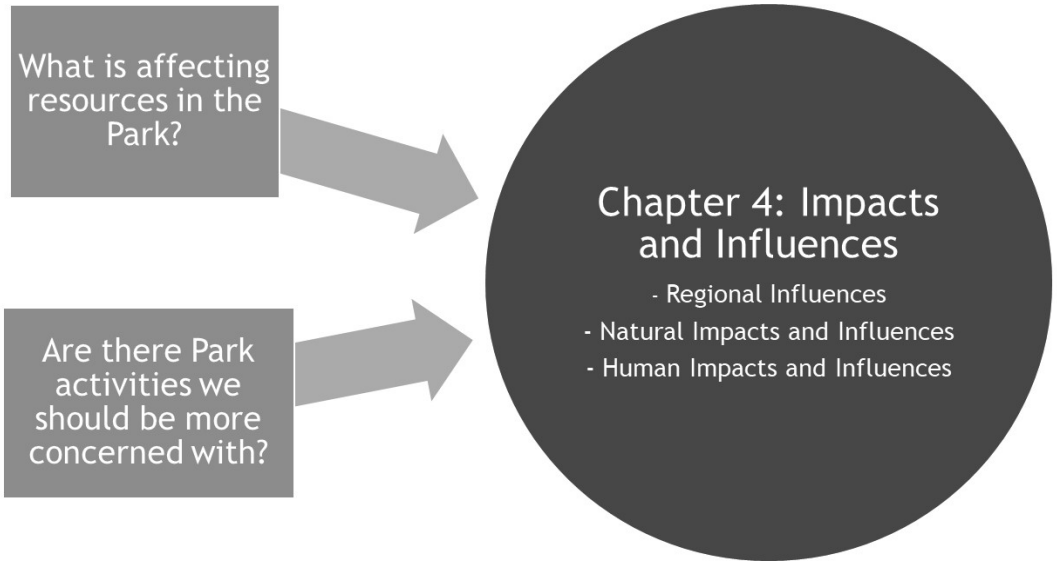
Stewardship Plan Outline

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



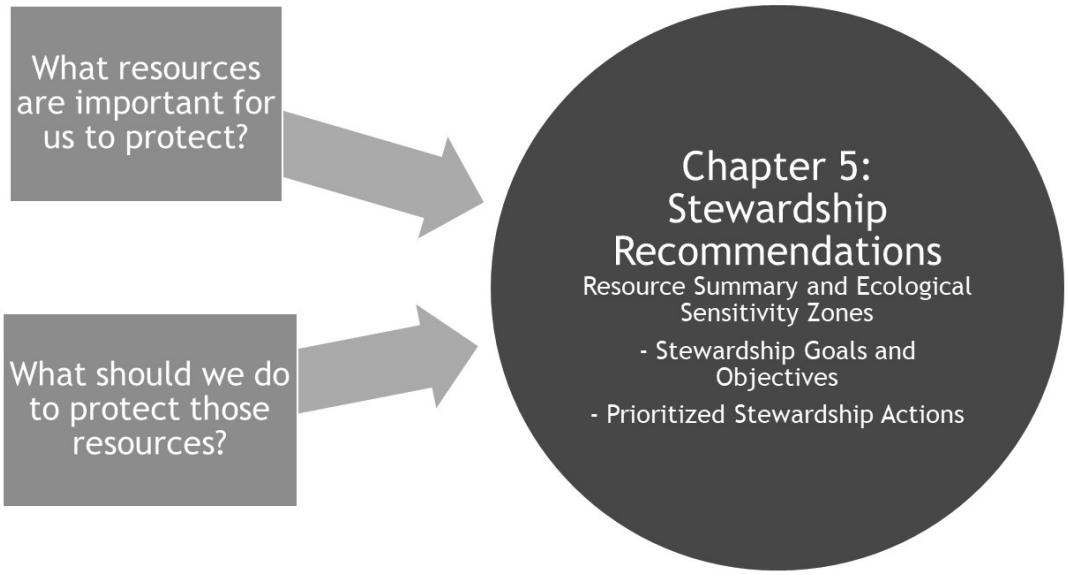
Chapter 3 : Resource Element Descriptions provides information of what resources are present in Sweetwater Lake Property based on knowledge gained from resource surveys, monitoring, institutional knowledge, and computer analyses conducted over several years. Chapter 3 summarizes findings, resource conditions,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

- General Wildlife and Rare Wildlife Species
- Vegetation Communities and Rare Plants and Communities
- Wetlands and Water Resources
- Geology, Soils, Paleontology
- Cultural Resources



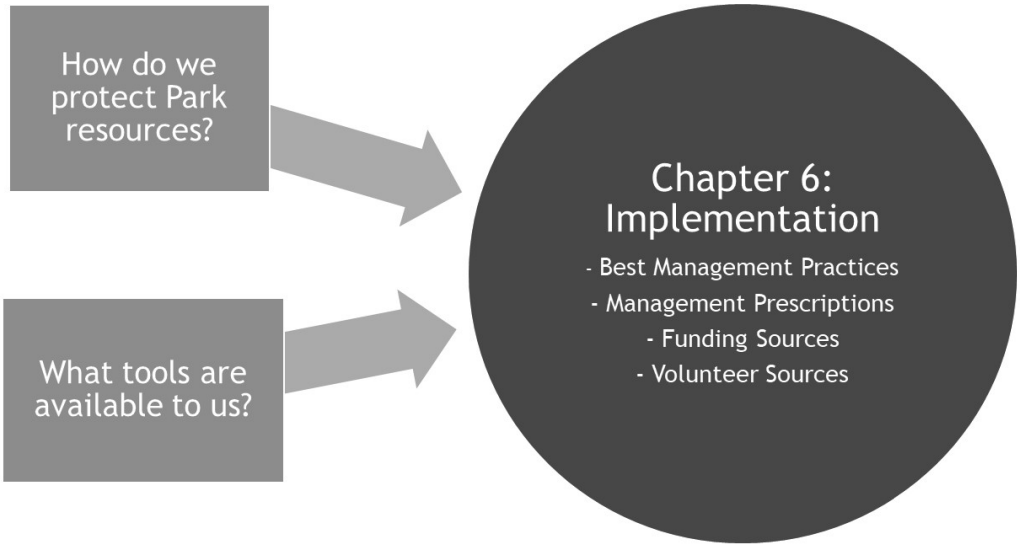
Chapter 4: Impacts and Influences provides information on what Property activities and influences outside of Sweetwater Lake Property are affecting the condition of resources present. It is imperative that the Property be able to provide recreational opportunities to visitors. However, some activities may affect the particular resources present at Sweetwater Lake Property 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 Property. This chapter first summarizes the findings from Chapter 3, then identifies tangible goals for the Property, 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 Property 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 Property. 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 Property resources.

Example 1: Rare Plant in the Property

Scenario:

A rare plant was previously identified in the Property 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 Property 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 Property.

Review the Stewardship Plan:

The Stewardship Plan addresses that the plant could occur in the Property but has not been found. It is a goal for the Property 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 Property 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 Property the following summer.
- If the plant is found, develop a rare plant monitoring program staffed by volunteers or Property 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 Property 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 Property.

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 temporarily 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 Property 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 Property, 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 Property.

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 Property 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 Parks and Wildlife Property. 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 Property management as a resource to help identify appropriate goals, guidelines, and potential threats to the Property resources, as well as recommended measures to help protect Property resources. Through this process, we can continue to provide recreation opportunities to visitors in a natural setting.

Property Description

Sweetwater Lake Property (Property) is situated approximately 18 miles north of Dotsero and spans 488 acres. The Property is located in the White River National Forest and will be managed by Colorado Parks and Wildlife in collaboration with the Forest Service and a local land trust. The partnership involves a joint vision for the site, and an oversight board made up of decision makers from each partner to guide and direct the project (CPW 2021).

Sweetwater Lake Property provides a place for current and future Americans to enjoy outdoor recreation, connect with nature, learn about the area's cultural and natural history, and experience a simpler way of life similar to that of their grandparents' generation (CPW 2021). The site holds significant cultural, historic, and social value for local communities, complete with a 72-acre Sweetwater Lake, rare wetland plants, ponds, meadows, springs, and a cave (CBS News 2021).

Resource Summary

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

Wildlife

Significant Features

- The Property 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. The Property provides important severe winter range and calving areas for mule deer and elk.
- A total of 105 bird species were identified in the Property during surveys conducted in 2022, of which, 39 were confirmed to be nesting in the Property. Several sensitive bird species are present in the Property, including Barrow’s goldeneye, peregrine falcons, and bald eagles.

- A total of 33 raptor nests were documented in the Property, of which, 11 were active. Nests were documented peregrine falcons, bald eagles, red-tailed hawks, sharp-shinned hawks, and Cooper's hawks.
- Six sensitive bat species were documented as occurring in the Property during acoustic monitoring conducted in 2022. Bats likely use the coniferous and deciduous forests, the cave, rock outcrops, and aquatic habitats for foraging and roosting activities.
- Aquatic and wetland habitats are a major feature of the Property and provide for a diversity of wildlife species. The sensitive species Barrow's goldeneye and Colorado River cutthroat trout have been recorded in Sweetwater Lake and utilize the aquatic and wetland habitats present.

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.
- Visitation and Habitat Degradation – Visitation is currently limited at the Property, but is expected to increase as more access areas are developed. If poorly planned, infrastructure and trail development can directly destroy native vegetation, which reduces wildlife habitat quality or impact important wildlife resources, like raptor nests.
- Catastrophic Wildfire – Although fire is a natural part of the ecosystems at the Property, fire suppression over many years may lead to more intense, catastrophic fires that greatly alter habitats. High severity fire could affect habitat patch size, edge effect, vegetation structure, and soil composition. Future climatic conditions could increase the likelihood of high severity fire.

Vegetation

Significant Features

- Harrington's beardtongue is a Colorado-endemic vascular plant that is only found in a limited area within the Colorado River drainage in northwestern Colorado. Five populations of over 300 individuals were counted in 2022 in the Property in sagebrush habitats.
- A total of nine CNHP-tracked sensitive communities at the Property are located in upland shrublands, wet shrublands, conifer forests, and rock outcrops.
- Extensive wetland and riparian areas serve many important physical and biological functions. These areas provide prime bird nesting habitat, contribute to healthy stream ecology, and protect stream banks during runoff season and flooding events.

Threats

- Noxious Weeds - The presence of noxious weeds in certain areas of the Property is of concern due to their known ability to displace the native vegetation, reduce biodiversity, and degrade wildlife habitat.

- Visitation and Development - Social trails trample native vegetative communities, cause erosion, and spread noxious weeds. If poorly planned, infrastructure development can directly destroy vegetative communities and create disturbances that encourage weed invasion.
- Wildfire Intensity – Fire is a natural cycle for the landscape in the Uncompahgre River Valley. However, historic wildfire suppression over the past 120 years has reduced the frequency and increased the intensity of wildfire in the landscape. The resulting high density of timber in the Property is such that it invites disease, insect infestations, and catastrophic wildfire. These large scale, high-intensity wildfires can clear all vegetation to lay bare highly erosive soils.

Water and Wetland Resources

Significant Features

- The majority of visitation at the Property centers around the Sweetwater Lake. If this resource is not maintained at a high-quality level, Property visitation could decrease.
- The water and wetland resources at Sweetwater Lake provide critical habitat for resident and migrating wildlife including cold-water fish, waterfowl, migrating birds, moose, elk, and mule deer.
- The wetland and riparian areas are critical for filtering sediment and pollutants from the water and improving water quality within the lake. The riparian vegetation also helps stabilize steam banks and the lake shoreline, reducing erosion and sediment loading, thus protecting the water quality of these systems.

Threats

- Noxious Weeds – Weed infestations threaten diversity, viability, and functionality of wetlands and riparian areas through the displacement of native species.
- Erosion – Naturally erosive soils combined with high visitation 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.

Geology, Soils, and Paleontology

Significant Features

- The soils present at the Sweetwater Lake Property are typical of the mountainous setting, with most of the soils being alluvial and are a result of parent material flowing down a river or creek and being deposited over time.
- The most significant geological features in the Property are karst towers. Isolated karst towers (fenglin karst) occur in other places in the world, but as far as is known, Sweetwater Lake is the only place in the United States where a landscape with numerous karst towers together (fengcong karst) can be seen.

- Seven paleontological fossil sites were found in the Property and include marine corrals, fish, snails, and a diversity of invertebrates.

Threats

- Susceptibility to erosion – Soils in the Property 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.
- Sedimentation - Excessive runoff in areas that have reduced vegetative cover can carry nutrients and sediment into nearby water bodies like Sweetwater Lake, potentially affecting water quality and aquatic ecosystems.
- Noxious weeds – These plant species can reduce the diversity of native plant species and the associated soil microorganisms that contribute to soil health. This can result in changes to soil structure, nutrient cycling, and water retention, potentially reducing the overall health and resilience of the soil.

Cultural Resources

Significant Features

Previous archaeological investigations conducted from 1997 and resulted in the determination that one (Sweetwater Lake Resort 5GF.5734) was eligible for a listing on the State and National Register of Historic Places (SRHP/NRHP). While a number of sites are not eligible, they are significant for the role they played in local history; as a result they offer a number of interpretive and educational opportunities for visitors.

- Sweetwater Indian Cave (5GF.2), NRHP Eligible
- Sweetwater Lake Resort (5GF.5734), NRHP Eligible
    - In use between the 1920s and 1960s, the resort is comprised of 13 buildings, including a lodge/restaurant building, a motel, a barn, a boathouse, and several cabins. It represents the long-term struggle to maintain public lake access, which is ongoing today, as well as the lake's primary social and economic activity since the 1880s, tourism.
- Sweetwater Guard Station (5GF.1484), Not NRHP Eligible
    - Constructed in 1937-38, the Sweetwater Lake Guard Station was part of New Deal expansion of Forest Service administration. It became the main Ranger Station for the White River National Forest. It housed rangers and their families as well as, sometimes, visitors to Sweetwater Lake.

Threats

- Structures-Some historic structures in the property 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 habitation or recreational activity.
- Collection of Artifacts - The collection of artifacts significantly alters a site's integrity making it difficult to determine significance without time consuming and costly excavations.

Disturbance of Undiscovered Sites - All development and use 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.

Impacts and Influences

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

- Population Growth – As of 2021, Garfield County was the 13th fastest growing County in the state per capita. However, most growth has occurred in metro areas, that are not near the Property.
- Noxious Weeds – A number of List B and C noxious weed species were discovered during 2022 weed surveys. Noxious weeds greatly affect the ability of native plants and wildlife to thrive in the Property.
- Drought and Climate Change – Long-term increased temperatures threaten snowpack and water resource availability in the region where the Property is located. Sweetwater Lake is fed by snowpack and may be impacted by future drought conditions and increasing temperatures.
- Grazing and Equestrian Use – If not properly managed, grazing and equestrian use can spread noxious weeds, degrade soils, and cause sedimentation of waters in the Property.

Stewardship Goals and Objectives

Based on the current natural resource assessments of The Sweetwater Lake Property, 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 Property.

Wildlife

- Maintain use of the Property by general and sensitive wildlife species. Maintain and protect habitat for sensitive species documented, such as little brown myotis, peregrine falcon, and bald eagle. Restore and improve habitat for sensitive wildlife species that could occur on the Property.
- Initiate a raptor monitoring program at the Property. Recruit volunteers and potentially utilize Stewardship Team technicians. Raptor monitoring efforts are an important stewardship effort, allows for adaptive management, and an understanding of raptor populations helps to better understand the overall ecosystem health of the Property.
- Protect and encourage the nesting of the wide-variety of raptor species within the Property, including peregrine falcons, bald eagles, red-tailed hawks, sharp-shinned hawks, and Cooper's hawks, which successfully nested in 2022 during the avian survey. Maintain populations of all existing bird species that use the Property as habitat. Continue to survey bird species at least every five years in the Property, if possible. Implement appropriate trail route closures to protect nesting bird species.

- Protect and conserve the cave in the Property that provides habitat for sensitive bat species identified. Implement procedures that prevent the spread of WNS.
- Document wildlife species and taxa that have not been inventoried or inventories that are outdated. Regular monitoring should continue for raptors and additional survey efforts for amphibians should occur, if resources are available. In addition, monitoring efforts should be communicated to the Property Manager to share information regarding wildlife management and sightings.
- Control and reduce the spread of noxious weed species to maintain and improve wildlife habitat quality. Continue to implement the Noxious Weed Management Plan, including following recommended treatments methods and priorities (Appendix).
- Protect sensitive wintering and calving habitat for mule deer and elk located on the north side of the Property. Implement no disturbance time periods so that the species are protected during these critical life periods.
- Limit access to the extensive wetlands located on the west side of the Property to protect habitat for moose, waterfowl, amphibians, and raptor foraging.
- Potentially restore beaver populations to the Property. This species is native to Colorado and could greatly improve water quality and wetland and riparian habitats in the Property.

Vegetation

- Maintain existing biodiversity and improve upon the condition of native plant communities by encouraging a high diversity of native species, natural vegetative structure, and minimizing disease and noxious weed infestations.
- Monitor the existing populations of the sensitive communities and rare plants, such as Harrington's beardtongue, that were documented on Property to ensure continued health and survival. Create a volunteer rare plant monitoring program to track the health of identified populations in the Property.
- Preserve and protect the rare plant populations and sensitive plant communities identified in the Property. Avoid planning new trails in sensitive communities or near rare plants and continue to revegetate social trails that form as a result of existing trails in these communities.
- Survey for rare plant species prior to construction in potential habitat zones to prevent disturbance to populations from development.
- Enhance habitat for rare plant species and communities by reducing non-native species cover.
- Design Property development activities (new buildings, trails, parking lots, roads, etc.) out of high-quality/excellent condition native plant communities, riparian zones, and wetlands to the extent possible.
- Contain, suppress or eradicate occurrences of noxious weeds, following the guidance of the Noxious Weed Management Plan (Appendix). Prevent the establishment of noxious weed species that are not already present in the

Property. Treat noxious weed populations immediately before and after construction activities occur.

Water and Wetland Resources

- Protect sensitive wetland resources in the Property, including the extensive wetlands areas identified in the western side of the Property and the wetlands and riparian areas surrounding the Lake. Protect the water resources in the Property and prioritize their use for wildlife that need them. Limit grazing activities near these sensitive resources.
- Maintain the good condition of water quality in the Property by preventing the introduction of pollutants and sediment. Continue to manage boats and grazing in a way that limits impacts to water quality.
- Limit visitors using the western wetland and riparian areas in any condition.
- Revegetate areas that are eroded and devoid of vegetation near waterways and the lake with native plant species. Revegetate social trails that develop around water resources.
- Establish formalized access to water resources in the Property in a way that conserves wetland areas and shoreline habitat. Establish natural vegetation or other physical barriers to sensitive area access.
- Reduce the spread of noxious weeds in wetlands and riparian areas by continuing to implement the Noxious Weed Management Plan (Appendix).

Geology, Soils, and Paleontology

- Monitor, protect, and preserve the unique geological and paleo features of the Property for human impacts. Provide access to visitors in a strategic way that allows users to enjoy the resource but maintain its integrity and the resources dependent upon it.
- Maintain hydric soils (and associated wetlands and riparian areas) in their current undeveloped condition, with new development located out of wetlands and riparian areas to the greatest extent possible.
- Maintain a sufficient cover of living plants and plant litter on upland areas to minimize soil erosion.
- Limit sediment-laden runoff from Property roads, paved sidewalks, and parking lots. This will decrease sedimentation into the waterways and reduce damage to road surfaces and embankments.
- Construct and maintain trails to prevent erosion. Ensure that soil types and slope and aspect of terrain are carefully considered during construction of trails and facilities, and erosive soils are avoided for development. Build trails with limited impact to geology, wildlife, and vegetation that require limited maintenance over the lifespan of the trail.
- Adhere to Best Management Practices for trail construction to avoid impacts to geology and soils.

- Avoid disturbance to paleontological sites, as they are a non-renewable resource that cannot be replaced once damaged. Plan trails to avoid known sites.

Cultural Resources

- Limit public access to cultural sites within Property to preserve cultural artifacts, including the cave, to be good stewards of cultural resources, to promote the health and safety of visitors, and to comply with cultural resources laws and regulations.
- Educate Property visitors about cultural resources through signage and interpretative materials. Distribute signs around the Property 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 Property.
- Maintain and preserve cultural resource sites and mitigate already present natural- and human-caused deterioration. Photo monitor all significant cultural sites for human and natural impacts.
- Adhere to Best Management Practices for cultural resource preservation provided in the Appendix.

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 the Sweetwater Lake Property:

Resource Management and Conservation Actions

- Implement the Noxious Weed Management Plan
- Temporarily close trails and lake access to protect raptors during breeding season
- Install wildlife-safe fencing around sensitive areas to prevent degradation from Property use activities
- Limit activity near cave to protect bat species and cultural resources
- Temporarily/seasonally close public access to sensitive elk and mule deer habitat
- Provide education and signage about wildlife presence in the area and safety measures
- Develop cultural resource outreach materials
- Maintain vault toilet covers in all restroom facilities
- Add fishing line recycling tubes
- Pursue International Dark Sky Place (IDSP) certification for the Property
- Reclaim and revegetate inappropriate social trails and bare ground as they appear in developed areas
- Manage the west end of the lake for waterfowl and shorebird species
- Install wildlife habitat enhancement infrastructure throughout the Property
- Remove unnecessary fencing within the Property
- Evaluate the potential encroachment of pinyon-juniper trees in sagebrush areas
- Evaluate the potential for beaver reintroduction
- Create “Stay the Trail” signage
- Install boot brush / cleaning stations near sensitive areas
- Apply for Leave No Trace Certification

Resource Plan and Report Actions

- Grazing Monitoring Plan
- Raptor Perch and Pole Plan

- Equestrian Management Plan
- Trail Revegetation Plan
- Forest Management Plan
- Noxious Weed Management Plan

Resource Surveys and Monitoring Efforts

- Monitor for the rare plant, Harrington's beardtongue.
- Monitor noxious weeds and inventory
- Monitor sensitive vegetation communities
- Monitor invertebrates, particularly butterflies
- Begin annual raptor monitoring
- Conduct additional amphibian monitoring, including acoustic surveys
- Conduct additional bat surveys and acoustic monitoring
- Conduct breeding and migratory bird surveys
- Monitor the health of wetlands and water resources
- Monitor cultural resource sites in the Property for degradation

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 Property. The following is a summary of actions for the Sweetwater Lake Property:

- 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 Property 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 Property goals, objectives, and stewardship actions.

Purpose of the Plan

The Sweetwater Lake Property Stewardship Plan (Plan) serves as the foremost guiding document for natural and cultural resource management at the Sweetwater Lake Property. The Plan serves as a bridge between the qualitative statements of current and future desired conditions and the measurable goals and strategies determined through Property 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 Property with the best possible management of our natural resources. The focus of the document is to:

- Summarize and organize resource data collected in the Property 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.

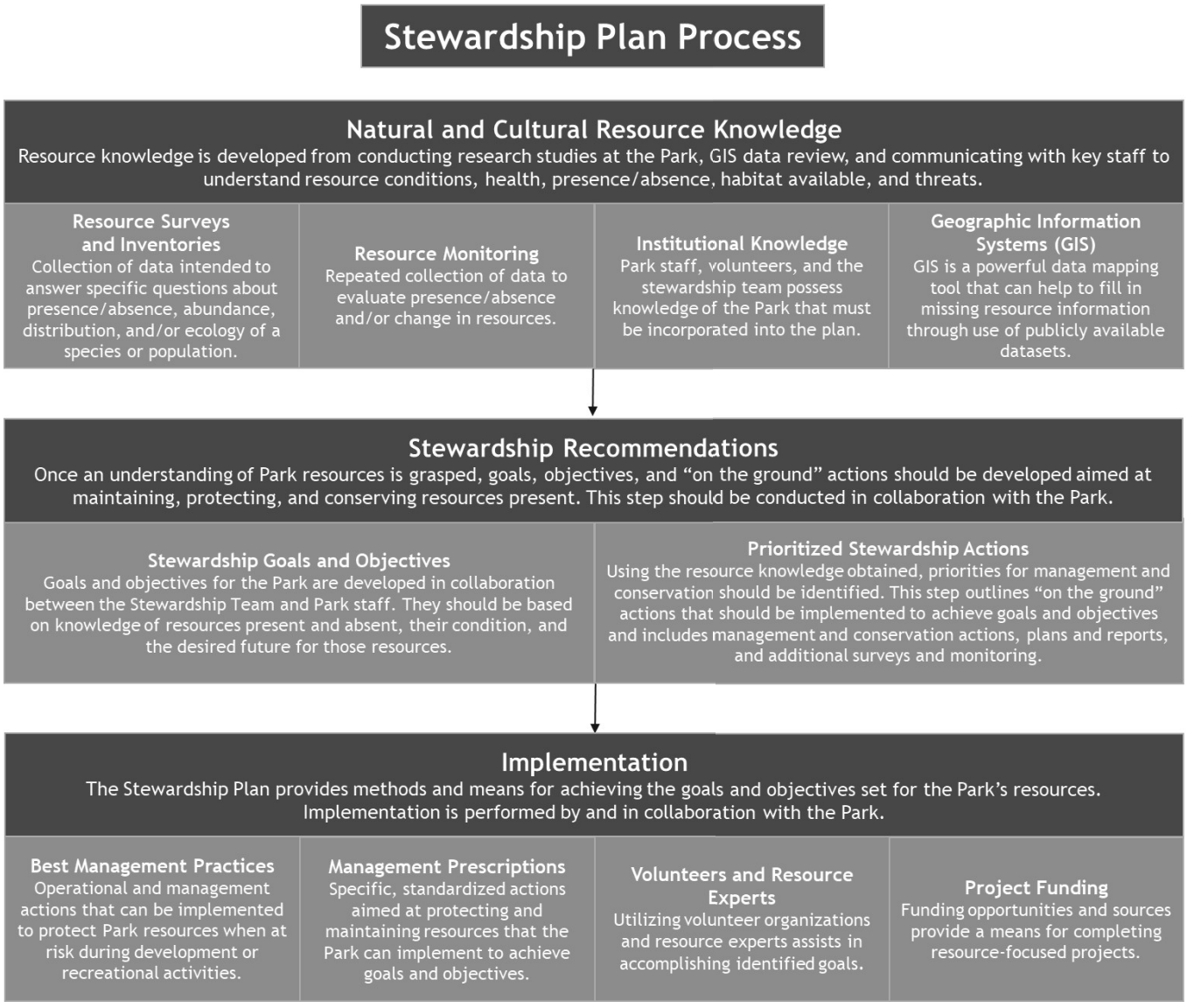
The team is tasked with identifying the nature and extent of the natural and cultural resources present at each Property, developing guidelines to facilitate a better understanding of these resources, and providing suggestions for short-term and long-term management. The process includes examining natural and cultural resources through field work, research, and collecting GIS data. Advice is provided to the Property 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 Property manager and then incorporated into the general management plan. This integration of specific resource objectives into the governing document of the Property 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 Property staff can make changes to the document during that interim period in order to keep it up to date. Property 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 Property 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 Property 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 Property budget.

The detailed appendices to this plan should help Property 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 Property 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

Since the Sweetwater Lake Property was newly acquired, a Management Plan has not been created yet and will be composed after the creation of this Stewardship Plan.

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 Property 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 Property'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 Property 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 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 Property to serve as a guiding document for comprehensive resource management.

Baseline Resource Assessments

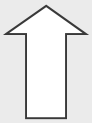
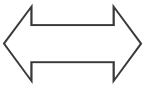
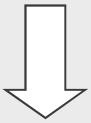
To effectively manage the natural systems, each Property must be aware of the significant resources present. Several baseline resource inventories have been conducted over many years to document wildlife, plant, water, wetland, cultural, geological, and paleontological resources in the Property. These 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 Property's resources and incorporate new data collected during the Baseline Resource Assessment. Resource element descriptions provide current and desired future conditions of the Property'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 Property. They provide direction to Property staff for the desired future of Property resources.
    - **Prioritized Stewardship Actions** - These action items aim to provide ways Property 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 Property 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 Property 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.

2.0 PROPERTY DESCRIPTION AND SIGNIFICANCE

This section provides information on the regional setting in which the Sweetwater Lake Property is situated.

Property Description

The Sweetwater Lake Property (Property) is situated approximately 18 miles north of Dotsero and spans 488 acres. The area surrounding the lake is quite arid and is characterized by scrub Gambel oak (*Quercus gambleii*), Douglas-fir (*Pseudotsuga menziesii*), and serviceberry (*Amelanchier* sp.). On the southwest side of the lake, there are tall cliffs made of limestone. The Property currently has limited facilities, which include a small parking lot, a vault toilet, and a narrow dirt pathway leading to the lake, which is only suitable for small boats. The use of gas engines is not permitted. Colorado Parks and Wildlife (CPW) stocks the lake with both rainbow trout (*Oncorhynchus mykiss*) and kokanee salmon (*Oncorhynchus nerka*).

The Property is located in the White River National Forest (WRNF) in Garfield County, Colorado and will be managed by CPW in collaboration with the USFS and a local land trust. The partnership involves a joint vision for the site, and an oversight board made up of decision makers from each partner to guide and direct the project (CPW 2021).

the Sweetwater Lake Property provides a place for current and future Americans to enjoy outdoor recreation, connect with nature, learn about the area's cultural and natural history, and experience a simpler way of life similar to that of their grandparents' generation (CPW 2021). The site holds significant cultural, historic, and social value for local communities, complete with a 72-acre Sweetwater Lake, rare wetland plants, ponds, meadows, springs, and a cave.

Physical Setting

The Property is approximately 18 miles north of the Dotsero exit on Interstate 70 and lies on the eastern edge of Garfield County. Gypsum, Colorado is the closest incorporated town and is located about 24 miles southeast of the Property. The topography of the Property is mountainous with steep vegetated hillsides rising above the lake. The area is characterized by coniferous forests to the south of the lake, a large connected wetland to the west, and steep sagebrush shrublands to the north and east. The Flat Tops Wilderness Area, which comprises a large area of land to the north, has lakes and ponds dotting the landscape among gently rolling sub-alpine conifer forests. In the broader area to the east, the upper Colorado River has formed deep canyons where water flows quickly. Beyond Sweetwater Lake itself, there are extensive wetlands to the northwest and several streams feeding the lake with snowmelt. The area attracts visitors to surrounding ski areas in the winter and hunters, hikers, and boaters in the summer months due to its natural beauty and easy access to nearby public lands.

Land Use and Land Ownership

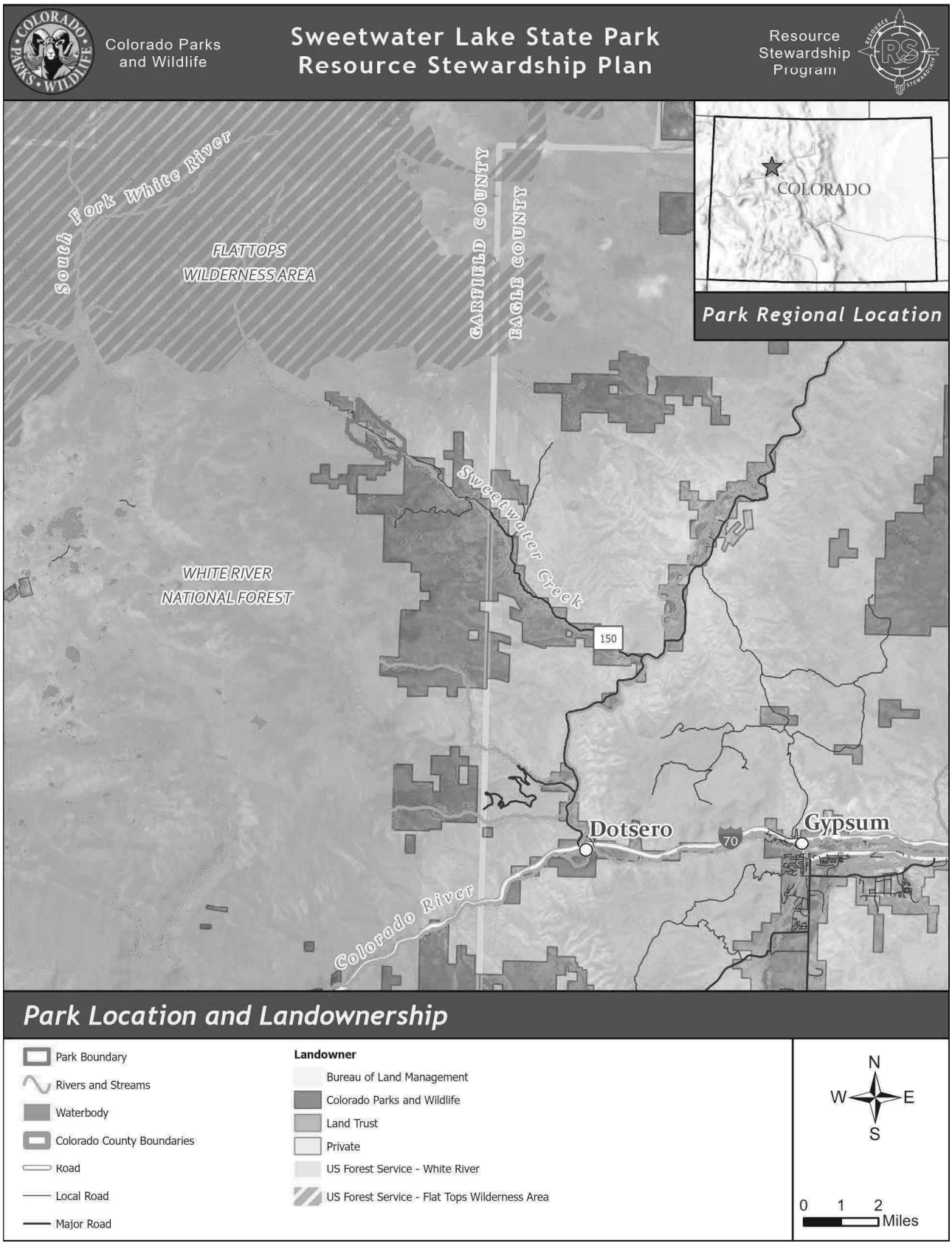
The Property is located in the WRNF and will be managed by CPW in collaboration with the USFS and a local land trust. These groups worked together to protect the land from being developed into high-end luxury homes and golf courses after the lake was

designated as a top priority for the Land and Water Conservation Fund, a federal program that safeguards wildlife habitats and outdoor recreation. The Conservation Fund bought the ranch in 2021, and then the Forest Service purchased it from them in the summer of the same year. Later, the Eagle Valley Land Trust organized a fundraising campaign to assist in purchasing the property for CPW (CPW 2021).

The Sweetwater Lake Property is the first Property to have this form of joint landownership and management. The partnership involves a joint vision for the site, and an oversight board made up of decision makers from each partner to guide and direct the project. Each partner will play an active role in providing services and opportunities on the site, and their roles will fall within their missions and capabilities. The land will remain under USFS jurisdiction, with final decision-making authority on land use resting with the USFS. Permits, agreements, and Memorandums of Understand (MOUs) will need to be issued to achieve the partnership's goals. Site operations will be managed by a single person appointed by the oversight board, with fee collection and enforcement of state and federal laws and regulations determined by the board. The USFS and CPW have the authority to create site-specific rules to meet management goals (CPW 2021).

The areas adjacent to the Sweetwater Lake Property fall in to a mix of ownership and uses. The Property itself and the majority of the land surrounding it is owned by the WRNF. The area to the east down to the Colorado River consists of Bureau of Land Management (BLM) land north of Sweetwater Creek and privately-owned land south of the Creek. The surrounding landscape is primarily used for cattle ranching. Cattle graze within high-quality rangelands in the summer months and feed on irrigated hay crops produced for supplemental feed in the colder months. **Figure 1** shows the Property’s location and surrounding landownership.

Figure 1. Location and Landownership Map.



Natural Setting and Ecoregion

Ecoregion

Ecoregions reflect broad ecological patterns occurring on the landscape. 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 2021).

the Sweetwater Lake Property is situated at 7,709 feet atop the White River Plateau, a transitional area between the Flat Top Mountains to the north and the upper Colorado River Valley to the east. This area is a part of the Sedimentary Mid-Elevation Forests (21f) Level IV Ecoregion, and is located along the westernmost edge of the Southern Rocky Mountain (21) Level III Ecoregion before the landscapes transitions into the Wyoming Basin (18) Level III Ecoregion to the west. The Sedimentary Mid-Elevation Forests ecoregion is located in the western and southern parts of the Southern Rockies, with elevations typically lower than Sedimentary Subalpine Forests (21e). While the elevation range and plant life in this area are similar to the mid-elevation forests found in the crystalline (21c) and volcanic (21h) ecoregions, there is a greater extent of Gambel oak woodlands and forest. The presence of carbonate substrates in some areas can impact water quality, hydrology, and the area's plant and animal life. The soils in this region are usually finer-textured compared to those found on crystalline and metamorphic substrates in the Crystalline Mid-Elevation Forests (21c) ecoregions.

The Southern Rocky Mountains ecoregion has an elevation range of 3,746 feet to 14,431 feet, with Colorado containing 73.5% of the ecoregion, New Mexico containing 18%, and Wyoming containing 8.5%. The region has been shaped by glacial activity, resulting in high rugged mountains, plateaus, alpine cirques, glacial moraines, and broad valleys. Colorado has the highest summits in the Rocky Mountain system, with over 300 peaks over 13,000 feet and 54 mountains exceeding 14,000 feet. The ecoregion has several notable features such as hogbacks, mesas, rocky outcrops, rugged canyons, and mesas. There are at least 184 species and subspecies that are endemic to the ecoregion, and some have become extinct or extirpated. At least three vertebrates and several invertebrate species are believed to be extinct, while several mammal species have been extirpated from the ecoregion (LandScope America 2021). **Figure 2** shows where the Property is located within the Southern Rocky Mountain Ecoregion and relative to other ecoregions.

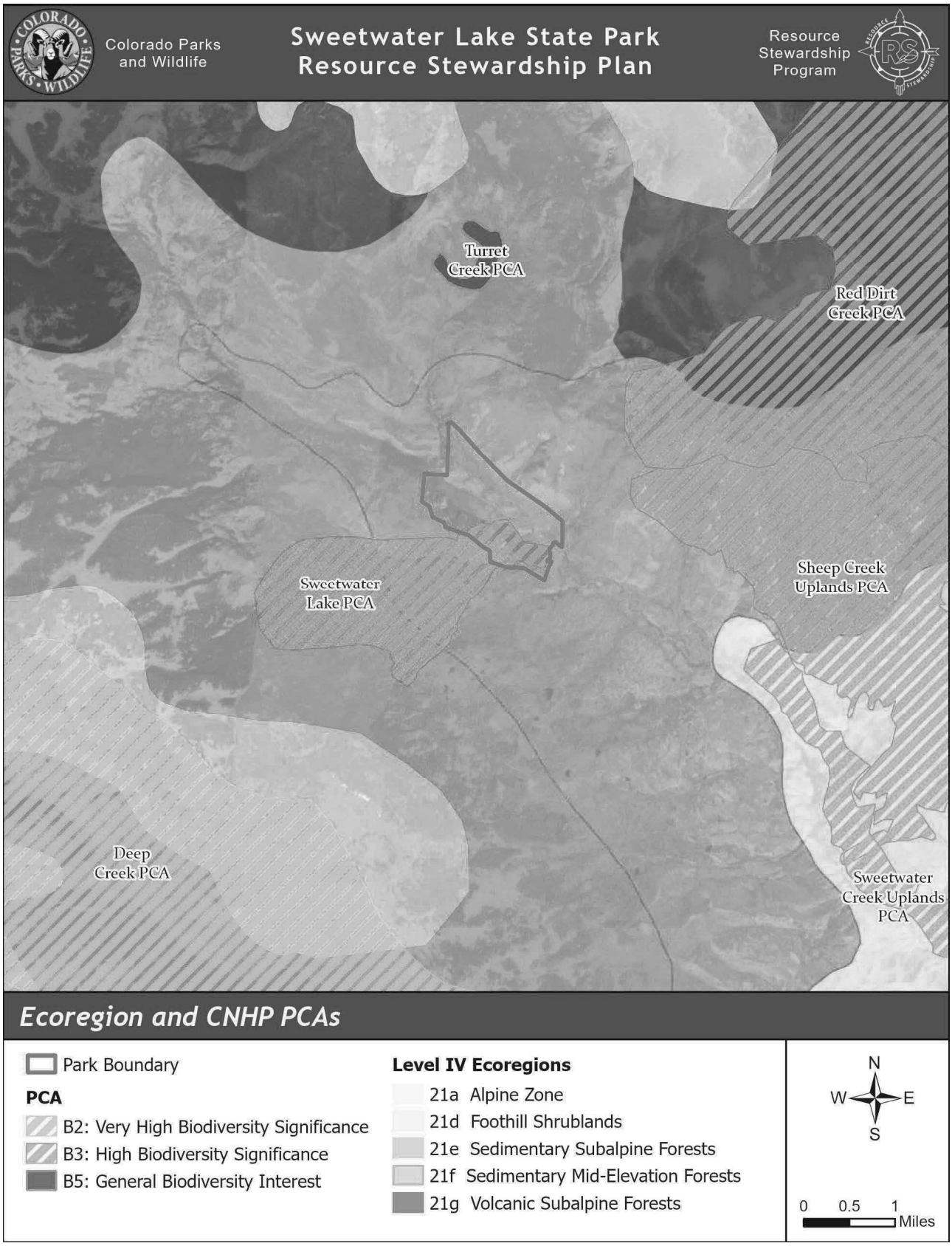
Potential Conservation Areas

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 Property overlaps with one PCA, “Sweetwater Lake,” identified by CNHP as having B3 level diversity or “High Biodiversity Significance”. This PCA encompasses Sweetwater Lake and parts of two of its tributaries, Darnell and Lake

Creeks, which combine before flowing into the lake. The intact ecosystem in this PCA ensures that nutrient cycles are complete, leading to excellent production export. The site is home to a B-ranked occurrence of a mountain willow / beaked sedge montane riparian willow carr, which is globally vulnerable (G3/S3). This particular association has been found in 13 locations in Colorado, but there may be 10 to 20 more locations in the state. In Colorado, mountain willow is often the dominant willow species, forming thickets with few other willow species present. However, in other states such as Utah, Wyoming, Montana, Idaho, Nevada, and Oregon, mountain willow becomes less important as it mixes with other willow species. Additionally, a B-ranked occurrence of an aspen / thinleaf alder montane riparian forest, which is also globally vulnerable (G3/S3), is present at the site. This plant association has only been documented in Colorado, but it may exist in other Rocky Mountain states. A probable breeding record of the white-faced Ibis (*Plegadis chichi*) was documented at the site in 1983, but no further observations have been reported since then (CNHP 2001).

Figure 2 displays the location of these PCAs within the Property 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.

Figure 2. Ecoregion and CNHP PCAs Map.



Climate

The climate of the Southern Rocky Mountain ecoregion is a temperate semiarid steppe regime with average annual temperatures ranging from 35˚F to 45˚F in most areas, but reaching 50˚F in the lower valleys (LandScope America 2021). The climate at the Sweetwater Lake Property is characterized by the extremes of the Southern Rockies, with temperature and precipitation varying considerably depending on time of year. In the summer months it is dry and hot considering its high altitude, reaches upwards of 86 degrees Fahrenheit in July, with nighttime average lows are in the 40s. In the winter months, temperatures plummet, with high temperatures in the 30s and lows in the single digits. Moisture in the summer months comes from frequent and unexpected monsoonal rains. During the winter, snow piles up in the surrounding mountains with over 30 inches on average annually. The spring and fall months are generally transitional times exhibiting warming and cooling respectively. Snow can fall in the Spring and Fall, and temperatures can fluctuate drastically (WRCC 2022).

Precipitations ranges from .49 inches in January to 1.61 inches in September (**Table 2**). Average annual precipitation totals 11.47 inches, with most precipitation occurring in from April onward and the highest snowfall occurring in December. The Property is accustomed to typical late summer monsoonal moisture, receiving the majority of its precipitation as rain and the remainder as snow in the winter (WRCC 2022).

The US Department of Agriculture Hardiness Zones and Average Annual Minimum Temperature Range for this area is 5a which has an annual low temperature range of -20 to -15 degrees Fahrenheit. **Table 2** summarizes the average annual temperature and precipitation is given for the town of Bond, Colorado, which is 25 miles east of the Property, it is the closest station to the Property and is at a similar elevation, and is also in Hardiness Zone 5a. These data should be representative of the climate of the Sweetwater Lake Property (WRCC 2022).

Table 2: Climate Data for Bond, Colorado.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Max Temp. (F)	35.6	40.9	49.0	60.1	71.1	80.0	86.5	83.7	75.0	64.4	47.9	36.2	60.9
Avg. Min Temp. (F)	4.4	10.8	18.5	26.6	34.3	41.2	47.3	44.7	36.3	27.9	17.9	7.3	26.4
Avg. Total Precip. (in.)	0.49	0.47	0.58	1.03	1.00	1.29	1.08	1.54	1.61	1.02	0.58	0.79	11.47

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Avg. Total Snowfall (in.)	4.7	5.1	3.9	2.7	0.2	0.0	0.0	0.0	0.7	0.5	4.3	8.5	30.6

Source: WRCC 2022, Length of record for data is 1982 – 2016, Station 050810.

Property Recreational Activities

the Sweetwater Lake Property provides a wide offering of recreational activities for users of all activity levels and interests. The main attraction for recreation is Sweetwater Lake itself: canoeing and kayaking, fishing, paddle boarding, and swimming will all be available for users to enjoy in the summer months. Ice fishing on the lake can be done in the colder months of the year when ice depths allow for over-lake travel. No snowmobiling is allowed to access ice fishing or anywhere else within the Property.

A campground is present adjacent to the lake to the southeast, next to a vault toilet and parking. Several hiking trails lead to the surrounding USFS lands, and provide users with a remote feel. All of these trails start within the Property and extend out to surrounding USFS land and with some even extending into the Flat Tops Wilderness area. A trail is also present in the Property that leads visitors to an existing cave in the limestone formations surrounding the lake, and can be found on the south side of the Lake. An outfitting operation currently is running within the Property, and provides customers with horse-back riding and hunting opportunities.

Trailheads

Sweetwater Lake Trailhead

Located on the south side of the Lake and provides access to WRNF west of the Property with trails heading up to Deep Lake, Triangle mountain and Baxter Peak.

Sweetwater Nature Trail

A 0.4-mile trail heads out from the Sweetwater Lake trailhead. It follows the lake shoreline in the forest and turns back to meet with the Ute – Deep Creek Trail that you can return the trailhead on, or turn southwest to continue on Cross Creek or the Ute – Deep Creek Trail. No bikes or motorized vehicles are allowed on this trail, but horses and dogs are allowed.

Ute - Deep Trail

This 7.5-mile trail climbs up the hillside right out of the trailhead above the Lake and heads southwest where it meets Jack's Spring Road and connects to other trails.

Cross Creek Trail

A 5.2-mile trail that at Sweetwater Lake Trailhead and takes visitors past Lake Creek falls and uphill into the White River National forest to the northwest of the Property. It follows along the ridge above Lake Creek toward Cross Creek where it connects to other trails.

Ute Trailhead

Located near the Sweetwater Guard Station on the northeast side of the lake and provides access to BLM land and into the Flat Tops Wilderness to the north.

BLM South 8451F

A 5.70mile trail that climbs northeast out of the Sweetwater Creek valley toward Hack Lake before it connects with other trails on BLM land.

Hilltop Trailhead

Located just outside the Property at the end of Sweetwater Lake Road at the confluence of Sweetwater Creek and Turret Creek northwest of the Lake, and provides access to BLM land and WRNF Land to the northwest and into the Flat Tops Wilderness.

Sweetwater Trail

A long trail that runs up Sweetwater Creek and connects users to Turret Creek and Shingle Peak Trails that go into the Flat Tops.

Photo 1. Water activities such as kayaking are a main attraction of the Property.

Source: Eagle Valley Land Trust

A photo of a person in an orange kayak on Sweetwater Lake with scenic cliffs behind them.

3.0 RESOURCE ELEMENT DESCRIPTIONS

This section describes the significance of the natural resources found in the Property 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 Property are summarized below.

- **Wildlife**
- **Vegetation**
- **Wetlands and Water Resources**
- **Geology, Soils, Paleontology**
- **Cultural Resources**

Wildlife

Resource Summary

Significant Features

- The Property 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. The Property provides important severe winter range and calving areas for mule deer and elk.
- A total of 105 bird species were identified in the Property during surveys conducted in 2022, of which, 39 were confirmed to be nesting in the Property. Several sensitive bird species are present in the Property, including Barrow's goldeneye, peregrine falcons, and bald eagles.
- A total of 33 raptor nests were documented in the Property, of which, 11 were active. Nests were documented peregrine falcons, bald eagles, red-tailed hawks, sharp-shinned hawks, and Cooper's hawks.
- Six sensitive bat species were documented as occurring in the Property during acoustic monitoring conducted in 2022. Bats likely use the coniferous and deciduous forests, the cave, rock outcrops, and aquatic habitats for foraging and roosting activities.
- Aquatic and wetland habitats are a major feature of the Property and provide for a diversity of wildlife species. The sensitive species Barrow's goldeneye and Colorado River cutthroat trout have been recorded in Sweetwater Lake and utilize the aquatic and wetland habitats present.

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.
- Visitation and Habitat Degradation – Visitation is currently limited at the Property, but is expected to increase as more access areas are developed. If poorly planned, infrastructure and trail development can directly destroy native vegetation, which reduces wildlife habitat quality or impact important wildlife resources, like raptor nests.
- Catastrophic Wildfire – Although fire is a natural part of the ecosystems at the Property, fire suppression over many years may lead to more intense, catastrophic fires that greatly alter habitats. High severity fire could affect habitat patch size, edge effect, vegetation structure, and soil composition. Future climatic conditions could increase the likelihood of high severity fire.

General Wildlife

Description

The Sweetwater Lake Property encompasses a diverse array of habitats, providing habitat for an equally diverse list of wildlife species. These habitats include deciduous and coniferous forests, shrublands, riparian shrublands, wetlands, and the lake. The Property boasts an impressive range of charismatic wildlife, particularly mammals and avian species, offering the public an invaluable opportunity to not only observe wildlife but also gain an appreciation for the importance of conserving their vital habitats essential for their survival and reproductive success.

Among the commonly sighted wildlife species within the Property are mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), black bear (*Ursus americanus*), peregrine falcon (*Falco peregrinus*), golden eagle (*Aquila chrysaetos*), bald eagle (*Haliaeetus leucocephalus*), and osprey (*Pandion haliaetus*). Although more elusive, occasional reports of moose (*Alces alces*), mountain lions (*Puma concolor*), and hoary bats (*Lasiurus cinereus*) add to the Property's intrigue. Furthermore, the potential presence of river otters (*Lontra canadensis*), bighorn sheep (*Ovis canadensis*), and Canada lynx (*Lynx canadensis*) contributes to the diversity of species that could thrive within the Property's boundaries. Notably, the Sweetwater Lake Property harbors unique and important habitats that support the proliferation of specific animal species.

The impressive cliff sides, for instance, provide essential nesting sites for raptors, with the peregrine falcon being a notable beneficiary of these precipitous cliffs. Additionally, the cliffs serve as crucial habitat for bighorn sheep, demonstrating their extraordinary climbing abilities on near-vertical rock surfaces. On the northwest side of the lake, the wetland ecosystems play a pivotal role as feeding grounds for moose, who browse on willows, and provide a haven for various amphibious species. Moreover, the surrounding forests offer refuge and sustenance for large game animals such as elk and deer, while also providing sanctuary for smaller mammals seeking protection from predators.

Sweetwater Lake itself is nourished by Sweetwater Creek on the western side, extending beyond the lake's outflow on the eastern side. These waterbodies serve as vital habitats for cold-water fish species, particularly trout, with documented sightings of the coveted Colorado cutthroat trout (*Oncorhynchus clarkii pleuriticus*). The streams and lake are home to naturally occurring or stocked species of rainbow trout, brook trout (*Salvelinus fontinalis*), and brown trout (*Salmo trutta*). Furthermore, the Property's waters are graced by the presence of kokanee salmon, a species deliberately stocked by CPW for angling enthusiasts.

Knowledge of species and habitats that occur in the Property 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 Sweetwater Lake Property. **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 Property based on these efforts. **Chapter 5** discusses future survey and monitoring effort needs for the Property based on those that have been conducted.

Table 3. List of Surveys and Monitoring Conducted for General Wildlife at the Sweetwater Lake Property.

Resource	Description	Years	Performed by
Survey for Amphibians, Reptiles, and their Habitats	Visual encounter surveys and acoustic monitoring were used to document findings	2022	Adaptation Environmental Triece and Ehrenberger
Acoustic Bat Survey	Three acoustic monitors were deployed in different habitat types to monitor bats and identify species present	2022	CPW Resource Stewardship
Raptor Strategy	The document aims to provide protection recommendations for known raptor nests in the Property from disturbance.	2022	CPW Resource Stewardship
Pygmy Shrew and Bat Survey	Pygmy shrews were trapped using pitfall traps, and habitat was mapped using GIS. Bat acoustic monitors were placed in potential foraging habitats in the Property.	2022	CNHP Siemers and Unrein
Avian Inventory Technical Report	Five independent survey visits were conducted from April to September including point count station surveys at ten stations	2022	Western Biology Adam Petry

Amphibians and Reptiles

Eighteen species of amphibian have been documented in Colorado and have been found within every ecological zone in the state. The greatest diversity of amphibians occurs within the eastern plains and valleys on the Western Slope. The majority of amphibian species (70 percent) do not venture above 8,000 feet in elevation in Colorado (Hammerson 1999). A total of 58 species of reptiles are present in Colorado, including seven turtles, 32 snakes, and 19 lizards (COPARC 2023). About 75 percent of the reptiles in the state are not found above 8,000 feet in elevation and most species occur between 4,000-5,000 feet (Hammerson 1999). The Property sits at approximately 7,709 feet above sea level, making it suitable for numerous species. Amphibians inhabit areas near wetlands and areas containing a water source throughout much of the year.

the Sweetwater Lake Property contains the necessary habitat components to host a variety of amphibious species. Habitat for amphibian species is prevalent throughout the Property, in wetland and stream areas. Wetland ecosystems are fundamental to the beginning stages of an amphibian's life cycle, they serve as breeding sites, allow for larval development, and provide an important food source. Specific areas identified as important amphibian habitat include the northwestern wetlands between Sweetwater Creek and the southwestern lake edge extending east to the wetland/lake transition, small pools with clumped grasses throughout the Property, and upland dispersal and foraging habitats adjacent to wetland or aquatic breeding grounds (Triece et al. 2022). Surveys conducted in 2022 did not identify any amphibian species

in the Property, but boreal chorus frog (*Pseudacris maculata*) western tiger salamander (*Ambystoma mavortium*) could be present (Triece et al. 2022). The possibility of boreal toads (*Anaxyrus borealis*) may be considered given the elevation (7700'). There is at least one boreal toad record from the 1970s that is only about five miles away but is at a higher elevation. This is in an area where toads have not been seen for at least a couple of decades (Triece et al. 2022). Species of conservation concern, including boreal toad, are discussed in more detail in the Sensitive Wildlife Section.

Habitat for reptiles occurs in a variety of areas in the Property, including upland grasslands, drainages, riparian areas, wetlands, and rock outcrops. Grassland areas with native bunch grasses and structure are highly valued by a variety of reptile species for cover and dispersal (Triece et al. 2022). Wetlands and riparian areas are important for insect larvae development and provide forage for reptile species with potential to occur in the Property. Rocky outcrops with natural openness and low invasive plant species cover provide primary habitat for lizard and snake species. Surveys conducted in 2022 found five occurrences of the wandering gartersnake (*Thamnophis elegans*) within the Property boundaries. Other species identified as likely being present are gophersnake (*Pituophis catenifer*) and smooth greensnake (*Opheodrys vernalis*) (Triece et al. 2022).

Photo 2. Wandering gartersnake is a reptile species confirmed to be present in the Property.

Source: Hunter Johnson, COPARC

A photo of a brown and tan wandering gartersnake coiled on a log.

Birds

The area encompassing the Sweetwater Lake Property makes up varied and high-quality bird habitat for many different species. A mix of resident birds, short-distance migrants, and neotropical migratory birds are present. The composition of the breeding bird community reflects the habitat availability in the Property, which is dominated by sagebrush and oak shrublands, dense willow riparian and wetland areas, cattail marshes, open perennial grasslands, and Douglas-fir forests.

At the top of the food chain, raptors can find nesting habitat above the lake among high rising cliffs to the south. Peregrine falcons nest directly in these cliffs and eagles, both bald and golden, have nesting habitat in the coniferous trees above the cliffs. With the lake directly below, there are ample hunting opportunities for fish and other

prey species. The sagebrush shrublands to the north of the lake offer habitat that small mammals occupy, providing prey opportunities there. These shrublands are also excellent habitat for grouse and other upland species of birds. The wetland complex to the west of the lake is exceptional foraging grounds for songbirds who prefer insects, invertebrates, and smaller prey items. There are ample wildflowers in the warm months that attract a different group of pollinating insects and birds alike. The willow community in the wetland provides nesting habitat in thickets along the edges of the wetland.

Photo 3. Rufous hummingbird (left) and olive-sided flycatcher (right) are two noteworthy species that were documented in the Property during bird surveys.

Source: Cornell Lab of Ornithology
A photo of a rufous hummingbird perched on a branch on the left, and a photo of an olive-sided flycatcher perched on a branch on the right.

According to the 2022 technical avian report, there are 105 species of birds confirmed at the Sweetwater Lake Property, with 37 possible breeders, 29 probable breeders, and 39 confirmed breeders (Western Biology 2023). The greatest species richness was found at point count stations in or near riparian deciduous forest and emergent wetlands, both of which are commonly found to be the have the highest bird diversity of any habitat types in the state. The highest average number of species per habitat per visit were located in shoreline areas and upland coniferous forests. Some common species found in the Property during the 2022 survey included American robin (*Turdus migratorius*), violet-green swallow (*Tachycineta thalassina*), warbling vireo (*Vireo gilvus*), broad-tailed hummingbird (*Selasphorus platycercus*), and song sparrow (*Melospiza melodia*). Several species were not detected at fixed-point count stations, but were observed during ongoing avian surveys within the Property. Notable songbirds observed during these continuous surveys included the sage thrasher (*Oreoscoptes montanus*), rufous hummingbird (*Selasphorus rufus*), and olive-sided flycatcher (*Contopus cooperi*) (CPW 2022a; eBird 2022). Nighttime surveys revealed the presence of the common poorwill (*Phalaenoptilus nuttallii*). Based on best available data, 15 special status species have potential to or are known to occur in the Property, and six have been confirmed to be present (Western Biology 2023). These species are discussed in more detail in the Sensitive Species Section.

Waterfowl, Shorebirds, Wading Birds

Sweetwater Lake, along with its connected wetlands and marshes, provide habitat for a diverse range of waterfowl, shorebirds, and wading bird species. The dense marshes

comprised of cattails and bulrushes surround open pools and provide ample foraging and nesting habitat for water-dependent species. Some of the species observed during the 2022 bird survey include mallard (*Anas platyrhynchos*), gadwall (*Mareca strepera*), lesser scaup (*Aythya affinis*), common merganser (*Mergus merganser*), ring-necked duck (*Aythya collaris*), snowy egret (*Egretta thula*), spotted sandpiper (*Actitis macularius*), Wilson's snipe (*Gallinago delicata*), and Barrow's goldeneye (*Bucephala islandica*). In addition to these species, eBird records indicate that willet (*Tringa semipalmata*), great egret (*Ardea alba*), and trumpeter swans (*Cygnus buccinator*) have been observed on Sweetwater Lake on at least one historical occasion.

Raptors

Sweetwater Lake provides excellent cliff nesting habitat for raptors. It's location on the southeast edge of the Flattops Wilderness Area provides habitat and expansive undeveloped landscapes for raptors to breed, forage, and for young to disperse and contribute to the sustainability of raptor populations in the White River National Forest and in the northwest region of Colorado (Prusse et al. 2022). Raptors and owls were documented during the migratory and breeding bird surveys conducted in 2023 (Western Biology 2023). Raptor monitoring efforts have not been conducted at the Property, but a monitoring program will be started in the near future.

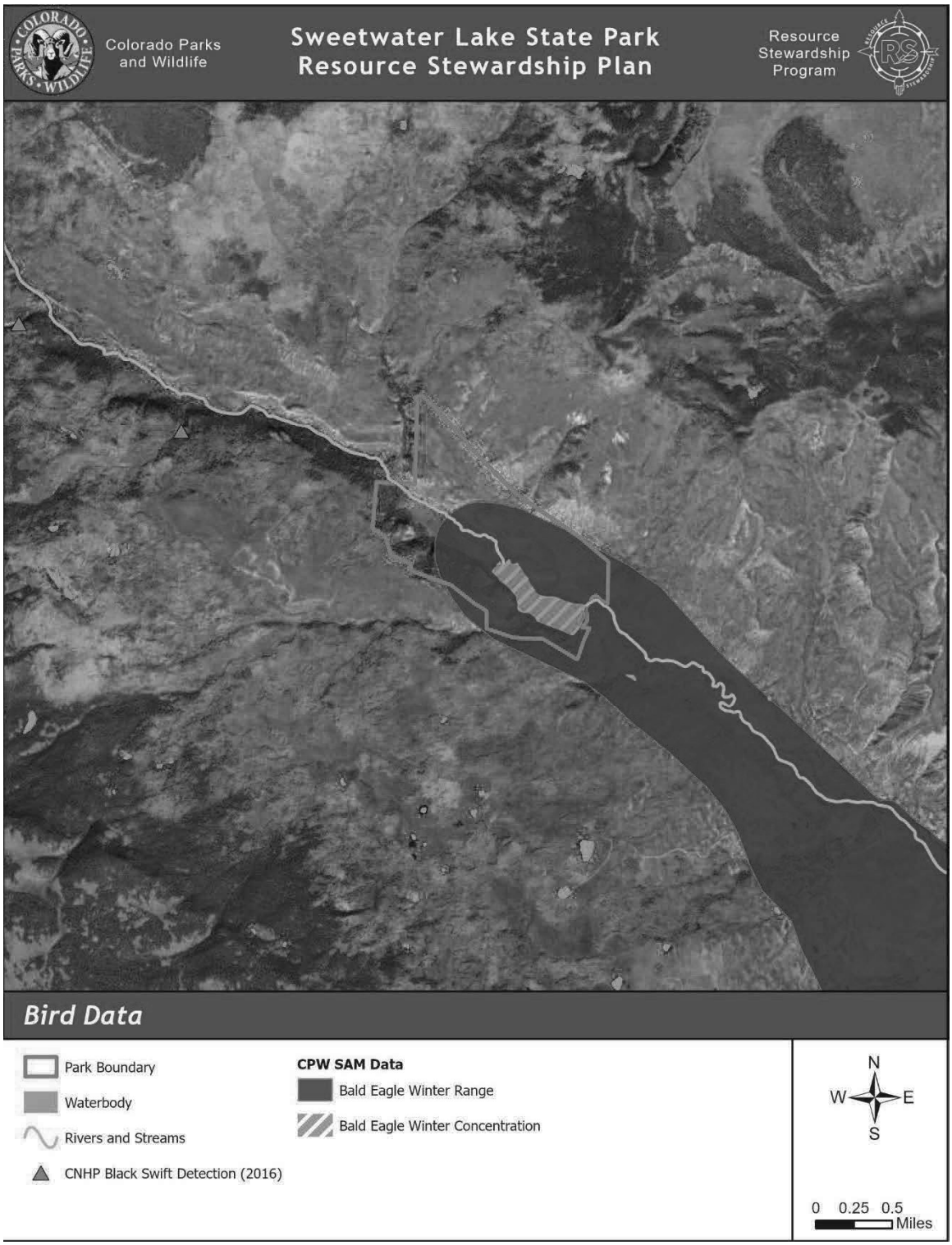
Photo 4. The Property contains many rock outcrops, ideal for raptor nesting.

Source: Western Biology 2023

A photo of scenic cliff bluffs with scattered trees located in the Sweetwater Lake Property.

A total of 33 raptor nests, 11 of which were active, were documented during the 2022 breeding and migratory bird survey. The Property had confirmed breeding pairs of peregrine falcons, bald eagles, red-tailed hawks (*Buteo jamaicensis*), sharp-shinned hawks (*Accipiter striatus*), and Cooper's hawks (*Accipiter cooperii*) (Western Biology 2023). American kestrels (*Falco sparverius*) and turkey vultures (*Cathartes aura*) were confirmed breeders although nests could not be located, while golden eagles (*Aquila chrysaetos*) and ospreys (*Pandion haliaetus*) were possible breeders. The density of nesting raptors was unusually high in the Property, as confirmed by the quantity and diversity of confirmed breeding raptors and the short nearest nest-neighbor distances. This suggests that there is currently an abundant availability of food and resources for a number of birds of prey. Owl surveys had to be stopped early in 2022. However, three unique detections of great-horned owl (*Bubo virginianus*) were recorded (Western Biology 2023).

Figure 3. Bird Data Map.



Fish

Photo 5. Kokanee salmon is a fish species stocked in Sweetwater Lake.

Source: Scott Willoughby, Colorado Outdoors

A photo of a person's hand holding a kokanee salmon in a stream.

Sweetwater Lake is managed by CPW as a Coldwater Mixed Stock Lake where a diversity of stocked fish and wild fish are managed for angling opportunity (Bakich 2023). Annually, fish stocked in Sweetwater Lake include catchable rainbow trout (*Onchorynchus mykiss*) and fingerling Kokanee salmon (*Oncorynchis nerka*). Wild brown trout (*Salmo trutta*) and brook trout (*Salvelinus fontinalis*) are also present. Anglers enjoy fishing in Sweetwater Lake in the summer primarily by floating watercraft or along narrow trails as shoreline access is limited by dense riparian areas, wetlands, and bedrock cliffs. In the winter, ice fishing is a popular way for anglers to fish Sweetwater Lake and Kokanee are the desired target along with other trout species (Bakich 2023).

Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) are present in the Sweetwater Creek headwaters. Periodically, some cutthroat trout will make it down to Sweetwater Lake. More information on the Colorado River cutthroat trout can be found in the Sensitive Wildlife Section.

Nuisance species are present in Sweetwater Lake and include yellow perch (*Perca flavescens*), goldfish (*Carassius auratus*), and white suckers (*Catostomus commersonii*) (Bakich 2023). More details about these species and management of them at the Property can be found in the Aquatic Nuisance Species Section.

Fish Stocking

At current levels of angling, approximately 3,000 catchable trout are stocked monthly between May and September each year (Bakich 2023). Up to 12,000 Kokanee fingerlings are planted upstream in Sweetwater Creek near the inlet to the lake each spring as available to exploit zooplankton blooms for food. Stocking upstream of the lake encourages the stocked Kokanee to return to the inlet in the fall in a spawning run for anglers to target. Only a few stunted feral Kokanee will natural recruit from wild spawning; therefore, supplementation by fish reared from eggs in a hatchery is needed to maintain a population exploitable by anglers (Bakich 2023).

Invertebrates

No surveys have been conducted for invertebrates within the Property. However, citizen science website, iNaturalist, documents three species of insects, one arachnid species, and no mollusk species within the Property. Insect species observed include the hoary comma (*Polygonia gracilis*), crackling forest grasshopper (*Trimerotropis*

verruculata) and the Bee-mimic Beetle (*Trichiotinus assimilis*). The arachnid species observed was the oblong running spider (*Tibellus oblongus*). A more in depth and formalized survey for invertebrates would be beneficial in understanding more of invertebrate species presence and ecology.

Mammals

The mammalian species inhabiting the Sweetwater Lake Property are widely distributed across the valleys and forests of western Colorado. Among the mammalian species encountered within the Property are moose, mule deer, elk, black bear, and mountain lion. The Property may serve as a habitat for badger (*Taxidea taxus*), bobcat (*Lynx rufus*), and beaver (*Castor canadensis*). Bats are found in the unique cave systems and forests found within the Property. Sensitive and or rare species of mammals are described in further detail in the Sensitive Wildlife Section.

Bats

Colorado bat species typically segregate in the summer when bats are highly active (Navo et al. 2018). Males congregate in smaller bachelor colonies or some species roost individually. Females form maternity roosts with offspring (pups), which can be much larger, and range from a few individuals to several thousand (Navo et al. 2018). The pups suffer high mortality rates even under normal conditions (CBOSMP 2021). In the fall, bats form large groups and display "swarming" behavior, where large amounts of bats are active throughout the night and typically fly in and out of caves or mines (Navo et al. 2018). Most Colorado bat species hibernate locally and complete short, seasonal altitudinal changes in order to find winter roosts. Mines, caves, talus slopes, and rock crevices have been documented as winter roost sites (Navo et al. 2018).

Rock crevices have been found to be especially important for bats. Rock crevices support summer maternity roosts, fall transition roosts, and hibernacula in Colorado (Navo et al. 2018). Rock crevices have been found to be preferred summer roosting habitat for many bat species, even when other substrates such as trees, caves, and buildings are present. Research has found the little brown myotis (*Myotis lucifugus*), long-eared myotis (*Myotis evotis*), and long-legged myotis (*Myotis volans*) often chose rock crevices as maternity roosts over available tree roosts. Little brown myotis was also found to use rock crevices and boulder fields as fall transition roosts and winter hibernacula (Navo et al. 2018). Rock resources in the forms of cliffs and boulders are abundant at the Property and are highly likely to be used by the bat species documented on the surveys.

Many bats in Colorado rely on caves for roosting, winter hibernacula, summer nurseries, summer bachelor roosts, migratry stopover sites, and fall swarming activity. Caves have been documented as essential habitat for many different bat species, and often house unusually large aggregations of bats. Threats to cave-dwelling bats include recreational activity in and around the cave, improper cave gate design, and the introduction of white nose syndrome (Navo et al. 2018). It will be critical that CPW properly manages the cave in the Property to protect bat species using the geologic feature.

Coniferous and deciduous forests mixed with open shrublands and rock outcrops, have been found to be important habitat for Colorado bats (Navo et al. 2018). Nine species of bats in Colorado use forests and woodlands for foraging and roosting. Bats may use tree crevices or cavities, exfoliating bark, or foliage of live trees for roosting

activities. Hoary bats (*Lasiurus cinereus*) and silver-haired bats (*Lasionycteris noctivagans*) may roost on tree trunks or among live tree leaves. Generally, larger trees are selected for roosting more often due to their large surface area and ability to persist for longer, which makes them usable for several years. Snags and trees may be used by individuals or up to hundreds of bats for roosting. Bats may use the same tree roost for an entire season and even come back to the same trees year after year. They may also change roost locations daily or every few days depending on the environment (Navo et al. 2018).

Photo 6. The Ute Cave present in the Property provides habitat for several bat species.

Source: Jeff Thompson

A photo of the Ute Cave entrance blocked with a wooden fence in the Sweetwater Lake Property.

In addition to Sweetwater Ute Cave found within the Sweetwater Lake Property's boundary, there is other suitable bat roosting and foraging habitat present. The cliffs and rock outcrops in the southern part of the park provide ample roosting opportunities. Tree-roosting species may also use the forest and woodland habitats found throughout the park. The diversity of wet and dry habitats throughout the rest of the park also provide suitable foraging habitat for bats (Siemers & Unrein 2022).

Bat species are in severe decline worldwide due to the spread of White Nose Syndrome (WNS). More information on this fungal disease can be found in the Pests and Disease Section.

An acoustic survey for bats was conducted in 2022 at the Sweetwater Lake Property. The survey consisted of three sites, each in different habitat types, to capture all possible bat species inside the Property. The habitat types were listed as aspen forest/riparian canyon, mixed conifer/oak scrub, and wet meadow/willow. Species detected with a high confidence based on acoustic analysis include:

- Townsend's big-eared bat (*Corynorhinus townsendii*)

- Big brown bat (*Eptescius fuscus*)
- Hoary bat
- Silver-haired bat
- California myotis (*Myotis californicus*)
- Western small-footed myotis (*Myotis ciliolabrum*)
- Long-eared myotis
- Little brown myotis
- Long-legged myotis
- Brazilian free-tailed bat (*Tadarida brasiliensis*).

There were a number of other bat species that were detected during this acoustic analysis, but with a lower confidence rating based on range, call sequences, and identification. These species include pallid bat (*Antrozous pallidus*), eastern red bat (*Lasiurus borealis*), western red bat (*Lasiurus blossevillii*), Arizona myotis (*Myotis occultus),* fringed myotis (*Myotis thysanodes*), Yuma myotis (*Myotis yumanensis*), canyon bat (*Parastrellus Hesperus*), and tricolored bat (*Perimyotis subflavus*).

Additionally, CPW SAM data for the following species' overall ranges overlap with the entire Property: big brown bat, little brown myotis, long-eared myotis, long-legged myotis, silver-haired bat, Townsend's big-eared bat, western small-footed myotis, and Yuma myotis.

Photo 7. Long-eared myotis (left) and western small-footed myotis (right) are two bat species that were documented during acoustic surveys conducted in 2022.

Source: Bat Conservation International (Rachel Harper)
A photo of a long-eared myotis getting a drink from a pond while flying on the left and a western small-footed myotis perched on a rock on the right.

Beaver

Beaver habitat occurs in the Property in areas adjacent to water with abundant willow. The effect that beaver behavior have on the landscape is essential to Southern Rocky Mountain riparian and wetland ecology. 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 space that affords them protection from predators and provides a self-sustaining food supply. Beavers impound water by constructing dams across flowing streams causing localized flooding. This flooding transforms former wetland habitat into aquatic habitat and converts some upland areas into wetlands. Tree cover is often greatly reduced in beaver habitat due to a combination of flooding and felling by beavers for use as food and building materials (CPW 2003).

Though the beavers' activities temporarily destroy habitat, they soon affect positive change that increases 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 Property 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 the Sweetwater Lake Property. A discussion of reintroducing beavers to the Property can be found in the Prioritized Stewardship Actions and Management Prescriptions Sections.

Black Bear

Black bears are present primarily in the western two-thirds of Colorado, but populations are expanding more into the Front Range recently. Black bears are habitat generalists, and have been documented throughout the U.S. in desert to mountain ecoregions. Black bears eat a variety of foods, including nuts, seeds, grasses, forbs, insects, carrion, small mammals, and young or elderly ungulates. Spring, after emergence from hibernation, and in the fall before winter hibernation, are essential consumption periods for the species. Bears spend most of their foraging efforts in aspen forests, riparian areas, Gambel oak-dominated mountain shrub, and avalanche chutes as they vary their diet between seasons (Armstrong et al. 2011).

Photo 8. A black bear spotted in the Property during resource surveys conducted in 2022.

Source: Western Biology 2023

A photo of a black bear walking along steep rock cliffs located in the Sweetwater Lake Property.

In Colorado, breeding occurs from early June to August. Denning may begin as early as October and extend to late December and dens are typically located in rock shelters

or in excavations under shrubs and trees. Cubs are born in the den from late January to February, while the mother is hibernating. Most females have a litter of two to three cubs every other year. Black bears are solitary, except for family groups (sow and cubs) or groups in areas with concentrated food resources, where many individuals are tolerant of one another. Black bears are mostly crepuscular or nocturnal, but may forage throughout the day. Colorado black bear densities are estimated to be one individual per 1,384 to 1,903 acres, with increased densities occurring in August. Home ranges vary year to year based on environmental factors and topography, but have been found to be between 988 to 46,703 acres (Armstrong et al. 2011).

Black bear on the Western Slope are most often associated with riparian draws, forests with ample food sources, and can even be found in shrublands if sufficient water sources are nearby - black bears can be found anywhere they can be supported by lush vegetation for food and cover in the summer. The Property contains ample habitat for black bears, in coniferous forest, upland oak and serviceberry shrublands, and along the waterways present in the Property.

According to CPW SAM data, the Sweetwater Lake Property is within black bear overall range and summer concentration zones (**Figure 4**). CPW SAM data also show black bear-human conflict areas overlapping with the Property around much of the Lake's shore to the east and north. Black bear fall concentration areas are also present to the south of the Property, but do not overlap with the Property. The ranges of black bear territories within the area make it highly probable to encounter bears traveling through the Property on occasion.

Black bears have been seen in the Property by visitors, Property staff, and during the 2023 bird surveys conducted. Black bear population in and around the area of Sweetwater Lake has been reported to be high by CPW and USFS biologists.

Mountain Lion and Bobcat

CPW SAM data show mountain lion overall range overlapping with the Sweetwater Lake Property boundaries. Mountain lions generally follow the seasonal migration of mule deer and have more or less matching timeframes and ranges. In Colorado, mountain lions are abundant across foothills, mountains, and mesas. Their range spans most of Colorado west of the shortgrass prairie, and they can mostly be found in brushy areas and woodlands more than forests or open prairies (CPW 2017a). The Property provides habitat for mountain lions in its forests, sagebrush shrublands, and rocky outcrop areas. The riparian corridors along the Sweetwater Creek drainage provide an important source of water and offer migration opportunities in the riparian corridor.

Bobcat habitat exists in the Property. The rocky outcrops and sheer cliffs surrounding the shores of Sweetwater Lake provide the broken and rocky terrain features that bobcat prefer to inhabit. The surrounding forests and lake habitats support plentiful prey items including rabbits, squirrels, birds, and aquatic species. This species prefers rocky, broken terrain of foothills and canyonlands with pinyon-juniper woodlands and montane forests. Much of their diet consists of rabbits, so they often can be found where rabbit habitat occurs. Bobcats will prey on a variety of other animals, including mice, chipmunks, squirrels, hares, porcupines, birds, deer, amphibians, and even crayfish. Bobcats are most abundant throughout the Rocky Mountains in Colorado, but may be found throughout the rest of the state as well (Armstrong, et al. 2011).

Elk and Mule Deer

Elk and mule deer are able to thrive on the Property lands. Elk are habitat generalists and use most of the habitat available within the Property 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. Females select calving grounds with cover, forage, and usually within 200 meters of water (Armstrong, et al. 2011).

the Sweetwater Lake Property has a somewhat milder winter climate than the surrounding mountains and provides key winter habitat and forage for elk, especially on the south facing hillslopes. Herds migrate down to areas below 9,000 feet in elevation during winter months, and the Property's communities of forests and sagebrush shrublands provide forage for elk during this period. The CPW SAM database shows the Sweetwater Lake Property overlaps with elk overall range, summer range, winter range, severe winter range, and winter concentration zones. Elk summer concentration area is mapped primarily at higher elevations west and north of the Property. SAM data also maps elk production areas near the Property, to the south and to the northwest. Based on observations by local staff and wildlife biologists, migration, calving, and fawning have been documented in the north side of the Property. These activities have been observed on the south-facing slope that predominates the landscape on the north side of County Road 150 (CPW & USFS 2021a, 2021b).

Photo 9. The Property provides sensitive winter habitat for elk.

Source: CPW

A photo of a bull elk bugling in a grassland area next to a stream.

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 Property contains. Individuals make seasonal movements, summering at higher elevations and wintering at lower elevations (Armstrong, et al. 2011). Based on the number of deer and the severe recent browsing on vegetation observed at the Sweetwater Lake Property in

2022, the local population within the Property appears high. Pinyon-juniper forest and sagebrush shrublands surrounding Garfield County are critical winter range for mule deer, who migrate from higher country to elevations between 7,000 and 7,600 feet as snows begin to accumulate. The CPW SAM database maps mule deer overall range, migration routes, summer range, and winter range as overlapping with the Property (**Figure 4**). Resident populations inhabit areas around the Property, and outside the Property in all directions. Similar to elk, local staff and wildlife biologists have documented mule deer migration, calving, and fawning in the area located on the south-facing slope that predominates the landscape on the north side of County Road 150 (CPW & USFS 2021a, 2021b).

Moose

Moose are established in several areas of Colorado, including Middle Property, the upper reaches of Laramie and Cache La Poudre Rivers, and Rocky Mountain National Property. 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).

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).

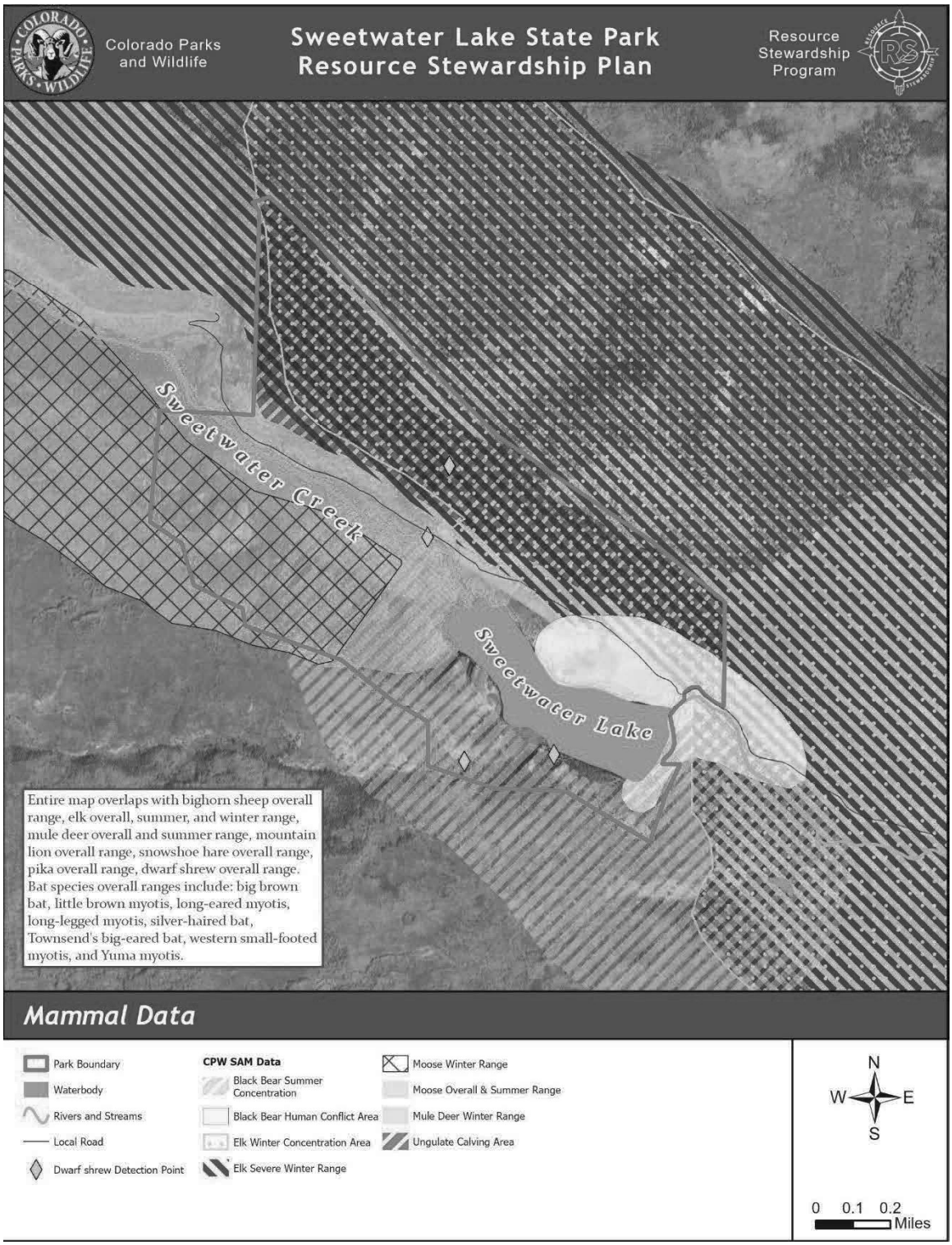
CPW SAM data for moose summer, winter, and overall range overlaps with portions of the Property. **Figure 4** displays range area for this species. Moose are commonly seen in the upper reaches of the Sweetwater drainage, including within the wetland area west of the lake (CPW & USFS 2021b).

Photo 10. The Property provides ample, high-quality habitat for moose.

Source: CPW

A photo of a bull moose walking through a wetland area.

Figure 4. Mammal Data Map.



Resource Conditions

Wildlife resources at the Property are in good to excellent condition. Although small, the Sweetwater Lake Property provides a unique refuge of habitat for wildlife. A variety of habitat types, including rock outcrops, a cave, coniferous forests, oak woodlands, sagebrush shrublands, vast wetland and riparian areas, and aquatic areas, including the lake and the many perennial streams, provides for a high diversity of wildlife species. A high diversity of bat and bird species have been documented using the available habitat types during surveys conducted in the Property. A telltale sign that the Property is rich in resources, is the presence and close proximity in which several raptor species are nesting. Peregrine falcon and bald eagle have nested in the Property for several years, only 200 meters from one another. This suggests ample food sources exist for these two indicator species.

The Property is connected to vast USFS lands in multiple directions, providing ample land for wildlife movement and migration. The ecological connectivity of the Property with adjacent public lands is important for many wildlife species in the area, allowing them to move freely to find food and water, breed successfully, and establish home territories. Connectivity of land allows for natural processes that wildlife depend on, to remain intact. This may include processes that result in clean air, water, and fertile soils that support native vegetation. The Property is mapped as sensitive winter habitat for elk and mule deer, and also has been documented to support calving activities. Preserving the land at Sweetwater Lake enhances the ability of these species to survive by allowing them to carry out these critical life events.

Wetlands and riparian areas of the Property are a habitat feature that is unique to the Property. Willow shrublands surround the lake and extend along Sweetwater Creek to the west. Emergent wetlands are also present on the periphery of the lake and in the western side of the Property. These wetlands are essential hunting grounds for peregrine falcons and bald eagles, provide ample browse for large mammals like moose, migration corridors for black bear and mountain lion, foraging and nesting habitat for shorebirds and waterfowl, and necessary wetland habitat for amphibians. Overall, wetlands are in good condition and provide important habitat for regional wildlife species. These areas have been impacted by the presence of noxious weeds and horse grazing activities.

Human activities have caused impacts on the habitats in the Property, and the degree of these impacts varies from one side of the lake to the other. The western side of Sweetwater Lake has minimal human impact on natural resources, limited only to a low-use recreational trail, which is closed for much of the year to protect nesting and fledging raptors, including bald eagles. The ecosystem components, including soils, vegetation, and water resources, are intact and functioning well, providing high-quality habitat for wildlife. The ecosystems are well-connected, allowing for larger-scale ecological processes like wildlife migrations to occur and enhancing the resilience of both native species and ecosystems to climate change.

On the eastern side of Sweetwater Lake, however, human impacts on habitats are much higher. Ecosystem processes have been compromised by alterations to vegetation, soils, and hydrology. In much of the Property's upland habitat on the east side of the lake, human disturbance has affected vegetative species composition, soil compaction and erosion, and local hydrology. The surrounding landscape is a patchwork of agricultural or semi-developed areas that fragment habitats and create barriers to system processes like migration.

Table 4. List of General Wildlife Resource Conditions at the Sweetwater Lake Property.

Resource	Condition / Status	Description
Birds		The Property was documented in 2022 to have extremely high bird diversity and abundance, including the presence of several rare or sensitive species. The Property provides important habitat for migratory and resident birds. Additionally, several raptor species use the Property and have been documented to successfully nest. Increased protection measures for sensitive raptors and other species should continue to be implemented in order to conserve and improve this resource. Future visitation to the Property threatens the continued success of raptor nests. However, areas may potentially be closed part of the year to protect this resource.
Mammal Populations and Migration Corridors		Mammal populations seem to be stable and healthy in the area. The Property contributes to a large, connected landscape, along with neighboring conserved lands. This larger area provides important habitat connectivity for long-ranging mammals in the area, like mule deer and elk. Additionally, the Property provides important habitat for several rare bats and small mammals that are unique to the region. Future visitation to the Property could disturb mammals that utilize the Property during critical life events. However, areas may potentially be closed part of the year to protect this resource.
Amphibians and Reptiles		Not many amphibian and reptile species were documented in the Property during recent surveys. Wetland and riparian habitats are in good condition and provide for amphibians present. Rocky outcrops are prevalent and are in relatively good condition, and provide habitat for reptiles. Continued acoustic monitoring should be conducted to uncover more species at the Property.
Fisheries		Fish populations are in good condition overall. The water quality of the lake is good, and provides excellent habitat for native fish species. Fish are stocked annually in the lake and populations seem healthy. Non-native fish species are present in the lake and threaten the native fish populations.
Riparian and Wetlands Habitat		The periphery of the lake and streams in the Property provide riparian and wetland vegetation, that are crucial to wildlife. Most of the wetlands are undisturbed, but some areas see vegetation trampling by visitors and horses and noxious weed presence. Increased visitation has the potential to threaten the health of these areas by introducing noxious weeds. As of now, these areas are

Resource	Condition / Status	Description
		considered to be in good condition and provide important habitat for wildlife species present in the Property.
Aquatic Habitat		The lake and the streams provide a necessary water source for mammals, birds, and amphibians in the area, and are stocked with a diversity of fish species. The future of the lake and other waterways are somewhat uncertain, as climate change threatens the snowpack-fed water resources.

Discussion and Conclusions

Overall wildlife and their habitats are in good condition and are currently able to sustain the populations that exist at the Property. A high density of nesting raptors in a small area is an indicator of a healthy ecosystem. The biggest threats to raptors within Sweetwater Lake are proximity of trails to active nests and increased visitation. With increased usage of the Lake itself comes decreased surface area for raptors to hunt fish within the lake and wetlands. Implementing the planned lake and trail seasonal closures will help to protect this important resource.

The largely intact wetlands at the northwestern edge of Sweetwater Lake host a wide variety of amphibians, birds, and mammals. Many species depend on the presence of the vast wetlands in the Property, including a large diversity of waterfowl and shorebirds that forage and nest in the area. These birds are easily disturbed, and seek refuge from any form of disruption, particularly those associated with loud noises and sudden movements. Human-induced disturbances can lead to nest abandonment, reduced hatching success, and decreased survival rates for hatchlings. The presence of a diversity of species makes a great opportunity for wildlife viewing. However, allowing access to the area must be balanced carefully with resource protection. Planning efforts should consider the potential impacts to wildlife from the presence of people and pets. The general conditions of the wetlands and its' inhabitants is a huge asset to the area.

Aquatic Stewardship begins with intentional protection of sensitive areas including riparian and wetland habitats that supports protective buffers and important wildlife habitat around Sweetwater Lake (Bakich 2023). Not only do aquatic species rely on the productivity of wetlands and riparian areas both for rearing juvenile fish and refuge from threats, they also contribute significant additional food resources. As well, most terrestrial wildlife and big game species are strongly associated with these areas, periodically utilizing the areas for food and refuge. Water quality is maintained and enhanced as these areas act as buffers to upland inputs that may otherwise degrade conditions including increased water temperatures, turbidity, and pollutants. Directing visitor access to the lake and shore at intentionally developed and targeted points will mitigate erosion and pathways for pathogens, and discourage access to sensitive areas that support the aquatic environment and allow resident wildlife to thrive. Conservation efforts for native aquatic wildlife, including Colorado River cutthroat trout and boreal toads, are supported by reminding people about the Best Practices to avoid introducing harmful pathogens from their recreational pursuits. Enhanced fishing opportunities and protection of native fishes also relies on the prevention and

targeted removal of invasive fish and aquatic species. Working with local wildlife experts, enforcing wildlife regulations, and educating the public to prevent unintended impacts of Aquatic Nuisance Species is important (Bakich 2023).

Ungulate habitat abounds throughout the area, and is generally in good condition. Many mule deer and elk can be seen in and around Sweetwater Lake given the largely undisturbed and connected migration corridors surrounding the area. High elevation grasses provide the necessary food source for elk and mule deer to thrive. With a healthy snowpack and seasonal moisture in the summer from monsoons, they should have plenty of forage to sustain vigorous populations in to the future. Without the necessary moisture for plants to grow to maturity and produce seed, the grass communities these animals depend on for survival could become decadent and less abundant. Several years of drought has already impacted available moisture for plants and animals, and if it continues, will be an even more pressing issue affecting these animals. Additionally, sensitive wintering and calving habitats are present on the north side of the Property. These areas should be considered for seasonal use, outside of these sensitive time periods in order to reduce the likelihood of disturbance to elk and mule deer.

The predatory animals that use Sweetwater Lake as hunting grounds consume a variety of animals including amphibians, lizards, and birds, but their diet mostly consists of other mammals. Given the relative abundance of small and large mammals in the area, these predators should have enough prey to sustain their populations at healthy levels. The presence of a large number of elk and deer should give mountain lions a steady stream of food to prey on. Smaller predators like coyotes, fox, and bobcats rely on smaller prey items such as rodents, rabbits, squirrels, and birds. The various habitats that support these species are in good condition and thus can support the various prey items these predators rely on for sustenance.

Several bat species occupy the unique habitat features in the Property, including the Ute Cave. Additionally, bats may occupy old buildings and other structures. Property planning efforts should consider how the removal of such structures could negatively impact bat roosting habitat. Creating additional roosting habitat for bats, such as bat houses, should occur following the demolition of structures in the Property.

As with the rest of the state, the increase in population growth and development could affect the Property. Currently, the Property sits next to a substantial acreage of public lands which provide contiguous landscapes for a variety of wildlife species to use. The connection to undeveloped lands managed by the USFS is likely a major reason why the Property contains healthy, diverse wildlife populations. Protection against surrounding development through additional acquisitions, conservation easements and/or management agreements would continue to safeguard wildlife populations in the area and expand wildlife habitat and movement corridors.

Sensitive Wildlife

Description

Sweetwater Lake provides habitat for many species of wildlife that inhabit forests, water bodies, wetlands, and shrublands. The presence of many charismatic wildlife species creates opportunities for the public to not only view the wildlife, but also to become educated about the need to conserve their habitats. This section highlights and further discusses the animals present at Sweetwater Lake that are deemed

sensitive, threatened, or endangered by the state or federal wildlife officials. These species have been documented as declining, or a significant portion of their habitats have been modified and are no longer suited for the species to thrive in the current conditions. Many of the species found in the sensitive wildlife sections require niche habitats that have been altered. The management of these species and their success in the wild is very important to maintaining biodiversity locally and globally. More recommendations on the management of these species can be found in the **Stewardship Recommendations Section**.

Knowledge of species and habitats that occur in the Property 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 Sweetwater Lake Property. **Table 5** 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 Property based on these efforts. **Chapter 5** discusses future survey and monitoring effort needs for the Property based on those that have been conducted.

Table 5. List of Surveys and Monitoring Conducted for Sensitive Wildlife at the Sweetwater Lake Property.

Resource	Description	Years	Performed by
Survey for Amphibians, Reptiles, and their Habitats	Visual encounter surveys and acoustic monitoring were used to document findings	2022	Adaptation Environmental Triece et al.
Acoustic Bat Survey	Three acoustic monitors were deployed in different habitat types to monitor bats and identify species present	2022	CPW Resource Stewardship
Raptor Strategy	The document aims to provide protection recommendations for known raptor nests in the Property from disturbance.	2022	CPW Resource Stewardship
Pygmy Shrew and Bat Survey	Pygmy shrews were trapped using pitfall traps, and habitat was mapped using GIS. Bat acoustic monitors were placed in potential foraging habitats in the Property.	2022	CNHP Siemers and Unrein
Avian Inventory Technical Report	Five independent survey visits were conducted from April to September including point count station surveys at ten stations	2022	Western Biology Adam Petry

The Property contains potential habitat for approximately 39 sensitive wildlife species, 16 of which have historically been documented occurring in the Property. Eight sensitive bird species were documented as present in the Property during the 2022 migratory bird survey or during other surveys. No federally-listed bird species under ESA were documented. six sensitive bat species were recorded during recent acoustic bat surveys conducted. The state sensitive, dwarf shrew, was documented during

small mammal trapping efforts. A summary of the sensitive wildlife species with potential to occur in the Property is provided below in **Table 6**.

Table 6. List of Sensitive Wildlife Species that Could Occur in the Sweetwater Lake Property.

Common Name	Scientific Name	Listing Status			Property Presence
		Fed	CPW	CNHP	
Mammals					
American pika	*Ochotona princeps*		Tier 1	G5, S5	Not detected
Bighorn sheep	*Ovis canadensis*	USFS	Tier 2	G4, S4	Not detected
Brazilian free-tailed bat	*Tadarida brasiliensis*	-	-	G5, S1	Detected in 2022*
California myotis	*Myotis californicus*	-	-	G5, S3	Detected in 2022*
Canada lynx	*Lynx canadensis*	FT	Tier 1	G5, S1	Not Detected
Dwarf shrew	*Sorex nanus*		Tier 2	G4, S2	Detected in 2022
Eastern red bat	*Lasiurus borealis*	-	-	G3, S2S3B	Not Detected
Fringed myotis	*Myotis thysanodes*	USFS	Tier 1	G4, S3	Not detected
Hoary bat	*Lasiurus cinereus*	USFS	Tier 2	G3, S3B	Detected in 2022*
Little brown myotis	*Myotis lucifugus*	FP	Tier 1	G3, S5	Detected in 2022*
Pygmy shrew	*Sorex hoyi montanus*	USFS	Tier 2	G4, S2	Not Detected
Silver-haired bat	*Lasionycteris noctivagans*	-	-	G3, S3S4	Detected in 2022*
Snowshoe hare	*Lepus americanus*	-	Tier 2 SC	G5, S5	Not Detected
Southern red-backed vole	*Clethrionomys gapperi*	-	Tier 2	G5, S5	Not Detected
Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	USFS	Tier 1	G3G4, S2	Detected in 2022*
Tricolored bat	*Perimyotis subflavus*	-	-	G3, S2	Not detected

Common Name	Scientific Name	Listing Status			Property Presence
		Fed	CPW	CNHP	
White-tailed jackrabbit	*Lepus townsendii*	-	Tier 2	G5, S4	Not detected
Yuma myotis	*Myotis yumanensis*	-	-	G5, S3	Not detected
Birds					
Bald Eagle	*Haliaeetus leucocephalus*	BGEPA	Tier 2, SC	G4, S1B	Detected in 2022
Barrow's goldeneye	*Bucephala islandica*	-	Tier 2	G5, S2B	Detected in 2022
Black swift	*Cypseloides niger*	USFS	Tier 2	G4, S3	Detected in 2022 (just outside of the Property)
Brewer's sparrow	*Spizella breweri*	USFS	Tier 2	G5, S4	Not Detected
Cassin's finch	*Carpodacus cassinii*	-	Tier 2	G5, S5	Detected in 2022
Flammulated owl	*Otus flammeolus*	USFS	Tier 2	G4, S4	Not Detected
Golden eagle	*Aquila chrysaetos*	BGEPA	Tier 1	G5, S3	Detected in 2022
Lazuli bunting	*Passerina amoena*	-	Tier 2	G5, S5B	Not Detected
Mexican spotted owl	*Strix occidentalis lucida*	FT	Tier 2, ST	G3, S1B	Not Detected
Northern goshawk	*Accipiter gentilis*	USFS	Tier 2	G5, S3B	Not Detected
Olive-sided flycatcher	*Contopus cooperi*	USFS	Tier 2	G4, S3	Detected in 2022
Peregrine falcon	*Falco peregrinus*	-	Tier 2, SC	G4, S2	Detected in 2022
Prairie falcon	*Falco mexicanus*	-	Tier 2	G5, S4	Not Detected
Purple martin	*Progne subis*	USFS	Tier 2	G5, S3B	Not Detected
Virginia's warbler	*Leiothlypis virginiae*	-	Tier 2	G5, S5	Detected in 2022
Western yellow-billed cuckoo	*Coccyzus americanus*	FT	Tier 1 SC	G5, S1B	Not Detected
White-faced ibis	*Plegadis chihi*	-	Tier 2	G5, S2B	Detected in 1983
Reptiles and Amphibians					
Boreal toad	*Anaxyrus boreas*	USFS	Tier 2 SE	G4, S1	Not Detected
Northern leopard frog	*Lithobates pipiens*	USFS	Tier 1 SC	G5, S3	Not Detected
Plateau fence lizard	*Sceloporus tristichus*	-	-	G5, S3	Not detected
Fish					
Colorado River cutthroat trout	*Oncorhynchus clarkii pleuriticus*	USFS	Tier 1 SC	G4, S3	Detected in 2023

Sources: (CPW 2015, 2022b; NatureServe 2022a; Triece et al. 2022; Bakich 2023; Western Biology 2023)

Common Name	Scientific Name	Listing Status			Property Presence
		Fed	CPW	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, SE – State Endangered, ST – State Threatened, SC - State Special Concern, BGEPA – Bald and Golden Eagle Protection Act, USFS WRNF Sensitive.					
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.					
*Species detected during acoustic monitoring surveys and are likely present but cannot be confirmed 100 percent due to methods used.					

Amphibians and Reptiles

In 2022, Adaptation Environmental Services conducted a survey of amphibians, reptiles, and their habitats in the Property (Triece et al. 2022). Although not detected, suitable habitat exists for the sensitive species, plateau lizard, within the Property. Boreal toad is unlikely to occur, due to the elevation of the Property, but potential habitat is present. Northern leopard frog is also possible in the Property, but less likely. No sensitive species were documented in the Property as a result of the 2022 surveys. Information about the three sensitive species that could occur is provided below.

Boreal Toad

Boreal toads (*Anaxyrus boreas*) (G4T1T2Q/S1) can be found in a variety of wetlands, including emergent marshes, kettle ponds, beaver ponds, streams, lakes, reservoirs, and wet meadows, usually in areas surrounded by coniferous forests. Adult individuals are often found in forest openings near water, and breeding occurs primarily in spruce-fir forests and alpine meadows with lakes, marshes, ponds, and bogs present. In Colorado, the species is found between elevations of 7,500 to 12,000 feet (NatureServe 2022b; CPW 2020, 2023a). During winter, boreal toads may travel up to 1.5 miles from breeding and summer habitats to hibernate in areas that do not freeze. Individuals may find safe areas under logs and rocks, in rodent burrows, under large burrows, and in beaver lodges (CPW 2020).

The boreal toad is a Tier 1 Species of Conservation Concern in the State Wildlife Action Plan and is State Endangered (CPW 2015). It is listed as a sensitive species by USDA Forest Service in Rocky Mountain Region (Region 2) and Bureau of Land Management. Threats to boreal toad populations include disease, ultraviolet radiation, environmental toxins, changes to hydrological systems upon which they depend, habitat disturbance. Chytrid fungus has also been found to be a main cause of declines nationally and in the Southern Rocky Mountain population (CPW 2020). Habitat

degradation has been reported from recreation, grazing, and roads creating erosion and subsequent sedimentation of waters used by the species. Climate change is also expected to impact the species by reducing snowpack and creating drier conditions throughout the year that do not support habitats required by the species (CPW 2015, 2020).

Boreal toads were not documented during herptile surveys, although potential habitat exists in the Property. The Property is located at the lower end of the elevational range for the species. The survey report deemed their occurrence in the Property possible, but unlikely. However, because habitat for this species exists in the Property, continued monitoring efforts should occur to assist in finding any populations that may exist in the Property. The Property is in close proximity to historic populations and natural dispersion from these sites to the Property is unlikely (Triece et al. 2022).

Northern Leopard Frog

Northern leopard frogs are green-brown in color with large rounded or oval spots and a pearly white underside (CPW 2017a). From head to vent, their bodies can be up to 4.3 inches in length. They breed from March to June, depending on elevation, in shallow, quiet areas in permanent surface waters or in areas of seasonal flooding close to permanent water bodies. Northern leopard frogs require a variety of habitats to carry out their life cycle. They inhabit the edges of streams, ponds, reservoirs, and small bodies of water, but also forage in upland habitats often considerable distances away from water. In the spring, adults will breed in suitable waterbodies. Adults spend the winter at the bottom of ponds or deep pools (Hammerson 1999).

CNHP ranks the northern leopard frog as G5, S3 (State-ranked vulnerable to extirpation). The species is tracked by CNHP, CPW, the USFS, and the BLM as a species of conservation concern. It is listed as a Species of Greatest Concern by CPW (Tier 1) and as a sensitive species by the USFS Rocky Mountain Region (Region 2) and by the BLM (CPW 2015).

Northern leopard frogs were not documented during herptile surveys, although their existence in the Property was deemed possible. However, habitat for this species exists in the Property and continued monitoring efforts should occur to assist in finding any populations that may exist in the Property (Triece et al. 2022).

Plateau Fence Lizard

The plateau fence lizard (*Sceloporus tristichus*) (G5/S3) occurs throughout central Arizona to southwestern Utah, into western Colorado (east of the San Luis Valley) (COPARC 2014). CPW SAM data shows this lizard's range overlapping entirely with the Property (CPW 2019).

Photo 11. Plateau fence lizard is a sensitive reptile species with potential to occur in the Property.

Source: Barbara Magnuson and Larry Kimball, COPARC

A photo of plateau fence lizard perched on a rock.

This species is relatively small, measuring up to three inches from snout to vent. It has a gray-brown to golden-brown coloration and possesses pointed, keeled, overlapping scales. Typically, individuals of this species exhibit two light stripes on their back and a wide, muted, gray mid-dorsal stripe (New Mexico Herpetological Society 2023). Habitat for the species in Colorado includes canyon walls, hillsides with large boulders, fallen trees, debris, and other material. The species is typically active from April to mid-September or late October (COPARC 2014). It forages on the ground for terrestrial arthropods (New Mexico Herpetological Society 2023).

This species was not documented during herptile surveys, although habitat exists in the Property. The surveys deemed their occurrence in the Property possible. However, because habitat for this species exists in the Property, continued monitoring efforts should occur to assist in finding any populations that may exist in the Property (Triece et al. 2022).

Birds

During the 2022 bird surveys, several sensitive bird species were identified in the Property. Those confirmed to be present are described in more detail below. Several other species have potential to occur in the Property, but have not been documented. CNHP recorded two element occurrences for sensitive bird species in/near the Property: a 2006 occurrence of the black swift (*Cypseloides niger*) just outside the Property and a 1983 element occurrence of white-faced ibis (*Plegadis chihi*) within the Property boundaries. Both of these species are Tier 2 SCGN and tracked by CNHP. Black swift was specifically searched for in the 2022 migratory bird surveys and was not found in the Property. Continued surveys and monitoring efforts should occur in order to further document the bird diversity in the Property.

Bald Eagle

Bald eagles breed and nest in areas with at least some mature forests or riparian areas. Nests are built in tall trees or occasionally on cliff ledges. Access to water resources with active fish populations is key for foraging, as they rely primarily on fish as prey during spring and summer. However, the species may expand their prey base to include small mammals and birds in inland areas. The species has been recorded to nest at elevations up to 8,695 feet. Bald eagles were previously considered only a migrant or winter resident in Colorado, but now actively breed in the state. Nesting and egg-laying begins in February but can be much later at higher elevations. Fledglings have been observed as late as early August in the state. During the winter they congregate around larger rivers and open lakes and reservoirs where they roost in large or small numbers on cottonwoods and conifer snags adjacent to these water bodies (Wickersham 2016a; Audubon 2023).

Bald eagles are listed as a Tier 1 Species of Greatest Conservation Need in the Colorado State Wildlife Action Plan and a species of concern by the State of Colorado (CPW 2015). The species is also protected under the Bald and Golden Eagle Protection Act (BGEPA), administered by the USFWS. Populations of bald eagles has increased since the banning of DDT in 1972. Threats are still present however and include illegal shootings, habitat loss and degradation, electrocutions, lead poisoning and collisions (Wickersham 2016a; Audubon 2023).

CPW SAM data maps a bald eagle winter concentration area over Sweetwater Lake and a winter foraging area along Sweetwater Creek to the north and east of the Property.

Bald eagles were confirmed to be breeding in the Property in 2022, and successfully fledged two eaglets from the nest (Western Biology 2023). The bald eagle nest is located on the south side of the lake, and is only approximately 200 meters from an active peregrine falcon eyrie (Western Biology 2023). The species has been documented to breed in the Property since 2007 (CPW & USFS 2022; Prusse et al. 2022). More information about this nest can be found in the avian inventory report located in the Appendix.

Barrow's Goldeneye

Barrow's goldeneye is a duck species primarily found in remote areas of the northwestern United States. The species breeds from California to Alaska, with Colorado representing the southern-most extent of the breeding range. In Colorado, the species is primarily found near open water lakes with dead or dying trees in close proximity for nesting. Barrow's goldeneye is a cavity nester and uses substrates within 30 meters of water or a wetland area. Most often, they excavate nest cavities in large diameter trees, but may also use crevices in rocky cliffs, nest boxes, tree stumps, marmot burrows, hay lofts, or abandoned corvid nests (Kingery 2016). Barrow's goldeneye feeds by submerging and swimming underwater, but rarely feeds by dabbling in shallow water. In freshwater habitats like Sweetwater Lake, the species primarily consumes insects like dragonfly and caddisfly larvae. The species also eats plant materials, such as pondweeds (Audubon Society 2023).

Photo 12. Barrow's goldeneye is a sensitive bird species documented using the Property in 2022.

Source: Western Biology 2022

A photo of three Barrow's goldeneye ducks on Sweetwater Lake.

This species is listed as a Tier 2 Species of Greatest Conservation Need in the Colorado State Wildlife Action Plan. Threats to the species include oil spills, heavy metal bioaccumulation, logging, and recreation (Kingery 2016). The 2022 avian survey recorded Barrow's goldeneye at Sweetwater Lake as a presumed winter resident (Western Biology 2023).

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 2016a). 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 of Greatest Conservation Need 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 2016a).

Cassin's finch was documented at Sweetwater Lake in the 2022 avian surveys and is listed as a possible breeder within the Sweetwater Lake property (Western Biology 2023).

Golden Eagle

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

Photo 13. A large stick nest that could be used by golden eagles, located on the eastern cliff wall of Turret Creek in the northwest portion of the Property.

Source: Western Biology 2022

A photo of a pile of sticks placed by a raptor on a rock outcropping.

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

During the 2022 avian survey at Sweetwater Lake, the golden eagle was documented to occur and was considered a possible breeder. Golden Eagles were possible breeders in the Property in 2022. There is a possible golden eagle nest complex in the western edge of the Property consisting of three large good-condition stick nests located in the cliff outcrops. One nest is located within the proposed Property boundary, while the other two are approximately 200 feet and 0.5-mile from the Property boundary. At least two of the three nests were inactive or unsuccessful in 2022 but contained fresh greenery on top, which can indicate recent visitation and/or a possible nest attempt (Western Biology 2023). Continued monitoring of these nest locations should occur to confirm the breeding status of the species in the Property.

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).

Photo 14. Olive-sided flycatcher is a sensitive songbird documented in the Property.

Source: Daniel Streiffert

A photo of an olive-sided flycatcher perched on a branch.

Olive-sided flycatchers are a Tier 2 Species of Greatest Conservation Need under the Colorado State Wildlife Action Plan (CPW 2015). 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).

During the 2022 avian survey, the olive-sided flycatcher's presence was confirmed inside the Sweetwater Lake property boundaries, and is listed as a possible breeder. Four individuals representing two possible pairs were confirmed in the southwest corner of Property during peak passerine breeding season. The birds were detected in suitable breeding habitat in the open aspen woodlands ecotone with mixed-conifer woodlands, which occurs on USFS

lands and the proposed Property boundary (Western Biology 2023).

Peregrine Falcon

Peregrine falcons (*Falco peregrinus*) can be found in a variety of habitats around the world, including mountains, forests, cities, valleys, deserts, and coastlines, and can travel long distances to get from their wintering grounds to their breeding grounds. They primarily eat other birds, with around 450 North American species documented as prey and potentially as many as 2,000 worldwide. They can also eat bats and occasionally steal prey from other raptors. Falcons typically nest on high cliffs, sometimes up to 1,300 feet high, and have clutches of two to five eggs which incubate for 29 to 32 days (NWF 2022).

Peregrine falcons are a Tier 2 Species of Greatest Conservation Need under the Colorado State Wildlife Action Plan (CPW 2015), and are tracked by CNHP (G4T4/S2B). Peregrine falcons were at risk of being locally extinct in the United States and Canada due to the use of the pesticide DDT in the middle of the 20th century. DDT made its way into the food chain, causing the thinning of eggshells and preventing offspring from developing. Since the banning of DDT in the 1970s, peregrine falcons have steadily increased and are no longer federally listed as endangered (NWF 2022).

Photo 15. A peregrine falcon seen in the Property during the 2022 avian inventory.

Source: Western Biology 2022

A photo of peregrine falcon perched on orange rocks located in the Property.

According to CPW SAM data, there have historically been peregrine falcons nesting in the cliffsides at Sweetwater Lake. The 2022 avian survey documented peregrine falcons to be breeding in the Property in 2022 (Western Biology 2023). The Sweetwater peregrines may change their nest scrape location annually, but they consistently nest along the cliff band on the southwest side of Sweetwater Lake. An eyrie was located in the north-facing cliff on the south side of the lake and successfully fledged three

young in 2022 (Western Biology 2023). In 2021 and 2022, the eyrie was located within approximately 200 meters of an active Bald Eagle nest, which is unique. The Property's cliffs support excellent falcon nesting habitat. A territorial peregrine falcon was also observed in 2022 in the upper Sweetwater Creek drainage approximately one mile west of the proposed Property boundary; this territorial bird may have been an adult from the known eyrie at the lake or may indicate an additional neighboring pair (Western Biology 2023).

Virginia's Warbler

In Colorado, Virginia's warblers (*Leiothlypis virginiae*) prefer shrublands and scrub forests along the slopes of mesas, ravines, and mountain valleys. Typical breeding habitats include pinyon-juniper or oak woodlands with occurrences of mountain mahogany and serviceberry. Nest sites are located in partly open habitat with drought-tolerant deciduous shrubs. Migrants arrive in Colorado during the last third of April and depart for fall migration by mid-August to early October. Virginia's warbler breeds in Colorado from May through June. They have a small breeding range, mainly in the Four Corners states of Colorado, Utah, New Mexico, and Arizona. They nest on the ground and favor dense shrublands for concealment (NatureServe 2022a).

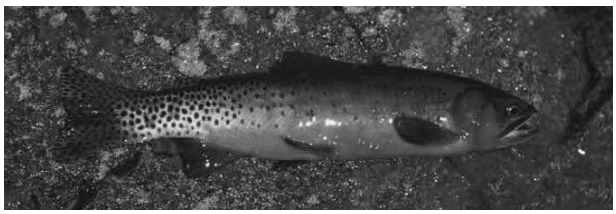
Virginia's warbler is listed as a Tier 2 Species of Greatest Conservation Need in the State Wildlife Action Plan due to habitat degradation and predation (CPW 2015). From 1966 to 2002, populations were considered to be declining nationwide. Although they are currently classified as stable in Colorado, Virginia's warbler is considered by Audubon to have declining populations. Increased drought frequency and intensity are predicted to continue to stress populations over the coming decades. Additionally, the Colorado Breeding Bird Atlas documented brown-headed cowbird parasitism affecting some pairs in Colorado (NatureServe 2022a).

Virginia's warblers were documented in in the Property during 2022 bird surveys (Western Biology 2023). The varied terrain and scrub-shrub habitat in the Property provide excellent foraging and nesting habitat for the species

Fish

Only one sensitive species, the Colorado River cutthroat trout, has been positively detected in the Property (Bakich 2023). More information about the species is provided below.

Photo 16. Colorado River cutthroat trout is a sensitive fish species that occasionally is found in Sweetwater Lake.



Source: CPW

A photo of a red and yellow Colorado cutthroat trout on a rock.

Colorado River Cutthroat Trout

Colorado River cutthroat trout are one of three native cutthroat trout subspecies found in the state of Colorado (CPW 2023b). Historically, the species was widespread in the Colorado River drainage in Colorado, Utah, and Wyoming. However, non-native fish species introductions over the past 100 years has severely impacted the species' population. The species is listed as a Tier 1 Species of Greatest Conservation Need in the SWAP and a species of special concern by

the State of Colorado. In 2006, Colorado, Utah, and Wyoming state wildlife agencies formed the Conservation Agreement for Colorado River Cutthroat in order to coordinate conservation efforts for the species that crosses state boundaries in riverine habitats. The states still work together to conserve the species and reduce or eliminate threats that that the species faces (CPW 2023b).

Colorado River Cutthroat Trout are present in the Sweetwater Creek headwaters. Periodically, some cutthroat trout will make it down to Sweetwater Lake. In the watershed, the populations are supplemented by recreational fish plants by CPW. In Sweetwater Lake, these fish would be considered a novel recreational opportunity and are managed for harvest through fishing regulations (Bakich 2023).

Mammals

A total of seven sensitive mammal species have been positively detected in the Property, including one shrew and six bat species, and numerous other mammals have the potential to occur (**Table 6)**. Dwarf shrew was identified during small mammal trapping efforts conducted in 2022 (Siemers & Unrein 2022). Although not detected, suitable habitat exists for several sensitive mammal species in the Property, including Canada lynx. Pygmy shrew surveys were conducted in 2022, and no individuals were captured. It was determined that due to the elevation at the Property and a lack of habitat present, the species is unlikely to occur. However, the sensitive species, dwarf shrew was detected during the surveys (Siemers & Unrein 2022). Bat surveys confirmed the presence of six sensitive bats, which are described in more detail in following sections (CPW 2022b; Siemers & Unrein 2022). Numerous other sensitive bat species have the potential to occur in the Property based on range and habitat available and are listed in **Table 6**.

Photo 17. Habitat for Canada lynx, a federally-protected species, is present in the Property.

Source: CPW

A photo of a Canada lynx walking in a snowy forest.

Canada Lynx

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 2023a).

Lynx is listed as Federally Threatened under ESA, State Endangered, and is a Tier 1 Species of Greatest Conservation Need in the State Wildlife Action Plan (CPW 2015). CPW data shows that the predictive summer and winter habitat mapping overlaps with parts of the Property. Additionally, CPW SAM data for snowshoe hare, which is the biggest prey source for Canada lynx,

overlaps with the Property. Habitat is likely present in the small areas of Douglas-fir forest and willow-dominated mountain stream corridors found within the Property. More habitat is present outside of the Property boundaries, in the vast USFS lands that surround the Property. The species has not been documented in the Property, but could occur.

Dwarf Shrew

Dwarf shrew is a small shrew found from Montana and South Dakota to Arizona and New Mexico. In Colorado, the species is found at elevations above 5,500 feet along the Southern Rocky Mountain range in the central and western parts of the state (Armstrong, et al. 2011). Very little is known about the ecology and life history of the species in the state. The species has been documented in a variety of habitats in the state, including the edges of alpine and subalpine rockslides, spruce-fir bogs, coniferous forests, sedge marsh, open woodland, and dry, brushy hillsides. The species is thought to tolerate arid conditions, and has been trapped up to 0.5 miles from the nearest water source. Dwarf shrew have been documented to feed on insects, spiders, and carrion. Breeding has been documented to occur in June and July in alpine and subalpine areas (Armstrong, et al. 2011).

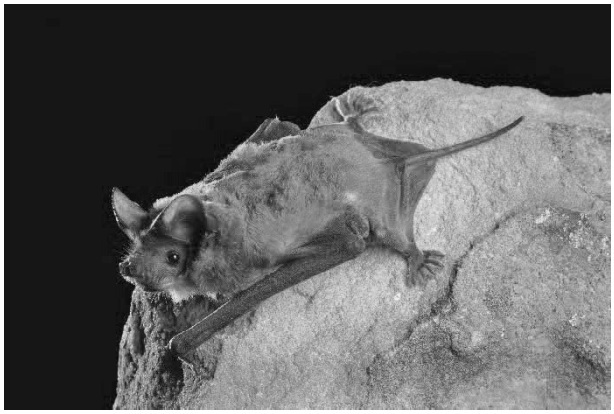
Dwarf shrew is listed as a Tier 2 Species of Greatest Conservation Need in the State Wildlife Action Plan, due to a lack of information from research and monitoring efforts (CPW 2015). CPW SAM data maps the species' overall range overlapping with the entire Property. CNHP trapping efforts in 2022 collected six individuals from four sites within Property boundaries (Siemers & Unrein 2022).

Bats

Brazilian Free-tailed Bat

The Brazilian free-tailed bat (*Tadarida brasiliensis*) (G5/S1) is characterized by its brownish-gray fur and elongated, pointed wings (Navo et al. 2018). They are also known for their unique, "free-tail" appendage, which is longer than their body, and is visible as they fly. These bats are typically found in a range of habitats, including caves, mines, bridges, and buildings. They are known to roost in large colonies that can number in the thousands, and are often found in areas where insects, their primary food source, are abundant (Navo et al. 2018).

Photo 18. Brazilian free-tailed bat is species of conservation concern detected during 2022 bat acoustic surveys in the Property.



Source: CPW

A photo of a Brazilian free-tailed bat perched on an orange rock.

Brazilian Free-tailed Bats are known to migrate long distances, with some individuals traveling over 2,000 km in a single migration (Navo et al. 2018). Females typically give birth to a single pup in late spring or early summer. Pups are born blind

and hairless, and are dependent on their mothers for nourishment until they are old enough to fly and forage for food on their own (Navo et al. 2018).

Brazilian free-tailed bats are listed as critically imperiled in the state by CNHP. Threats to this species include large water impoundments that may flood rock crevices and cliffs used for roosting and recreational climbing disturbing maternity colonies (Navo et al. 2018).

Brazilian free-tailed bat was detected with high confidence on the 2022 acoustic bat monitoring surveys conducted by CPW Resource Stewardship. Most detections were in aspen forest/riparian canyon habitat point (CPW 2022b).

California Myotis

The California myotis (*Myotis californicus*) (G5/S3) is widely distributed in western North America, and is commonly found in desert scrub habitats but may also occur in oak and ponderosa pine woodlands. This species commonly roosts beneath loose bark and in crevices of dying trees. Small maternity colonies are often found in cliffs, buildings, and bridges. Roosts are typically found in proximity to feeding areas, where the species forages for very small insects (BCI 2023a).

The California myotis is not listed in the State Wildlife Action Plan but is considered vulnerable in the state of Colorado (CPW 2015). The species is not known to experience significant mortality from turbines at wind energy facilities, and it is not affected by white-nose syndrome (NatureServe 2022).

This bat was documented at Sweetwater Lake in the 2022 acoustic bat surveys conducted by CPW and CNHP biologists (CPW 2022b; Siemers & Unrein 2022). During the CPW surveys, most detections were noted in the aspen forest/riparian canyon and wet meadow/willow carr point locations (CPW 2022b).

Photo 19. Hoary bat is species of conservation concern detected during 2022 bat acoustic surveys in the Property.

Source: CPW

A close up photo of a hoary bat.

Hoary Bat

Hoary bats (*Lasiurus cinereus*) (G3/S3B) have the largest range of any bats in North America and can be found from Canada, southward through Mexico and into Guatemala. The species is often associated with forested habitats throughout its range in North America. In Colorado, the species is found throughout much of the state from low elevation canyonlands and grasslands to montane coniferous forests. Hoary bats roost at the ends of branches in foliage of deciduous and coniferous trees in edge habitats. Hoary bats may also use caves, rock ledges, woodpecker holes, or buildings as roosting locations. Research suggests the species migrates from Colorado to winter hibernacula in California and Mexico. Hoary bats are usually solitary but may form flocks

in late summer and fall. Mating occurs in late summer and early fall. Females give birth to one to four pups from May through July in areas east of the Rocky Mountains, although some females rear young in Colorado. The species prefers to eat moths but may also eat other insects such as grasshoppers, beetles, flies, termites, dragonflies, and wasps (Navo et al. 2018; CBWG 2021).

Hoary bat is listed as a Tier 2 Species of Greatest Conservation Concern in the State Wildlife Action Plan and is also considered USFS sensitive. The State Wildlife Action Plan cites renewable energy and wind turbines, loss of roost sites due to beetle kill, and WNS as the primary threats to the species (CPW 2015). More information about WNS is located in the Wildlife Disease Section.

This bat was documented at Sweetwater Lake in the 2022 acoustic bat surveys conducted by CPW and CNHP biologists (CPW 2022b; Siemers & Unrein 2022). During the CPW surveys, most detections were noted in the mixed conifer/scrub oak point location (CPW 2022b).

Little Brown Myotis

The little brown myotis (*Myotis lucifugus*) (G3/G5) is commonly found throughout forested areas of the United States, extending as far north as Alaska and ranging from Alaska to Labrador and Newfoundland in Canada. It can be found in a variety of forest habitats in the West, including montane and riparian areas, xeric-scrub, aspen meadows, and coniferous rain forests. This species is known to associate with humans, often forming nursery colonies containing hundreds or even thousands of individuals in man-made structures such as buildings and attics (BCI 2022). Little brown myotis rely on roosts that provide safety from predators while being close to foraging grounds. They commonly forage over water, consuming aquatic insects such as mayflies, midges, mosquitoes, and caddisflies. In addition to water sources, they feed over other open areas, such as trails, cliff faces, meadows, and farmland (BCI 2022).

The little brown myotis is a State Wildlife Action Plan Tier 1 Species of Greatest Conservation Concern and is Petitioned for listing under the Endangered Species Act (CPW 2015).The primary danger to the little brown myotis is WNS, which attacks bats during hibernation and has killed over a million little brown myotis since its discovery in 2006 (NatureServe 2022). More information about WNS is located in the Wildlife Disease Section. The little brown myotis also faces threats from wind energy facilities, pesticides and other contaminants, deforestation, use of cyanide in mining, and destruction of caves and shafts (NatureServe 2022).

This bat was documented at Sweetwater Lake in the 2022 acoustic bat surveys conducted by CPW and CNHP biologists (CPW 2022b; Siemers & Unrein 2022). During the CPW surveys, most detections were noted in the aspen forest/riparian canyon and mixed conifer/scrub oak point locations (CPW 2022b).

Silver-haired Bat

The silver-haired bat has black or dark brown silver-tipped hairs, short and rounded ears with a blunt tragus, and a partially furred interfemoral membrane on the dorsal surface (Navo et al. 2018). Silver-haired bats are known for their solitary behavior and tend to roost alone during the day in tree hollows or under loose bark. They are primarily active at night, emerging at dusk to forage for insects such as moths, beetles, and flies. Their echolocation calls are high-pitched and rapid, allowing them to detect and locate prey in the dark. Females give birth to a single pup in May or

June, after a gestation period of approximately 50 to 60 days. The pups are born naked and blind and rely on their mother's milk for nourishment.

The silver-haired bat is not listed in the State Wildlife Action Plan but is considered rare or uncommon in the state of Colorado (CPW 2015). Threats to this species include habitat loss, pesticide use, and wind turbine collisions. Conservation efforts to protect bat populations often focus on preserving roosting and foraging habitats and minimizing human disturbance to these areas (Navo et al. 2018).

This bat was documented at Sweetwater Lake in the 2022 acoustic bat surveys conducted by CPW and CNHP biologists (CPW 2022b; Siemers & Unrein 2022). During the CPW surveys, most detections were noted in the mixed conifer/scrub oak point location (CPW 2022b).

Townsend's Big-eared Bat

Townsend's big-eared bats (*Corynorhinus townsendii pallescens*) (G3G4/S2) are distributed throughout western North America, ranging from British Columbia to Oaxaca, Mexico. In Colorado, the species can be found along the Front Range, southern areas, and the canyon regions of the Western Slope. They are believed to hibernate in Colorado from late October until March (CPW 2022b). These bats typically inhabit arid western desert scrub and pine forest regions and hunt moths and other insects using echolocation. During the spring and summer, female bats form maternity colonies in mines, caves, or buildings, while male bats roost individually. In the winter, they hibernate in caves and abandoned mines. These bats are highly sensitive to disturbance at their roosting sites and have experienced significant population declines throughout much of the United States (BCI 2023b).

Photo 20. Townsend's big-eared bat is species of conservation concern detected during 2022 bat acoustic surveys in the Property.

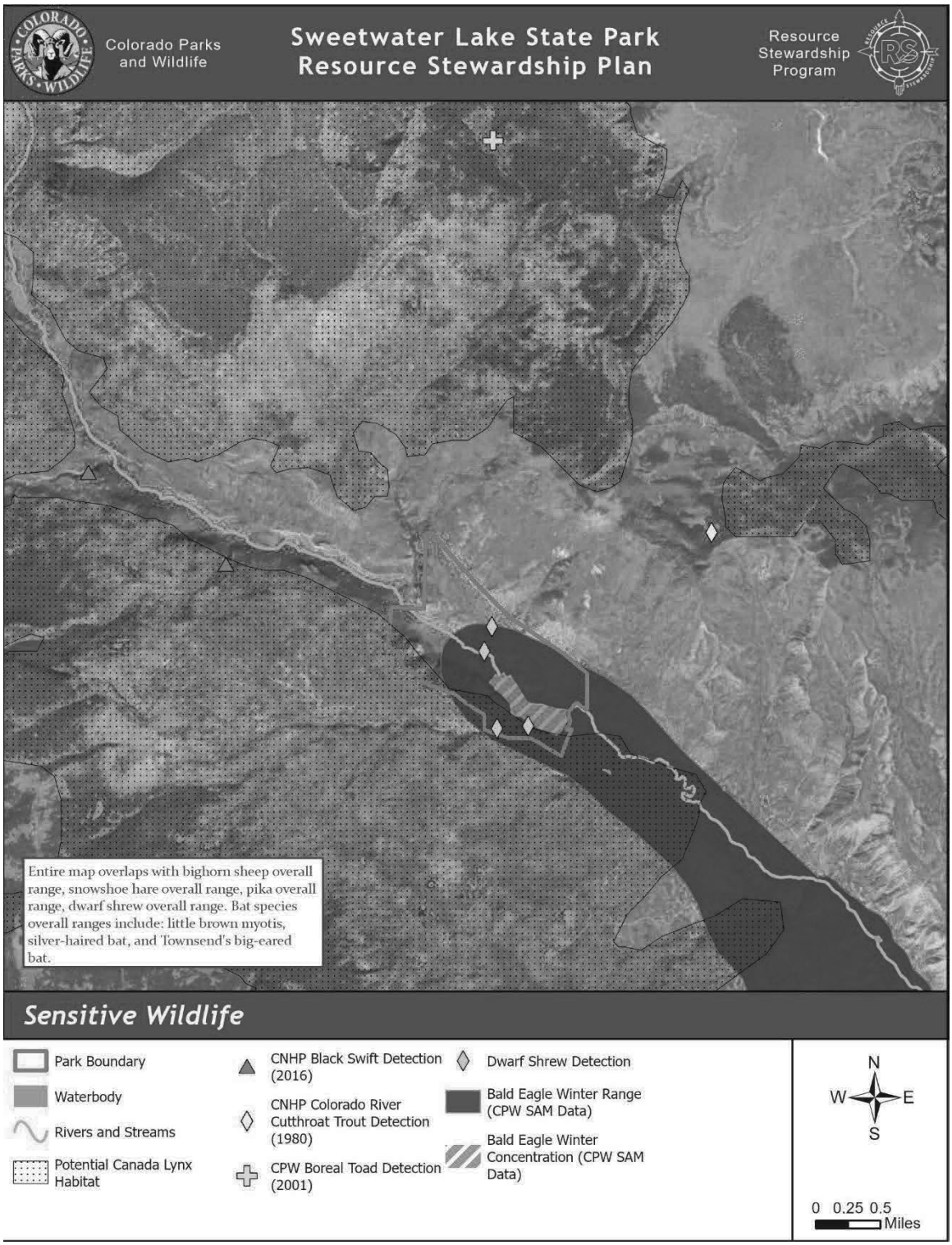
Source: CPW

A close-up photo of a Townsend's big-eared bat being held by a person wearing a yellow glove.

Townsend's big-eared bat is a State Wildlife Action Plan Tier 1 Species of Greatest Conservation Concern. Threats to Townsend's big-eared bats in Colorado include the loss of roosting habitat due to mining activities, human disturbance to roosting and maternity roosting sites, and improper gate closure and installation (CPW 2015).

Townsend's big-eared bat was detected with high confidence on the 2022 acoustic bat monitoring surveys conducted by CPW Resource Stewardship. Most detections were in aspen forest/riparian canyon habitat point (CPW 2022b).

Figure 5. Sensitive Wildlife Species Map.



Resource Conditions

Sensitive wildlife populations at the Sweetwater Lake Property are in excellent condition. The Property boundaries encompass a small area, but a diverse range of habitat types. Many ecological niches are present within the steep, rugged terrain and an array of vegetative communities. Surveys conducted by CPW and partners in the past have uncovered a wide variety of species present on the Property.

Bird surveys performed from 2022 and observations from other surveys confirmed the presence of eight sensitive species, some of which include golden eagle, bald eagle, Barrow's goldeneye, and Virginia's warbler. The Property provides ample raptor nesting habitat with large rock outcrops and mature trees. Acoustic bat surveys conducted in the past five years found that six sensitive bat species are utilizing the forest, grassland, shrubland, rock outcrop, and open water habitats. The little brown myotis has been documented in the Property and is listed as a State Wildlife Action Plan Tier 1 Species of Greatest Conservation Concern and is Petitioned for listing under the Endangered Species Act. Threats to sensitive wildlife resource conditions are similar to those posed to general wildlife and are discussed in the General Wildlife Resource Conditions Section.

Table 7. List of Sensitive Wildlife Resource Conditions at the Sweetwater Lake Property.

Resource	Condition / Status	Description
Bats		Acoustic surveys found that six sensitive bat species are present in the Property. Ample roosting and foraging habitat are present in the Property including coniferous and deciduous woodlands, caves, rock crevices and outcrops. Protection of these areas, especially during maternal roosting season, should occur to reduce disturbance to bat species.
Birds		The Property was documented to have high bird diversity and abundance. Several sensitive raptor species have been documented to nest in mature trees and rock outcrops present. Protection of important nesting areas from human disturbance will help to ensure the continued presence of these resources.
Mammals		The sensitive dwarf shrew was documented in the Property in 2022. Several other sensitive mammals could occur in the Property and more surveys for these species could be completed in order to better understand mammal populations.
Herptiles		Although not detected, potential suitable habitat exists for boreal toad, northern leopard frog, and plateau fence lizard. Wetland habitats are sensitive areas, subject to change easily and are threatened by grazing, fluctuating water levels, and noxious weed species. Monitoring and habitat enhancement efforts may help improve the condition of habitat that can be used by sensitive amphibian species.

Resource	Condition / Status	Description
Invertebrates		No surveys have been conducted for invertebrates, so it is difficult to know the status of this taxa. Pollinator habitat improvements could be made to increase habitat availability and focused monitoring/survey efforts could be completed to gain a better understanding of species present.

Discussion and Conclusions

The Property is anticipated to be a popular recreational destination as more trails are open to the public. High visitation leads to more social trails, more noxious weeds, higher impacts on riparian areas, and increased disturbance to wildlife. Wetland and riparian habitats are extremely important to several of the sensitive wildlife species that have been documented to occur at the Property, including Barrow's goldeneye, peregrine falcon, and bald eagle. Increased visitor use at the Property must be mitigated with intentional management strategies if habitat is to be preserved.

Consistent monitoring and management programs for sensitive wildlife species and their habitats will afford a greater understanding of habitat use and shortcomings in the Property. Several surveys have been conducted in the past five years and continuing such surveys and regular monitoring is important to identify sensitive species population and occurrence changes over time, and to identify any disturbances to natural resources that need further protection. Several surveys are recommended for the future in order to document the presence of species in the Property and are outlined in the Resource Surveys and Monitoring Efforts Section.

Vegetation

Resource Summary

Significant Features

- Harrington's beardtongue is a Colorado-endemic vascular plant that is only found in a limited area within the Colorado River drainage in northwestern Colorado. Five populations of over 300 individuals were counted in 2022 in the Property in sagebrush habitats.
- A total of nine CNHP-tracked sensitive communities at the Property are located in upland shrublands, wet shrublands, conifer forests, and rock outcrops.
- Extensive wetland and riparian areas serve many important physical and biological functions. These areas provide prime bird nesting habitat, contribute to healthy stream ecology, and protect stream banks during runoff season and flooding events.

Threats

- Noxious Weeds - The presence of noxious weeds in certain areas of the Property is of concern due to their known ability to displace the native vegetation, reduce biodiversity, and degrade wildlife habitat.
- Visitation and Development - Social trails trample native vegetative communities, cause erosion, and spread noxious weeds. If poorly planned, infrastructure development can directly destroy vegetative communities and create disturbances that encourage weed invasion.
- Wildfire Intensity – Fire is a natural cycle for the landscape in the Uncompahgre River Valley. However, historic wildfire suppression over the past 120 years has reduced the frequency and increased the intensity of wildfire in the landscape. The resulting high density of timber in the Property is such that it invites disease, insect infestations, and catastrophic wildfire. These large scale, high-intensity wildfires can clear all vegetation to lay bare highly erosive soils.

Vegetation Communities

Description

The vegetation at the Sweetwater Lake Property exemplifies the diversity of vegetation types found in Colorado's Southern Rocky Mountain ecoregion within the eastern half of Garfield County. Within the area, complex geology, dramatic changes in elevation, and fluctuating topography create a landscape that fosters a rich array of vegetation communities and plant species (Malone et al. 2016). Soils and climate highly influence plant community types present, and both factors are highly variable

and unique in the area. This landscape characteristic results in an equally unique suite of vegetation and plant associations found within the Property (Malone et al. 2016).

The dominant vegetation communities in the Property include sagebrush shrublands, Gambel oak woodlands, coniferous forests, and riparian and wetland communities. Wetland and riparian communities surround Sweetwater Lake and Sweetwater Creek within the Property and contain a high diversity of plants, some of which include water birch (*Betula occidentalis*), Rio Grande cottonwood (*Populus deltoides ssp. wislizeni*), numerous willow species (*Salix* spp.), alder (*Alnus incana*), cattails (*Typha* sp.), sedges, and rushes. The upland areas present on the rolling hills moving up in elevation contain ecologically-valuable mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*) mixed with antelope bitterbrush (*Purshia tridentata*) and a diversity of forb and graminoid species. Shrubby hillsides, containing Gambel oak (*Quercus gambleii*), mountain mahogany (*Cercocarpus montanus*), and serviceberry (*Amelanchier* spp.) are present at higher elevations. Coniferous forests are present often on cooler, north-facing slopes on the westside of Sweetwater Lake and are primarily composed of Douglas-fir (*Pseudotsuga menziesii*).

The west side of Sweetwater Lake contains largely undisturbed habitats, with a low-use recreational trail present that allows hiking and horseback riding. Ecosystems present in this area are relatively intact and low levels of disturbances, such as noxious weeds and vegetation trampling, are present (CNHP 2022). The east side of Sweetwater Lake provides most of the recreational opportunities for visitors and historic grazing activity, and therefore has seen impacts from land use. Vegetation communities in this area have been compromised by human impacts to soils, vegetation species composition, and hydrology (CNHP 2022).

Photo 21. Overview of the landscape and vegetation communities at the Sweetwater Lake Property.

Source: Western Biology 2022

A photo of Sweetwater Lake surrounded by rock outcroppings, coniferous forest, and emergent wetlands on a sunny day.

Knowledge of vegetation communities and conditions that are present in the Property 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 Sweetwater Lake Property. **Table 8** 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 Property based on these efforts. **Chapter 5** discusses future survey and monitoring effort needs for the Property based on those that have been conducted.

Table 8. List of Surveys and Monitoring Conducted for Vegetation at the Sweetwater Lake Property.

Resource	Description	Years	Performed by
Vegetation Communities Mapping and Condition Assessment	Vegetation communities were mapped according to the NVC and condition was assessed.	2022	CNHP
Noxious Weed Management Plan	The Property was assessed for weed populations and treatments were recommended.	2022	CPW Resource Stewardship

A total of 17 vegetation community Alliances (classified according to the 2008 National Vegetation Classification [NVC] system) were identified in the Sweetwater Lake Property. Only about 75 percent of the Property, mostly around the lake, was mapped, and therefore it should be noted that other community Alliances may exist in the Property that are not listed here (CNHP 2022). **Figure 6** shows the layout of the vegetation community Alliances found within the Property. Brief descriptions of each vegetation community Alliance found in the Property are included in sections following, and more information is available in the full report, located in the Appendix.

A3207 Spiked Big Sagebrush - Mountain Big Sagebrush Steppe

This Alliance is widespread in mountainous areas across the western U.S. and is characterized by a moderate to dense shrub layer in which mountain big sagebrush (*Artemisia tridentata ssp. vaseyana*) or spiked big sagebrush (*Artemisia tridentata ssp. spiciformis*) dominates. If other shrubs are present, they have low cover and do not codominate. Stands form large, continuous stands on mid-elevation mountain slopes and foothills, and can extend above the lower treeline as patches within montane or subalpine coniferous forests (USGS 2022). This community was mapped at low to mid-level elevations in the Property to the north / northeast and south of Sweetwater Lake (CNHP 2022).

A3208 Mountain Big Sagebrush - Mixed Steppe & Shrubland

This Alliance is widespread in mountainous areas across the western U.S. The vegetation is characterized by a moderate to dense shrub layer in which mountain big sagebrush is codominant with non-sagebrush shrub species Utah serviceberry (*Amelanchier utahensis*), mountain spray (*Holodiscus dumosus*), antelope bitterbrush,

or mountain snowberry (*Symphoricarpos oreophilus*). Perennial graminoids typically dominate the open to moderately dense herbaceous layer. This Alliance forms large, continuous stands on mid-elevation mountain slopes and foothills, and can extend above the lower treeline as patches within montane or subalpine coniferous forests (USGS 2022). This community was mapped at low to mid-level elevations in the Property to the north / northeast and south of Sweetwater Lake, and to the east, near the main parking lot and campground (CNHP 2022).

A3254 Western Ruderal Perennial Grassland

Dominant diagnostic species for this Alliance are invasive, perennial grass species such as crested wheatgrass (*Agropyron cristatum*), meadow foxtail *(Alopecurus pratensis),* orchardgrass *(Dactylis glomerata),* timothy *(Phleum pratense),* Kentucky bluegrass *(Poa pratensis),* Russian wildrye *(Psathyrostachys juncea)*, and many others (USGS 2022). This community was mapped at lower elevations in the Property to the north / northeast of Sweetwater Lake in areas previously disturbed from development and grazing activities (CNHP 2022).

Photo 22. Ruderal grasslands present to the north of Sweetwater Lake and are used for horse grazing.

Source: Western Biology 2022

A photo of horses grazing in a pasture at the Sweetwater Lake Property.

A3454 Southern Rocky Mountain Douglas-fir Forest & Woodland

In this Alliance, canopies are dominated or codominated by Douglas-fir (*Pseudotsuga menziesii*) in association with other conifer species. These forests and woodlands are distinguished from other Douglas-fir Alliances in having a species composition that is more associated with the southern Rocky Mountains (USGS 2022). In the Property, these forests are located along north-facing slopes near Lake Creek and unnamed drainages, bordered primarily by Gambel oak or sagebrush shrubland communities. Stands in the Property consist mostly of young to mid-aged trees and have little to no old-growth (CNHP 2022).

A3732 Utah Serviceberry - Mountain-mahogany Shrubland

These mixed montane shrublands are typically dominated by Utah serviceberry, mountain mahogany, or occasionally little leaf mountain mahogany (*Cercocarpus intricatus)*. Shrub cover may be sparse to moderate. These shrublands may be either codominated by other shrub species or have sparse to dense understories of graminoids. Tree may be present, but are scattered and have low cover (USGS 2022). This Alliance was identified in a small area on the south-facing hillslope north of the lake. This community in the Property is dominated by multiple age classes of mountain-mahogany. Bluebunch wheatgrass (*Pseudoroegneria spicata*) dominates the understory along with a mixed forb cover consisting of several dominant species (CNHP 2022).

A3735 Gambel Oak - Mountain Snowberry Shrubland

Temperate cold-deciduous shrublands 1-2 m tall dominated or codominated by Gambel oak (*Quercus gambelii)* in association with other mid- elevation shrubs. Understories are sparse to dense and typically grass- or sedge-dominated (USGS 2022).

Community structure is complex and characterized by upper, mid and low shrub layers with diverse species composition, with the upper shrub canopy being dominated by Gambel oak and the lower shrub canopy is characterized by mountain big sagebrush. Additional shrub species in the lower layer include mountain snowberry and rubber rabbitbrush (*Ericameria nauseosus*). Herbaceous cover varies and is characterized by a mix of graminoids and forbs. This community was mapped in large areas to the north, south, and east of Sweetwater Lake within the Property (CNHP 2022).

Photo 23. Overview of some of the montane shrubland habitats that include Gambel oak and mountain mahogany present in the Property.

Source: CPW

A photo of rolling hills covered by shrubby, green vegetation and tan exposed soils in the Sweetwater Lake Property.

A3740 Rocky Mountain Indian-parsley - Rockspirea - Raspberry Cliff, Scree & Rock

This Alliance is characterized by perennial forb, shrub and graminoid vegetation of rock, scree and cliff areas of the Colorado and Wyoming Rocky Mountains. Sites have little to no soil development which promotes sparse vegetation cover. Most of the unvegetated surface is barren rock (USGS 2022). In the Property, habitat is characterized by natural vegetation with an even distribution of age-classes, species interactions and natural processes occurring across many communities; however, the surrounding landscape is fragmented by roads and includes partially disturbed natural or semi-natural communities. This community was mapped on the south side of Sweetwater Lake (CNHP 2022).

Photo 24. Cliff habitat and associated vegetation communities present in the Property.

Source: CPW

A photo of tan and white rocky outcrops with scattered shrubby, green vegetation.

A3759 Narrowleaf Cottonwood Riparian Forest

This Alliance consists of riparian woodlands dominated by narrowleaf cottonwood alone or codominated with other deciduous or coniferous trees. It occurs on narrow stream terraces and large floodplains in the Rocky Mountains of Montana, Idaho, Wyoming, Utah, Colorado and New Mexico. It is also found in the mountains of eastern Oregon, Nevada, California's Sierra Nevada, and the highlands of Arizona. Elevations range from 1200-2750 m (4,000-9,000 feet) (USGS 2022).

A3769 Western Montane Tall Willow Wet Shrubland

This Alliance is characterized by dominance or codominance (>5% relative cover) of one or more of several montane willow species present in the western US (USGS 2022).

In the Property, species composition within the occurrence is primarily native species with a diverse physiognomic structure and all age classes of *Salix* species present with an even distribution. Bebb's willow (*Salix bebbiana*) dominates the upper shrub canopy; mid shrub canopy is a mix of *Salix* species including coyote willow (*Salix exigua),* park willow *(Salix monticola),* and dusky willow (*Salix melanopsis*); the herbaceous layer is sparse to dense and dominated by graminoids including beaked sedge (*Carex utriculata),* water sedge *(Carex aquatilis),* redtop *(Agrostis gigantea),* and smooth brome (*Bromus inermis).* Adjacent habitat is altered and dominated by non-native species which threaten to invade this community. This willow shrubland has been reduced in size by anthropogenic development (CNHP 2022).

A3771 Gray Alder – Green Alder Wet Shrubland

Vegetation types within this riparian tall (>1.5 m) shrubland Alliance typically occur adjacent to streams and in mountain meadows at moderate to high-elevation (1,200-3,000 m) riparian habitats of the northern Rocky Mountains and Cascade Range where deep snow accumulations are common. Landforms associated with this alliance are streambanks, alluvial bars, and floodplains. Gray alder (*Alnus incana*) or green alder (*Alnus viridis ssp. sinuata*) forms a dense canopy with at least 90 percent cover (USGS 2022). In the Property, gray alder dominates the upper shrub layer; Drummond's willow (S*alix drummondiana*) characterizes the mid shrub layer; the lower shrub layer is characterized by red-osier dogwood (CNHP 2022).

A3772 Western Water Birch Wet Shrubland

In this Alliance, water birch (*Betula occidentalis*) forms a dense, closed canopy with cover up to 95 percent. The shrub layer may also include gray alder, mountain big sagebrush, red-osier dogwood, Wood's rose *(Rosa woodsii),* willows, and many other species. Due to the dense shrub canopy, herbaceous undergrowth is usually limited (USGS 2022). In the Property, this community was mapped in large areas to the northwest and northeast of Sweetwater Lake. Species composition is primarily of native species with a diverse physiognomic structure. Water birch dominates the upper shrub; a mid-shrub layer is characterized by Drummond's willow and water birch; and a lower shrub layer is characterized by a mix of red-osier dogwood and Wood's; herbaceous cover is characteristically sparse with a mx of graminoids and forbs. Shrub components have naturally high cover with all age classes present in an even distribution. Native herbaceous cover is only slightly diminished by invasion of reed canarygrass (*Phalaris arundinacea*) in isolated patches (CNHP 2022).

A3800 Narrowleaf Willow - Dewystem Willow Shrubland

This community is dominanted by coyote willow, sandbar willow *(Salix interior),* bluestem willow *(Salix irrorata),* and/or dusky willow. It is typically a monotypic stand with some herbaceous understory; however, other shrubs and trees can be present (USGS 2022). This Alliance was identified in the Property along the south and eastern edges of the lake. Shrub cover is characterized by a dense shrub dominated by coyoted willow but that also includes other native riparian shrub species in bands of vegetation structured along the soil moisture gradient (CNHP 2022).

Photo 25. Dense willow shrublands, dominated by coyote willow, that line the periphery of Sweetwater Lake.

Source: Western Biology 2022

A photo of leafless, shrubby willows and a dirt path leading to Sweetwater Lake with rocky hillsides in the background.

A3846 Western Ruderal Reed Canarygrass Marsh

This herbaceous alliance covers stands dominated by reed canarygrass, which tends to occur in monocultures. Stands are found along riparian areas, pond and lake margins, wet meadows, and intermittent drainages, and is known from throughout the western U.S. (USGS 2022). This ruderal community was found where Sweetwater Creek flows into the lake. Reed canarygrass is a non-native invasive species that has formed expansive monocultures on several sites at the Sweetwater Lake Property, completely displacing native plants as well as altering ecosystem structure, productivity, flooding regimes and soil nutrient properties (CNHP 2022).

A3848 Ruderal Kentucky Bluegrass - Redtop - Creeping Bentgrass Marsh

This Alliance includes grasslands dominated by introduced grasses such as *redtop, Agrostis stolonifera,* meadow foxtail, or Kentucky bluegrass, and is a very common and widespread in the western U.S. where it has invaded natural meadows, wetlands and riparian areas (USGS 2022). This ruderal community was found where Sweetwater Creek flows into the lake. This Alliance has invaded a large natural wetland meadow in the Property (CNHP 2022).

A3893 Mare's-tail - Widgeonweed - Bur-reed Aquatic Vegetation

This Alliance consists of aquatic plant communities dominated by mare's tail (Hippuris vulgaris), spiral ditchgrass (*Ruppia cirrhosa*), beaked tasselweed (*Ruppia maritima*), narrowleaved bur-reed (*Sparganium angustifolium*), great bur-reed (*Sparganium*

eurycarpum), and/or thread-leaved false pondweed (*Stuckenia filiformis)* in any combination. These associations are floating aquatic that are rooted in mud but require a water column for support. Sites are non-tidal, freshwater to slightly brackish, seasonally or permanently flooded marshes, shallow lakes and ponds (USGS 2022). This Alliance was identified in the Property along the edges of the lake. Distinct zonation along an inundation-soil moisture gradient has enabled the development of a complex lake margin-marsh community. However, grazing and upland development has introduced excess nutrients, pollutants, and sediments in runoff and degraded marsh integrity (CNHP 2022).

A3896 Western Emergent Cattail - Common Reed Marsh

This native Alliance contains freshwater cattail marshes dominated by southern cattail (*Typha domingensis),* broadleaf cattail *(Typha latifolia)*, and/or common reed (*Phragmites australis ssp. americanus)*, which can be monotypic stands or codominated by bulrush species. It is found most commonly along lake margins and in shallow basins, and occasionally in river backwaters in the semi-arid western U.S., including the semi-arid western Great Plains, and adjacent Canada, and possibly Mexico (USGS 2022). This Alliance was identified in the Property along the edges of the lake. System is structurally complex with vegetation organized along a moisture regime with bands of communities occurring along a variable moisture regime; however, a road and campground development diminish structural complexity and alter local hydrology (CNHP 2022).

Photo 26. Emergent cattail-bulrush marsh located in the Sweetwater Lake Property.

Source: CNHP

A photo of a great blue heron walking in a pool of water with green herbaceous vegetation in the background.

A3920 Whitewater Crowfoot - Water-starwort Aquatic Vegetation

This aquatic herbaceous Alliance consists of floating communities dominated by twoheaded water-starwort *(Callitriche heterophylla),* spiny water starwort *(Callitriche palustris),* common water-crowfoot *(Ranunculus aquatilis),* and/or Lobb's buttercup (*Ranunculus lobbii)* found throughout the western U.S. and western Canada in waterbodies that are generally shallow (<0.5 m), poorly oxygenated and nitrogen-rich (USGS 2022). In the Property, this community type was located around the edge of Sweetwater Lake (CNHP 2022).

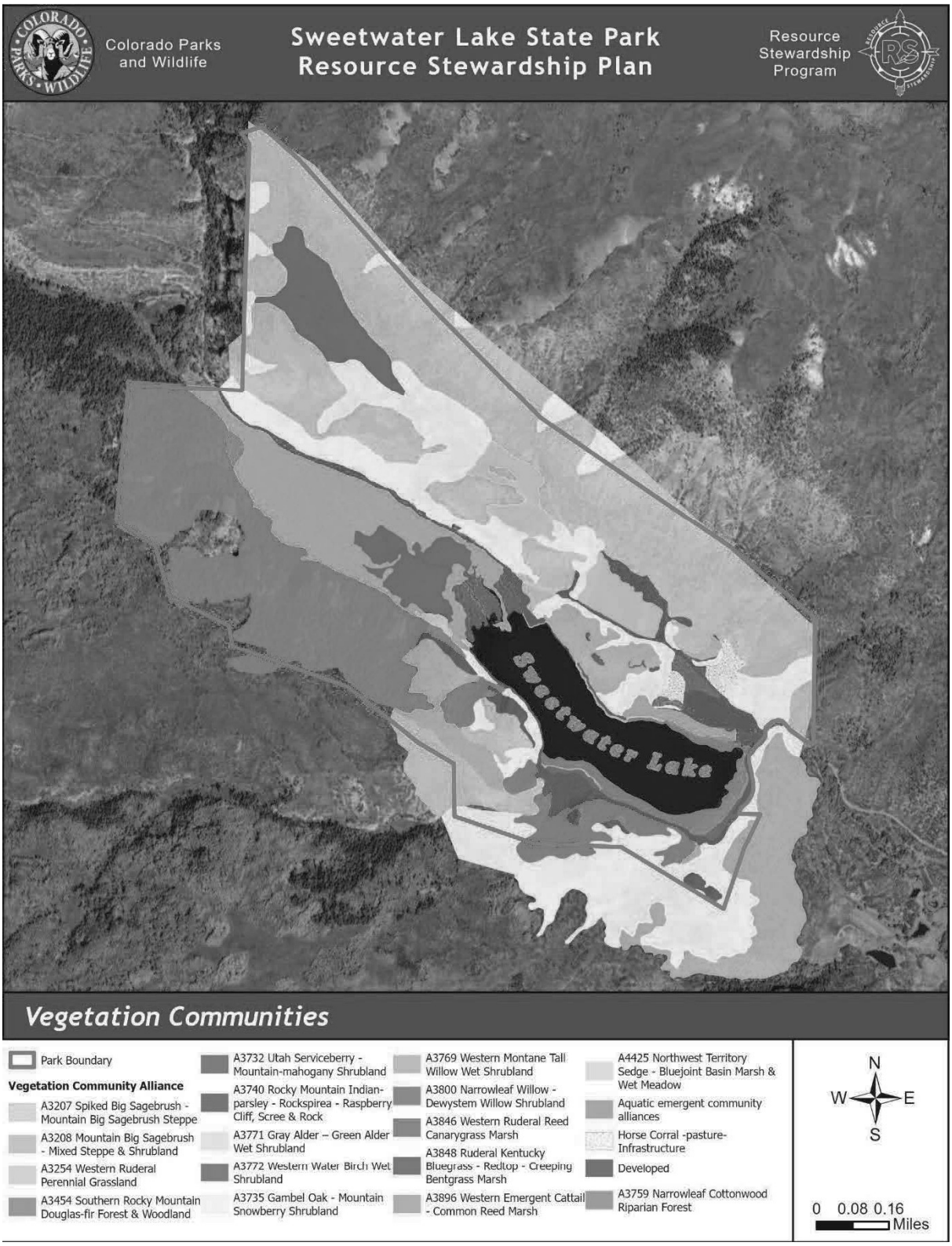
A4066 Pondweed - Hornwort - Waterweed Aquatic Vegetation

These wetlands are characterized by the dominance of pondweed (*Potamogeton* spp.), hornwort (*Ceratophyllum* spp.), and waterweed (*Elodea* spp.). These wetlands typically little emergent vegetation comprising less than 25 percent cover (USGS 2022). In the Property, this community type was located around the edge of Sweetwater Lake (CNHP 2022).

A4425 Northwest Territory Sedge - Bluejoint Basin Marsh & Wet Meadow

This ecosystem is provisional because the concept is under review. This herbaceous wetland association is found throughout much of the western U.S. Stands occur in montane and subalpine areas around the edges of lakes and beaver ponds, along the margins of slow-moving reaches of streams and rivers, and in marshy swales and overflow channels on broad floodplains (USGS 2022). In the Property, this Alliance was reported at the confluence of Lake Creek and Sweetwater Lake. Within this community at the Property, Northwest territory sedge (*Carex urticulata*) covers 80-90% surface area and duckweed *(Lemna minor*) takes up the rest of the space (10-15%) (CNHP 2022).

Figure 6.Vegetation Communities Map.



Resource Conditions

During 2022 CNHP surveys, condition assessments were performed on natural plant communities based on four criteria: exotic species, community health, community structure, and species richness. Each criterion was scored on a scale of poor (1), fair (2), good (3), or excellent (4), with the overall condition determined by the average of the four scores. Guidelines for condition assessments were informed by the Ecological System Viability Specifications for Southern Rocky Mountain Ecoregion. Additionally, a list of plant species within the monitoring area was used to inform the rating of species richness (CNHP 2022). More information about vegetative condition in the Property is available in the full 2022 CNHP report, located in the Appendix.

Gambel Oak Shrublands and Mixed Mountain Shrublands

The Oak and Mixed Mountain Shrublands located on the western side of Sweetwater Lake are generally in good ecological condition, whereas those situated on the eastern side are in fair to poor condition. These shrublands have high biodiversity scores, although they are inadequately protected in Colorado. Nonetheless, they are vital for wildlife habitat (CNHP 2022).

Sagebrush Shrublands

To the west of Sweetwater Lake, the sage shrublands are generally in good ecological condition, but those to the east are in fair to poor condition. The condition of sagebrush shrublands throughout Colorado has been degraded due to various factors, including fire suppression, heavy livestock grazing, and conversion to croplands or hay meadows. Additionally, invasive species like cheatgrass have altered the natural fire regime. These shrublands are weakly conserved in Colorado despite the fact that many mammals rely on them (CNHP 2022).

Coniferous Forests

The cooler north-facing slopes on the west side of the Sweetwater Lake Property are home to conifer forests. Although they are in "good" ecological condition, they have not fully recovered from past logging and are still in a successional stage. Over time, they will likely transition to climax Douglas-fir forests, with changing species dominance and density. These forests are crucial water sources and support fewer animal species than lower elevation forests, but still provide habitats for mammals and bird species.

In Colorado, mixed conifer forests are only moderately conserved, and few have any special protection or wilderness designation. Recreational activities pose a significant threat to these forests, as recreation has been linked to declines in rare and sensitive species throughout the US. The regular usage of recreational trails is a significant threat to the ecosystems in these forests (CNHP 2022).

Cliff Communities

Cliffs play a crucial role in supporting various bird species as they create a sharp contrast in landscapes. These habitats are typically unaffected by human and livestock activity and remain in their natural state. Nevertheless, the rising trend of rock climbing has resulted in more human activity, which can have an adverse impact on

bird communities. The harm caused includes reduced success rates for bird nesting and a drop in both the quantity and variety of bird species in the area (CNHP 2022).

Wetlands

Three types of wetlands were identified through surveys at the Property: wet meadows, Lower Montane-Foothill Riparian Woodland and Shrublands, and Emergent Marshes. Even though wetlands only make up a small percentage of Colorado's land, they are extremely important in terms of ecology and economics. They perform a variety of essential functions, including water storage and wildlife habitat, and play a crucial role in providing clean water by acting as a filter for pollutants. The hydrologic regime is the most important factor in wetland vegetation patterns and dynamics, and threats to wetlands include changes in hydrology, vegetation alteration, landscape fragmentation, and the removal of beavers. Human activities that have occurred on the Property's lands, such as drainage alterations, vegetation clearing, excessive livestock grazing, and nutrient inputs, have had a negative impact on wetlands by degrading their integrity and allowing for the invasion of non-native species like reed canarygrass, which displace native vegetation and degrade the habitat and function of wetlands (CNHP 2022).

Aquatic Vegetation

Sweetwater Lake and its adjacent aquatic ecosystems are crucial habitats for various fish, amphibian, and waterfowl species. The presence of aquatic plants is particularly beneficial to the ecosystem as it contributes to the dissolution of oxygen (O_2), absorption of carbon dioxide (CO_2), protection of banks, beds, and shorelines, provision of macroinvertebrate and fish habitat, sustenance for waterfowl and other animals, and cycling of nutrients while also slowing sediment movement (CNHP 2022).

Ruderal Marshes

Overall, the ruderal marshes of the Property contain non-native species that provide lower quality of habitat for wildlife species than native vegetation, and therefore these areas are in relatively poor condition. Reed canarygrass is a highly invasive plant species that can have severe impacts on wetland ecosystems. This plant can form large monocultures, displacing native plant species and fundamentally altering the structure and function of the ecosystem. In addition, the invasion of reed canarygrass can change hydrological patterns and increase the risk of flooding in nearby areas. Similarly, the Kentucky Bluegrass - Redtop - Creeping Bentgrass community is also an invasive species in wetland habitats, leading to degradation of marsh integrity and promoting the invasion of non-native plant species. Human disturbances such as overgrazing, logging, and mining can introduce excess nutrients, pollutants, and sediments in runoff, which can further exacerbate the negative effects of invasive species. The displacement of native plant species by invasive species like reed canarygrass and Kentucky Bluegrass - Redtop - Creeping Bentgrass can lead to negative impacts on a range of wildlife, including waterfowl, amphibians, and other aquatic organisms (CNHP 2022).

Ruderal Grasslands

Similar to the ruderal marsh communities, the ruderal grasslands are dominated by non-native species, reducing their overall ecological condition and benefits to the

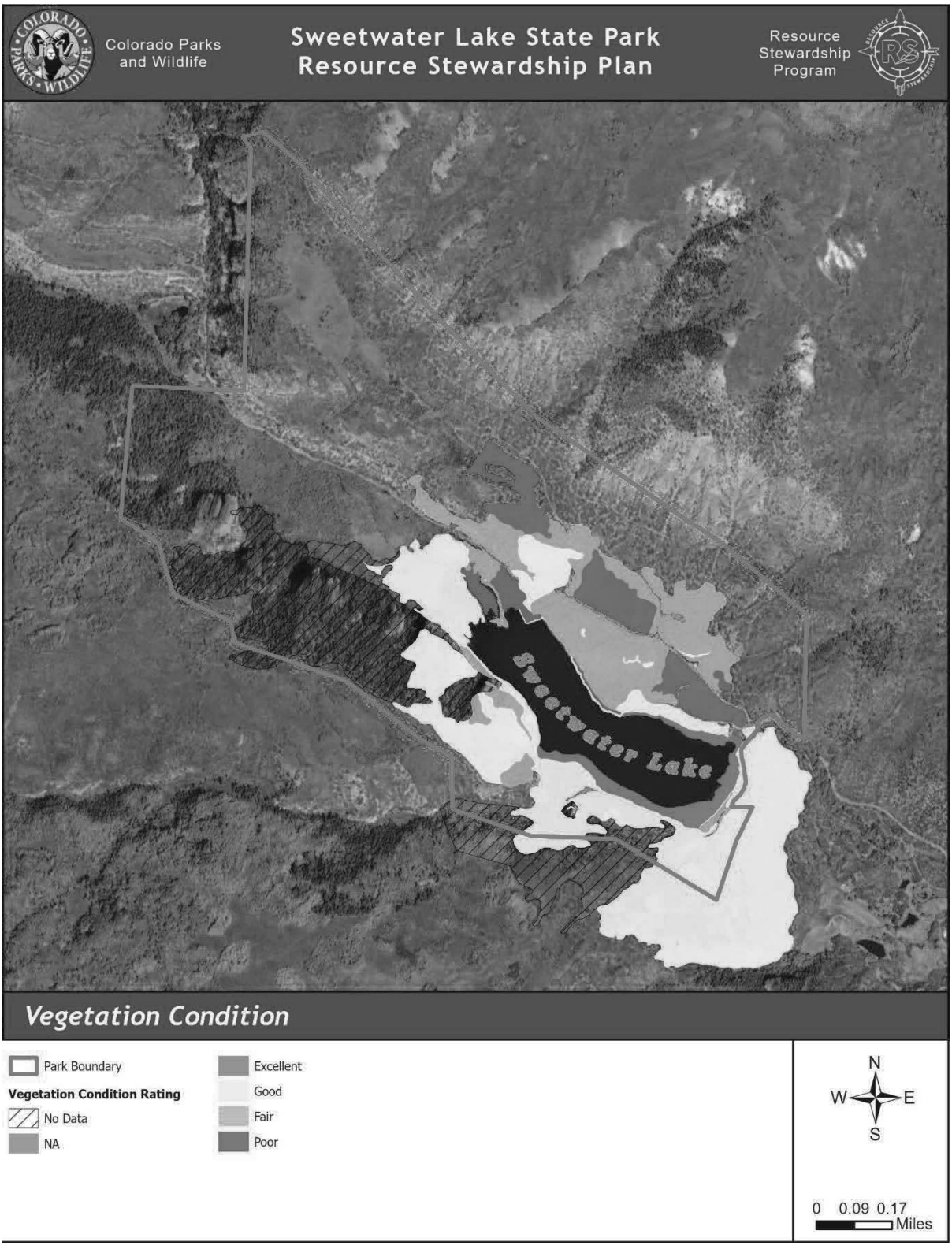
biotic community at the Property. This community is threatened by invasive species, which could result in a reduction of native species due to competition for resources and habitat modification. In Western U.S. grasslands, the invasion of cheatgrass has resulted in an increase in wildfire frequency and intensity. Crested wheatgrass is another invasive plant that competes with native plants and results in a decrease in biodiversity and biologically unproductive habitats for nesting songbirds. Smooth brome, on the other hand, thrives in disturbed areas and has the potential to spread into native plant communities, forcing the native species to be outcompeted and displaced over time (CNHP 2022).

Table 9. List of Vegetation Community Conditions at Sweetwater Lake.

Vegetation Community	Condition / Status	Description
Oak and mixed mountain shrublands		The oak and mixed mountain shrublands in the Property range from good to poor condition, depending on the location in the Property. Some areas have robust populations of dominant shrubs and healthy understories. Others contained moderate levels of invasives, like Kentucky bluegrass and smooth brome, stressed plants, and low species richness.
Sagebrush shrublands		The sagebrush shrublands in the Property range from good to poor condition, depending on the location within the Property. Some locations are relatively undisturbed due to low visitation by people and livestock. Other areas were documented to have moderate cheatgrass invasions and were overbrowsed by livestock.
Coniferous forests		Most coniferous forests are in good condition, but are still rebounding from historic logging activity. Low non-native species cover was documented in most areas. Species diversity was somewhat low due to higher than average canopy cover. However, most forests in the Property are in good shape and will improve with proper management.
Cliff communities		Cliff communities are robust and in good condition. Threats include the presence of cheatgrass in many areas, but otherwise communities are relatively undisturbed and in a natural condition.
Wetlands		Wetlands in the Property vary in condition. Hydrologic regime seems to be intact, with a natural supply of water to wetland areas. Many wetlands contain average species richness, but some non-natives occur and may threaten current status. Property developments nearby and continued horse grazing are likely to impact

Vegetation Community	Condition / Status	Description
		these areas in the direct vicinity of campgrounds and pastures, and may decrease in condition if visitation increases.
Aquatic communities		Aquatic communities in are in relatively good condition and contain a diversity of species, good structure, and relatively low non-natives. However, threats such as grazing and upland development have introduced nutrients, pollutants, and sediment that may degrade the condition of the communities present. These communities are at risk if visitation and grazing continues or increases.
Ruderal marshes		These communities are in overall poor condition due to the dominance of reed canarygrass, which reduces habitat quality.
Ruderal grasslands		These communities are in overall poor condition due to the dominance of non-native grasses (crested wheatgrass, smooth brome, cheatgrass) that reduce habitat quality.

Figure 7. Vegetation Conditions Map.



Discussion and Conclusions

The habitat on the west side of Sweetwater Lake currently provides good quality, relatively undisturbed foraging and protective cover habitat that is essential to the long-term survival of native wildlife. The development of Property facilities and potential increase in visitation to the area could negatively impact vegetation and wildlife resources. To protect and conserve these landscapes, an attempt to reduce the loss, alteration, or fragmentation of habitat at the Sweetwater Lake Property from recreational development and human disturbance would assist in the effort. Additionally, restoring landscape connectivity by closing habitat interior and "social" trails on the east side of the lake, and limit recreational use to the current trail, maintain its current character, and prohibit mechanized trail use on the west side of the lake (CNHP 2022).

To maintain Gambel oak shrublands in the Property, management recommendations include eradicating non-native plant species, using sustainable grazing practices, and preventing further fragmentation and loss due to recreational development. Similar management strategies apply to sagebrush shrublands, where restoring sustainable livestock management and revegetating with native plants while limiting recreational activities that lead to fragmentation and disturbance. For the Douglas-fir forests, it is recommended to maintain large, unfragmented patches of forest to sustain wildlife and ecosystem processes (CNHP 2022).

To improve the health of wetlands in the Property, management recommendations include potentially reintroducing beavers, restoring the natural water flow, and rehabilitating upland vegetation and soil to prevent sediment and nutrient runoff. To protect aquatic communities, motorized recreational use should be limited while allowing specific recreational activities such as fishing, birdwatching, and walking along the shoreline (CNHP 2022).

For ruderal marshes and grasslands, management recommendations include removing non-native plant species and replacing them with native plants such as wetland graminoids or upland graminoids and forbs. Additionally, sustainable grazing practices should be implemented in the grasslands. Overall, these management recommendations aim to preserve and maintain the ecological integrity and biodiversity of the Property (CNHP 2022).

Rare Plants and Sensitive Communities

Description

The distinct terrain and geography and unique location of the Property make for unique ecological niches in which rare plants can thrive. A formal rare plant survey was conducted in the Property in 2022, but further exploration could reveal additional rare species and sightings of species with potential to occur. the Sweetwater Lake Property has been confirmed to have habitat and populations of one species, Harrington's beardtongue (*Penstemon harringtonii*). CNHP also tracks sensitive communities, which are categorized based on the NVC association level. Nine tracked communities were found at the Sweetwater Lake Property. Surveys for rare plants and tracked communities were conducted in the Property in 2022.

Knowledge of species and habitats that occur in the Property 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 the Sweetwater Lake Property State Property. **Table 10** below lists the surveys and monitoring efforts that have been conducted related to Sensitive Plant Species and Communities. Sections following provide information about specific taxa and associated habitats that are known in the Property based on these efforts. **Chapter 5** discusses future survey and monitoring effort needs for the Property based on those that have been conducted.

Table 10. List of Surveys and Monitoring Conducted for Sensitive Plants and Communities at the Sweetwater Lake Property.

Resource	Description	Years	Performed by
Rare Plant Survey and Vegetation Communities Mapping	Vegetation communities were mapped for the Property and identified the presence of one plant and nine communities that are listed as rare or sensitive by CNHP.	2022	CNHP

As previously mentioned, the Property is home to one rare plant species that is tracked by CNHP and USFS sensitive, Harrington's penstemon. This species was documented while conducting a rare plant survey in the Property in 2022 (CNHP 2022). Two other species have historically been documented in the Property or in the vicinity of the Property. Many-branched blazingstar (*Mentzelia multicaulis*) could occur in the Property and was historically documented, in 1990, in CNHP element occurrence data within one mile of the Property. Willow hawthorn (*Crataegus saligna*), was documented within the Property boundaries in 1962, but has not been documented since. Additionally, several USFS sensitive plant species could occur at the Property based on elevation and habitat availability. Descriptions of species documented and with potential to occur are listed in **Table 11.**

A total of nine vegetation Associations documented during the 2022 vegetation assessment are considered sensitive communities (CNHP 2022). Sensitive plant communities are not protected by an agency or any regulations, but are unique combinations of plants that are uncommon and vulnerable to disappearance. Vegetation communities ranked as state-sensitive according to CNHP that could occur in the Property were included in **Table 11.**

Table 11. List of Rare Plants and Sensitive Vegetation Communities that Occur at Sweetwater Lake State Property.

Common Name	Scientific Name	Listing Status		Habitat Description	Property Presence	Source
		Fed	CNHP			
Plants						
Autumn willow	*Salix serrisima*	USFS	G5/S1	Associated with areas of permanently saturated soils with peat, a high mineral content and an alkaline pH.	No	WRNF Sensitive Plant Species List
Harrington's beardtongue	*Penstemon harringtonii*	USFS	G3/S3	Open sagebrush or, less commonly, pinyon-juniper habitats, on gentle slopes. Soils are typically rocky loams and rocky clay loams derived from coarse calcareous parent materials.	Yes	(CNHP 2022)
Livid sedge	*Carex livida*	USFS	G5/S2	Grows in peat bogs, boreal fens, calcareous floating mats, marly meadows, and swampy woods.	No	WRNF Sensitive Plant Species List
Lesser panicled sedge	*Carex diandra*	USFS	G5/S2	Most often found in fens and along lake and pond margins.	No	WRNF Sensitive Plant Species List
Many-branched blazingstar	*Mentzelia multicaulis*		G3/S3	Sparsely vegetated steep slopes, drainage gullies, roadcuts.	No (Documented within 1 mile of the Property)	CNHP 1990
Nagoon berry	*Rubus arcticus var. acautis*	USFS	G5/S1	Willow carrs, mossy streamsides.	No	WRNF Sensitive Plant Species List

Common Name	Scientific Name	Listing Status		Habitat Description	Property Presence	Source
		Fed	CNHP			
Park milkvetch	*Astragalus leptaleus*	USFS	G3G4/S2	Sedge-grass meadows, swale, hummocks at the edges of mountain brooks and among streamside willows.	No	WRNF Sensitive Plant Species List
Stream orchid	*Epipactis gigantea*	USFS	G4/S1S2	Seeps on sandstone cliffs and hillsides; springs, sometimes hot springs.	No	WRNF Sensitive Plant Species List
Willow hawthorn	*Crataegus saligna*		G3/S3	Endemic species to Colorado. Canyons and stream corridors from 1,630 to 2,620 m (5,345 to 8,600 feet) in western Colorado. Reported growing on river benches, in a gulch, in a floodplain, on riverbanks, and on the edge of a wetland.	Yes	CNHP 1962
Yellow lady's slipper	*Cypripedium parviflorum*	USFS	G5/S2	Aspen groves and ponderosa pine/Douglas-fir forests.	No	WRNF Sensitive Plant Species List
Vegetation Communities						
Alderleaf Mountain-mahogany / Needle-and-Thread Shrubland	*Cercarpus montanus* / *Pseudoroegneria spicata* Shrubland (CEGL001090)		G4/S2	Windswept ridgelines and rocky slopes on foothills and high plateaus within larger sagebrush shrublands,	Yes	(CNHP 2022)
Bebb's Willow / Mesic Graminoids Wet Shrubland	*Salix bebbiana* / Mesic Graminoids Wet Shrubland (CEGL001174)		G3/S3	Occurs on well-developed alluvial soils found along low- to moderate-gradient streams, ranging from intermittent streams to broad valley floodplains of higher order systems.	Yes	(CNHP 2022)

Common Name	Scientific Name	Listing Status		Habitat Description	Property Presence	Source
		Fed	CNHP			
Douglas-fir / Saskatoon Serviceberry Forest	*Pseudotsuga menziesii / Amelanchier alnifolia* Forest (CEGL000420)		G2Q/ S2	Restricted to cold north-facing slopes ranging from moderate to very steep.	Yes	(CNHP 2022)
Gambel Oak / Utah Serviceberry Shrubland	*Quercus gambelii - Amelanchier utahensis* Shrubland (CEGL001110)		G3G5/S2	Stands occur in canyons, or on mesas, benches, plateaus, ridges, foothills scarps and mountains at elevation ranges from 1,173 to 2,700 m (3,850-8,860 feet). Slopes are gentle to steep (1-100%) and may be oriented to any aspect.	Yes	(CNHP 2022)
Gray Alder - Drummond's Willow Wet Shrubland	*Alnus incana - Salix drummondiana* Wet Shrubland (CEGL002652)		G3/S3	Found along steep-gradient streams between 2,038 and 3,000 m (6,686-9,835 feet) elevation. Restricted to stream margins, alluvial surfaces, and coarse-textured cobble bars, rarely forming large or extensive stands.	Yes	(CNHP 2022)
Quaking Aspen / Gray Alder Riparian Forest	*Populus tremuloides / Alnus incana Riparian Forest*		G3/S3	Located in narrow ravines and along first- and second-order streams in Colorado at elevations of 2,480 to 2,930 m (8,140-9,600 feet).	No (Documented outside of Property)	CNHP 1993
Rockspirea Rock Outcrop Sparse Vegetation	*Holodiscus dumosus* Rock outcrop sparse vegetation (CEGL002801)		GNR/S3	Found on the upper edges and ledges of mesa cliffs, talus deposits below cliffs, on cliffs in canyons or gorges, boulder fields and on ridgetop outcrops. Sites are moderately sloped to steep and occur between 2,205 and 3,075 m (7,230-10,080 feet) elevation.	Yes	(CNHP 2022)
Water Birch / Red-osier Dogwood Wet Shrubland	*Betula occidentalis / Cornus sericea* /Graminoid spp. Wet Shrubland (CEGL001161)		G3/S1	Occurs on gently sloping, often undulating, streambanks and terraces of low- to high-gradient perennial or intermittent, spring-fed streams and rivers	Yes	(CNHP 2022)

Common Name	Scientific Name	Listing Status		Habitat Description	Property Presence	Source
		Fed	CNHP			
Water Birch Wet Shrubland	*Betula occidentalis* Wet Shrubland *(B. occidentalis/ S. melanopsis-S. exigua/C. utriculata* Wet Shrubland) (CEGL001080)		G3G4/ S3S4	Occurs on stream benches and floodplains in narrow to moderately wide valleys and hillside seeps in mountains, canyons, foothills, and sheltered alcoves across much of the western U.S.	Yes	(CNHP 2022)
Water Birch / Mesic Graminoids Wet Shrubland	*Betula occidentalis* / Mesic graminoids *(Carex utriculata)* Wet Shrubland (CEGL002654)		G3/S3	Occurs as dense bands up to 35 m wide along moderately wide to wide floodplains in mountain valleys.	Yes	(CNHP 2022)

Sources: Sources: (CNHP 2022; NatureServe 2022a)

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

Rare Plants

Harrington's Beardtongue

Harrington's beardtongue (G3/S3) is a Colorado-endemic vascular plant that is only found in a limited area within the Colorado River drainage in northwestern Colorado. There is a total of 74 known occurrences of this plant. The plant's population is estimated to be at least 43,000 individuals occupying a habitat of roughly 10,000 acres or 15 square miles. While additional surveys may reveal more occurrences of the plant, it is not expected to be found commonly outside its narrow range (CNHP 2006).

The plant is a perennial member of the plantain (*Plantaginaceae*) family. It has a four- to five-year life cycle, and therefore may have population boosts every four to five years during fruiting stages. This could be the reason for the significant changes in the number of individuals observed over time. The BLM and the Denver Botanic Gardens have been studying Harrington's beardtongue for several years to monitor population trends (NatureServe 2022b).

Harrington's beardtongue is typically found in open sagebrush or pinyon-juniper habitats on gentle slopes between elevations of 6,400 and 9,400 feet, where the soil is mostly rocky loams or rocky clay loams derived from coarse calcareous parent materials (NatureServe 2022b).

Overall threats across its range include residential and agricultural development, off-road vehicle use, exotic plant species invasion, over-grazing by domestic and wild ungulates, oil and gas development, and climate change. Over the past 25 years, these activities have been concentrated within the plant's range and habitat, which has led to a significant decrease in its population (CNHP 2006).

Photo 27. Harrington's beardtongue inflorescence.

Source: CNHP

A photo of blue and purple blooming flowers (Harrington's beardtongue) with grass in the background.

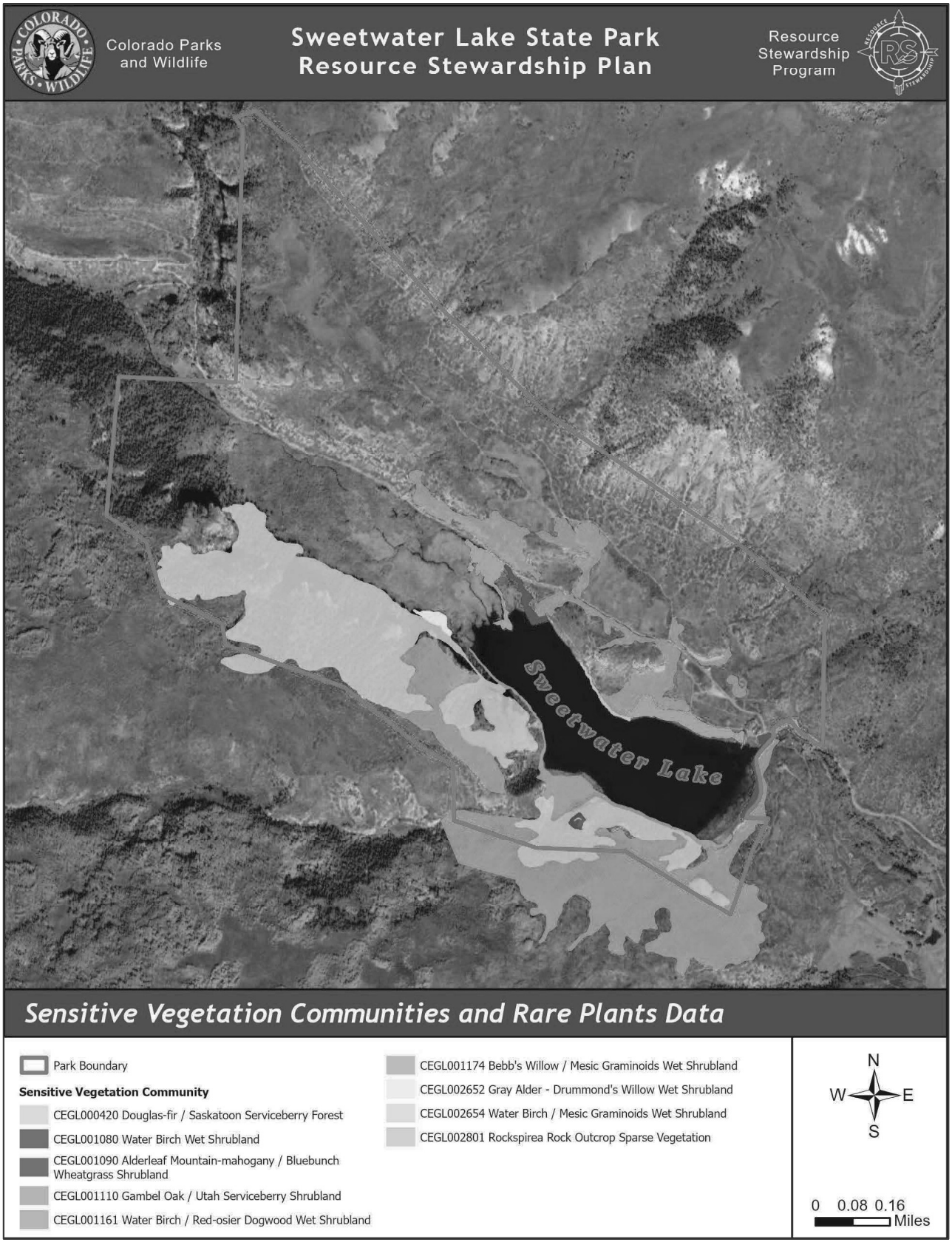
Five populations of over 300 individuals were counted in 2022 in the Property in sagebrush habitats. The major threats to Harrington's beardtongue at the Sweetwater Lake Property include grazing, invasion of non-native species, and recreational activities. The plant is at risk of being trampled and having its flowers browsed by livestock. Activities like mountain biking, firewood cutting, camping, and the creation of infrastructure for trail systems also threaten this species. Furthermore, the loss of sagebrush and the invasion of non-native and increaser species such as cheatgrass or rabbitbrush could reduce the availability of suitable habitats for this species (CNHP 2022).

Sensitive Community Associations

Nine sensitive plant communities were documented in the Property during the 2022 vegetation community mapping survey. As previously stated, sensitive plant communities are not protected by an agency or any regulations, but are unique combinations of plants that are uncommon and vulnerable to disappearance. More information about the plant community statuses and habitats can be found in **Table 11.** The communities identified during surveys that are considered sensitive and unique by CNHP are as follows:

- CEGL000420 Douglas-fir / Saskatoon Serviceberry Forest
- CEGL001080 Water Birch Wet Shrubland
- CEGL001090 Alderleaf Mountain-mahogany / Bluebunch Wheatgrass Shrubland
- CEGL001110 Gambel Oak / Utah Serviceberry Shrubland
- CEGL001161 Water Birch / Red-osier Dogwood Wet Shrubland
- CEGL001174 Bebb's Willow / Mesic Graminoids Wet Shrubland
- CEGL002652 Gray Alder - Drummond's Willow Wet Shrubland
- CEGL002654 Water Birch / Mesic Graminoids Wet Shrubland
- CEGL002801 Rockspirea Rock Outcrop Sparse Vegetation

Figure 8. Rare Plants and Sensitive Vegetation Communities Data.



Resource Conditions

Harrington's beardtongue is dependent on the conditions of sagebrush shrublands in the Property. A majority of the Harrington's beardtongue populations are located on the northeast side of Sweetwater Lake, where sagebrush habitat was found to be in fair to poor condition. The Guard Station and the road are right in the vicinity of this habitat, and it is likely that traffic reduces habitat quality in those areas. Trampling of plants and browse of flowers. Recreational activities threatening this species include, mountain biking, firewood cutting, camping, and creation of infrastructure to support trail systems. Declining sagebrush and invasion of non-native and increaser species such as cheatgrass (*Bromus tectorum*) or rabbitbrush (*Chrysothamnus nauseosus*) respectively, may reduce suitable habitat for this species (CNHP 2022).

Resource conditions for all assessed tracked communities in the Property are reported as being in overall good condition. This rating is based on ratings of exotic species, community health, community structure, and species richness (CNHP 2022). It may be possible to expand the area that these sensitive communities cover by reducing non-native invasive species in adjacent communities that are a close match to that association. Overall conditions of rare plant and sensitive vegetation community conditions can be found in **Table 12**.

Table 12. List of Sensitive Plant and Vegetation Community Conditions at the Sweetwater Lake Property.

Resource	Condition / Status	Description
Rare plants		One rare plant species have been positively confirmed in the Property as of 2022, Harrington's beardtongue. The species is dependent on sagebrush shrublands, with a majority of its populations located on the northeast side of Sweetwater Lake where habitat quality is in fair to poor condition.
Sensitive plant communities		All sensitive communities assessed in the Property during surveys were reported to be in good condition. It may be possible to expand the area that these sensitive communities cover by reducing non-native invasive species in adjacent communities that are a close match to that association.

Discussion and Conclusions

Management recommendations for protecting Harrington's beardtongue mainly include restoring and preserving the sage shrubland habitats where the plant grows. This can be achieved by implementing restoration measures, such as reducing soil erosion, reintroducing native plant species, and controlling invasive plant species to ensure the availability of habitat for the species. It is also important to prevent further loss, alteration, or fragmentation of the sage shrublands where the plant grows by limiting or avoiding recreational development in these areas. Lastly, it is crucial to eradicate non-native plant species that may compete with the Harrington's beardtongue plant for resources. Replacing them with native graminoids and forbs that support the

plant's growth and development will also help to protect its habitat and promote its growth (CNHP 2022).

Restoring the sagebrush shrublands on the east side of Sweetwater Lake via implementation of sustainable livestock management practices to prevent overgrazing and soil degradation could improve the habitat present there. Eradicating non-native plant species and replacing them with native forbs and graminoids will also promote the growth and development of the plant and its ecosystem. These actions will help to ensure the survival and growth of the Harrington's beardtongue plant and other species that rely on the sage shrublands for their habitat (CNHP 2022). However, it may not be possible with the future development of the Property plans in the area. Realistic goals for restoration should be set for this area.

Water and Wetland Resources

Resource Summary

Significant Features

- The majority of visitation at the Property centers around the Sweetwater Lake. If this resource is not maintained at a high-quality level, Property visitation could decrease.
- The water and wetland resources at Sweetwater Lake provide critical habitat for resident and migrating wildlife including cold-water fish, waterfowl, migrating birds, moose, elk, and mule deer.
- The wetland and riparian areas are critical for filtering sediment and pollutants from the water and improving water quality within the lake. The riparian vegetation also helps stabilize steam banks and the lake shoreline, reducing erosion and sediment loading, thus protecting the water quality of these systems.

Threats

- Noxious Weeds – Weed infestations threaten diversity, viability, and functionality of wetlands and riparian areas through the displacement of native species.
- Erosion – Naturally erosive soils combined with high visitation 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

Sweetwater Lake a natural 74-surface acre body of water located along Sweetwater Creek, which is sourced from Shepherd Lake and Rim Lake in the Flat Tops Wilderness. To the north of Sweetwater Lake are irrigated meadows that generate return flows that feed small drainages that flow down steep south-facing slopes and eventually into Sweetwater Creek or the lake itself. These drainages feature narrow bands of wetland and riparian vegetation, but the presence of a road impedes some of the irrigation return flows, causing water to pool and create wetlands along the northern side of the road. To the south of the Lake are various ephemeral streams, as well as Lake Creek. Freshwater emergent wetlands, ponds, and springs exist throughout the Property. Two small ponds occur south of Sweetwater Creek above the lake along an ephemeral stream (ERO 2009).

Knowledge of water resources in the Property 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 Sweetwater Lake Property. **Table 13** below lists the surveys and monitoring efforts that have been conducted related to Water Resources. Sections following provide information about specific taxa and associated habitats that are known in the Property based on these efforts. **Chapter 5** discusses future survey and monitoring effort needs for the Property based on those that have been conducted.

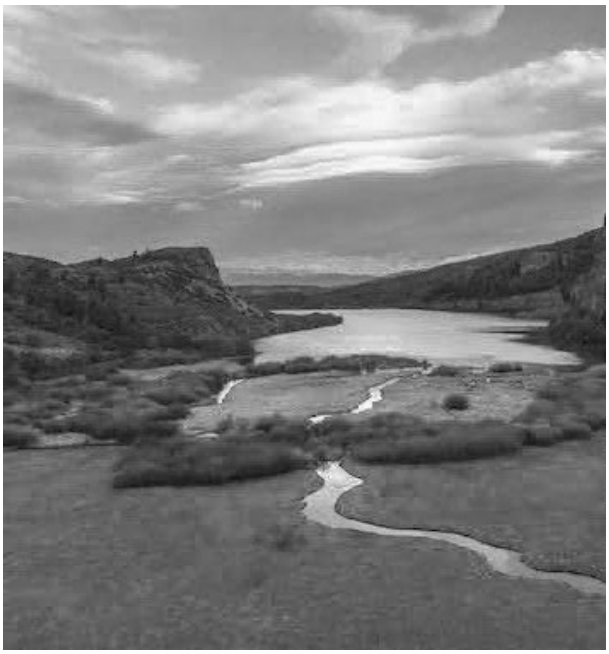
Table 13. List of Surveys and Monitoring Conducted for Water Resources at the Sweetwater Lake Property.

Resource	Description	Years	Performed by
Wetland Delineation Report	Wetland and water resources were investigated and documented	2009	ERO

Sweetwater Lake

Sweetwater Lake is a natural body of water situated on Sweetwater Creek roughly eight miles upstream from where it meets the Colorado River. Its elevation is approximately 7,712 feet, with a delineation area that reaches up to 8,400 feet (ERO 2009). On average, water is retained for about four days before it flows out of the outlet on the eastern side (EPA 2023a). It fluctuates between approximately 75 to 95 surface acres, depending on the flow of Sweetwater Creek. The water level of the lake is regulated by its outlet into Sweetwater Creek. During snowmelt runoff, when streamflow is high, the outlet channel narrows and the backed-up streamflow causes the lake's water level to rise. Conversely, as streamflow decreases, the lake's water level also drops. The lake's shoreline is predominantly covered with coyote willow, while the upper end of the lake contains a wetland complex that supports sedge (*Carex* spp.) marsh, wet meadows, scrub-shrub, and beaver ponds (ERO 2009).

Photo 28. View of Sweetwater Lake and Sweetwater Creek from western Property boundary.



Source: Eagle Valley Land Trust
A photo of Sweetwater Lake and Sweetwater Creek surrounded by rocky hillsides and shrubby wetland vegetation.

Water levels were regularly monitored at Sweetwater Lake from 2005 to 2009. Prior to this monitoring, there was no historical data available for the lake's streamflow or

water levels. To estimate the long-term historical conditions of the lake, a hydrological assessment was conducted on the Sweetwater Lake watershed, which involved simulating the historical stream flow of Sweetwater Creek using statistical correlations with nearby stream gauges that have a longer record. The simulation results show that there is an average annual runoff of approximately 50,000 acre-feet at the outlet of Sweetwater Lake. Moreover, the results indicate that the natural lake levels have varied between 0.5 to 4.0 feet during a 20-year historical simulation period (ERO 2009).

Sweetwater Creek

Sweetwater Creek is a tributary of the Colorado River that is sources from Shepherd and Rim Lakes in the Flat Tops wilderness. Over many millennia, its flow formed Sweetwater Canyon, a place known for its towering cliffs, scenic views, and excellent hiking opportunities. Sweetwater Creek flows into Sweetwater Lake and its fluctuations are reflected in the water levels of Sweetwater Lake (USGS 2023). The portion Sweetwater Creek in the Property has a mean annual flow volume of 84.58 cubic feet per second (cfs) and mean annual flow velocity of 1.40 feet per second (fps) (EPA 2023a).

Lake Creek

Lake Creek comes from an alpine spring in the WRNF southwest of the Property. It converges with Gruner Creek before entering Sweetwater Lake on the southern shore where it forms a multitude of emergent wet shrublands (USGS 2023). The portion Lake Creek in the Property has a mean annual flow volume of 11.38 cfs and mean annual flow velocity of 1.36 fps (EPA 2023a).

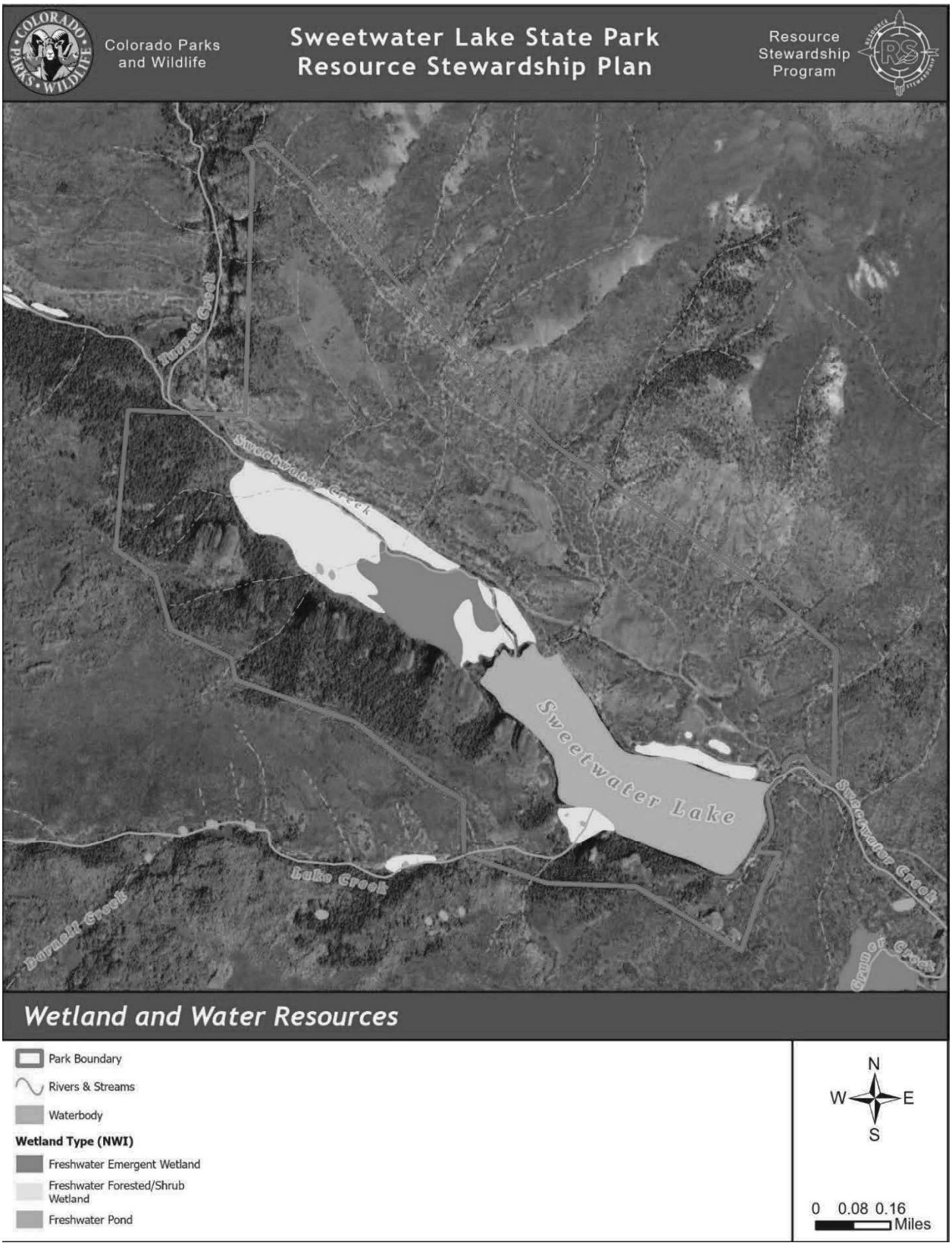
Irrigation Ditches

There are two irrigation ditches that run through the Property from northwest to southwest. The upper irrigation ditch, which is located farther north, is currently out of order and cannot convey water for more than a short distance. It also ends in an upland shrub area, and several drainages terminate in it. The lower irrigation ditch diverts water from Turret Creek and is currently operational. It runs perpendicular to drainages in the area and does not intercept any drainages. In the past, the lower irrigation ditch supplied water to two small wetland areas located to the north of Sweetwater Lake, but repairs have been made to prevent this from happening (ERO 2009).

Unnamed Drainages

There are various perennial unnamed drainages in the Property. On the northern side of the lake are two perennial drainages both of which flow from irrigation ditches above. Both feature a narrow riparian wetland corridor and form wetlands at their bases before flowing into Sweetwater Creek and Sweetwater Lake. In some of these drainages, water disappears underground and then reappears further downhill. The north side also features some ephemeral sources of water that occur in dry ravines. On the south side of the Property is an ephemeral stream that forms two small ponds within the wetland boundary before converging with Sweetwater Creek (ERO 2009).

Figure 9. Wetland and Water Resources Map.



Resource Conditions

Overall, water resource conditions in the Property are good. The Property contains Sweetwater Lake, one of the largest natural lakes in Colorado, Sweetwater Creek, and several tributaries and irrigation ditches. The Property is largely surrounded by public lands and is in a remote area, lowering the chance of influence of contaminants and influences to the water resources in the Property. Three water testing location occur in the Property, and all waters tested in the Property were found to be Attaining/Fully Supporting in all categories (Aquatic Life, Recreational Use, Agricultural Use, Water Supply Use), meaning they meet water quality standards. Sweetwater Creek and its tributaries are "Attaining", although it cannot be officially deemed as attaining because its arsenic levels have not been tested. Other than this unknown, Sweetwater Creek is in good condition (CDPHE 2022).

Table 14. Water Quality Data for the Sweetwater Lake Property.

Name	Listed Portion	Contaminants / Issues	Category / List	Priority
COUCUC07b_A	Sweetwater Creek and tributaries	Arsenic (insufficient information for using as a water supply), all else good	3b	M&E : As-T
COUCUC04_C	Lake Creek	None; Good	1a	
COUCUC13_B	Sweetwater Lake	None; Good	1a	

Category/List: These categories refer to the Environmental Protection Agency reporting categories associated with waterbody attainment status: 1. Meets all designated uses, 2. Meets some designated uses, 3b. Insufficient data to make a determination (Monitoring and Evaluation List), 4a. Impaired with an approved TMDL, 4b. Impaired with an approved 4b plan, 4c. Impaired due to pollution and 5. Impaired without a TMDL completed.

Priority: This is the Total Maximum Daily Load development priority. Priority options within Regulation #93 include: H= High Priority, M= Medium Priority, L= Low Priority

Source: (CDPHE 2022)

The lake is currently aquatic nuisance species (ANS)-free. ANS greatly threaten aquatic ecosystem functioning and commercial, agricultural, or recreational activities dependent on these ecosystems. Highline Lake State Park recently tested positive for zebra mussels, which is almost 150 miles west of the Property. Contamination of the Property lake is possible and continued preventive inspection programs should continue statewide. However, the Property unlikely to allow the use of motorized boats, so it is less likely they will be introduced.

The lake levels seem relatively constant, but not much historical data is available on the subject. Climate change is a direct threat to water supply to the lake, as it is fed by snowmelt runoff. Research has found that as the climate has warned, spring snowpack in the western US has declined on average, by about 20 percent from 1955 to 2020 (EPA 2023b). A reduction in lake levels could greatly impact the natural resources present at the Property, including the availability of habitat for birds, mammals, and amphibians, and the presence of wetland that are essential for wildlife use and other ecosystem services, such as water filtration. Lake level changes would

also affect the availability of recreational opportunities at the Property, such as kayaking and fishing.

Currently, horses are permitted in some areas of the Property and are owned by one of the outfitters nearby. The west and north sides of the Property have experienced moderate horse grazing, resulting in areas of decreased vegetation cover and the presence of non-native grasses and other species. This loss of vegetation may contribute to sediment loading into the lake and streams and reduce water quality. Grazing can introduce excess nutrients, pollutants, and sediments in runoff and degrade wetland integrity and may lead to invasion by non-native species such as reed canarygrass (CNHP 2022).

Table 15. List of Water Resource Conditions at the Sweetwater Lake Property.

Resource	Condition / Status	Description
Fishery		Sweetwater Lake is stocked every year with several species of fish that thrive in the healthy waters at the Property. The sustainment of the fish populations is one indicator that water quality is in good condition.
Water quality		All of the waterways in the Sweetwater Lake Property that have been tested are in good condition for aquatic life, agricultural use, recreation. Arsenic levels have not been tested in Sweetwater Creek and therefore the viability of drinking water is unknown. Some threats to water quality include the presence of horses in and around waterways, causing erosion and sedimentation of waters and reducing water quality.
Water levels		Water levels appear to be stable, but historic data is lacking and therefore a comparison of annual water levels is unavailable. Climate change and rising temperatures threatens the accumulation of adequate snowpack in the region, which is the primary water sources for the Lake.
Aquatic Nuisance Species		No aquatic nuisance species have been detected in the Property. Motorized boat access will not be allowed, so it is unlikely they would be introduced. Clean, dry, and drain requirements for allowed boats will be required.

Discussion and Conclusions

The waters in the Property are locally and regionally significant and are important for various wildlife species, such as fish, amphibians, and waterfowl. Water resources and water quality are currently in good condition and are anticipated to remain fairly stable. Sediment loading at the Property may increase in the future with development of the Property lands, which would increase removal of vegetation and soil runoff into the lake and other water bodies. Additionally, visitation may increase the likelihood of vegetation trampling and erosion as visitors access the lake. Intentional planning, such as setting back development from the waterways and making designated trails to reduce social trail creation, will assist in keeping the Sweetwater Lake Property's waters healthy. Additionally, managing grazing in a sustainable way, where important waters are protected from soil disturbance will be important. Property management may consider installing wildlife-safe fencing to confine horses to a smaller area of the Property and reduce overall impacts to vegetation, soils, and water quality. A way to track the impact of threats to water resources in the Property would be to implement shoreline erosion monitoring along the periphery of the Lake. More information is available in Chapter 5, Resource Surveys and Monitoring, and the Appendix.

Photo 29. View of Sweetwater Lake, the primary water resource in the Property.

Source: Eagle Valley Land Trust

A photo of a boater on Sweetwater Lake and rocky hillsides and shrubby wetland vegetation in the background.

Wetland Resources

Description

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

Knowledge of wetland resources in the Property 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 Sweetwater Lake Property. **Table 16** below lists the surveys and monitoring efforts that have been conducted related to Water Resources. Sections following provide information about specific taxa and associated habitats that are known in the Property based on these efforts. **Chapter 5** discusses future survey and monitoring effort needs for the Property based on those that have been conducted.

Table 16. List of Surveys and Monitoring Conducted for Wetland Resources at the Sweetwater Lake Property.

Resource	Description	Years	Performed by
Wetland Delineation Report	Wetland and water resources were investigated and documented	2009	ERO

Wetland Types

Various wetland types, including wetland shrublands, aquatic beds, wet meadows, and mixed riparian wetlands have been reported to be present within the Property. These broad categories were developed based on dominant plant species and growth form, landscape position, and hydrology. The most prominent wetlands in the Property include a large wetland complex is present on the north east side of the Property, surrounding Sweetwater Creek, and comprised of sedge marsh, wet meadows, scrub shrub, and beaver ponds (ERO 2009). National Wetlands Inventory (NWI) data is available for the Property and was updated in 2012 by the US Fish and Wildlife Service (USFWS) and is displayed on **Figure 9**. Vegetation mapping completed in 2022 also documents the wetland communities present in the Property, which are discussed in sections following (ERO 2009).

Wet Meadow

Wet meadow wetlands are present in various areas such as the upper end of Sweetwater Lake, irrigated meadows, and to the northwest. These wet meadows have experienced heavy grazing by livestock. Some of the common species found in these meadows are sedges, redtop, dandelion (*Taraxicum officinale*), and plantain (*Plantago major*). The soil in these areas is typically moist, and the water table is usually located more than 18 inches beneath the surface (ERO 2009).

Wetland Shrub

One wetland shrubland type is composed of various wetland shrubs such as willow species, birch, alder, red osier dogwood, and bush honeysuckle. Typically, these wetland shrub stands have an herbaceous understory of sedges and redtop. This category can be found throughout the Property, but is most abundant in the large wetland complex at the head of Sweetwater Lake and in the delta area created at the intersection of Lake Creek and Sweetwater Lake (ERO 2009).

Additionally, areas exist where dense thickets of coyote willow bushes are present with a sparse understory of sedges. It is primarily found along the shoreline of the lake, although not all stands of coyote willows are considered wetlands. In some areas along the north shoreline of Sweetwater Lake, the stands of coyote willows extend up to 200 feet inland from the lake shoreline. The wetland areas of the coyote willow stands are usually located within the first two benches along the lake shoreline, with an understory of sedges and/or redtop. The boundary between upland and wetland is closely linked to a distinct change in topography that is believed to be an old or infrequent high water shoreline for Sweetwater Lake (ERO 2009).

Photo 30. A view of the vast wet shrublands and wet meadows located on the west side of Sweetwater Lake.

Source: CPW

A photo looking down on the blue waters of Sweetwater Lake and green wetlands.

Mixed Riparian

The mixed riparian wetland category is found in the small, narrow channels that transport irrigation water from cultivated fields to Sweetwater Creek or Sweetwater Lake. It is characterized by a blend of vegetation including cottonwood trees, wetland shrubs, and herbaceous wetland plants (ERO 2009).

Aquatic Bed

The edges of Sweetwater Lake were surveyed to identify areas of aquatic beds or vegetated shallows. Vegetated shallows are considered unique aquatic sites, much like wetlands. These shallow areas are mostly covered by water weed (*Elodea* sp.). Most of these wetland areas fall below the ordinary high water mark (ERO 2009).

Resource Conditions

The conditions of wetlands in the Property are overall in good condition, and are threatened by the spread of noxious weeds, development, vegetation trampling by horses, and decreases in water levels due to climate change. The wetlands in the Property provide crucial habitat for a variety of wildlife species in a harsh environment. Wetlands provide shelter, forage, and cover for many wildlife species in the area. The resource condition of the Property's wetlands is therefore incredibly important to the continuing usage of this Property by wildlife species. Details of conditions of the wetland types in the Property are provided below.

Wet Meadows

The natural structure of the wet meadows in the Property has been changed by livestock grazing and vegetation clearing, and they are now dominated by non-native pasture species. The hydrologic regime of the meadows has also been significantly altered, but it could be restored (CNHP 2022).

Wet Shrublands

The wet shrublands in the Property, have some alteration in the natural hydrologic regime due to local irrigation canals, a small dam, and roads. Shrub components have high cover with all age classes present in even distribution, while native herbaceous cover is slightly lower than expected due to the presence of reed canarygrass. The presence of alder and birch is robust and reproductively successful, but this occurrence is small and vulnerable to loss due to conversion of adjacent wet meadow and livestock grazing into a ruderal pasture (CNHP 2022).

The willow communities in the Property have been impacted by the presence of reed canarygrass and non-native species along the road-shrub interface. The hydrology in the area has been slightly altered by human activities. While the species composition is mostly native, the structure is less complex than expected, and the herbaceous cover is dominated by graminoids (CNHP 2022).

Aquatic Beds

The aquatic cattail communities in the Property have a nearly intact natural hydrologic regime that is only slightly altered by local drainage and livestock grazing, and potential invasive species have very low cover. The system is structurally complex with vegetation organized along a moisture regime, but the presence of a road and campground development could reduce diversity by introducing noxious vegetation (CNHP 2022).

Table 17. List of Wetland Resource Conditions at the Sweetwater Lake Property.

Resource	Condition / Status	Description
Wet Meadows		Wet meadows in the Property have been altered by livestock grazing and vegetation clearing, now dominated by non-native species. A reed canarygrass monoculture has displaced native plants, and adjacent systems pose a threat to the native communities if the hydrologic conditions are changed.
Wet Shrublands		The wet shrublands in the Property are in relatively good condition, as they contain complex structural components, high diversity, and are in good health. Non-native species invasion, particularly in the understory is the largest threat to these systems. Overall, the Property contains large wetland shrublands that provide important habitat for wildlife species.
Mixed Riparian		Mixed riparian areas are limited in the Property, but are in overall good condition. Native species are dominant and structure is representative of this habitat type.
Aquatic Beds		The aquatic cattail communities in the Property have a nearly intact natural hydrologic regime, with minimal alteration from human activities and a structurally complex vegetation, but the presence of a road and campground development has reduced the complexity and altered local hydrology.

Discussion and Conclusions

Although wetlands account for less than 3% of Colorado's area, they are the most significant ecosystem both ecologically and economically. They play various vital ecological roles in the state's watersheds, such as providing 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. The wetlands in the Property are locally and regionally significant and are important for plants and wildlife, maintenance of high water quality, and recreational opportunities.

Wetlands are considered sensitive ecosystems because they are easily altered and so many ecological system functions and species are dependent upon them. Threats to wetlands in the Property should be controlled, if possible. Human activities that alter the drainage patterns, clear vegetation, allow for excessive livestock grazing, or introduce excessive nutrients can have a negative impact on the overall condition of wetland systems. Grazing and development of upland areas can contribute to runoff that contains excess nutrients, pollutants, and sediments. This can lead to a degradation of the wetland's integrity and increase the likelihood of non-native species such as reed canarygrass taking over and outcompeting native vegetation. This invasion can make it impossible for animals to move freely within the wetland, leading to a further degradation of the habitat and function of the wetland (CNHP 2022).

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 Property Noxious Weed Management Plans (Appendix) will be essential in maintaining the health and condition of wetlands.

Resource Summary

Significant Features

- The soils present at the Sweetwater Lake Property are typical of the mountainous setting, with most of the soils being alluvial and are a result of parent material flowing down a river or creek and being deposited over time.
- The most significant geological features in the Property are karst towers. Isolated karst towers (fenglin karst) occur in other places in the world, but as far as is known, Sweetwater Lake is the only place in the United States where a landscape with numerous karst towers together (fengcong karst) can be seen.
- Seven paleontological fossil sites were found in the Property and include marine corrals, fish, snails, and a diversity of invertebrates.

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.
- Sedimentation - Excessive runoff in areas that have reduced vegetative cover can carry nutrients and sediment into nearby water bodies like Sweetwater Lake, potentially affecting water quality and aquatic ecosystems.
- Noxious weeds – These plant species can reduce the diversity of native plant species and the associated soil microorganisms that contribute to soil health. This can result in changes to soil structure, nutrient cycling, and water retention, potentially reducing the overall health and resilience of the soil.

Geology, Soils, and Paleontology

Geology

Description

Despite its small size, the Sweetwater Lake property contains several significant geological features. It is the only property in the state parks system that contains lower and middle Paleozoic sedimentary rocks, providing a record of life and geography at that time in Earth's history. The Property's upper Paleozoic sedimentary rocks preserve a 325-million-year-old karst tower landscape that is not known to occur anywhere else in the United States. Largely due to its steep slopes, surface processes are very active on the property. Alluvium, alluvial fans, debris fans, fan deltas, sheetwash deposits, colluvium, and landslide deposits all provide evidence of recent

sediment transport and deposition. The natural dam that formed the lake is most likely a landslide deposit. Interpretation of these interesting and significant geological features should be a prominent component of the visitor experience at the property (Houck 2023a).

Natural erosion of rock formations and deposition of the resulting sediment in Sweetwater Lake will be an ongoing problem. Landslide, sheetwash, and debris fan deposits may move. Infrastructure and recreational activities should be designed so as to avoid making these problems worse (Houck 2023a).

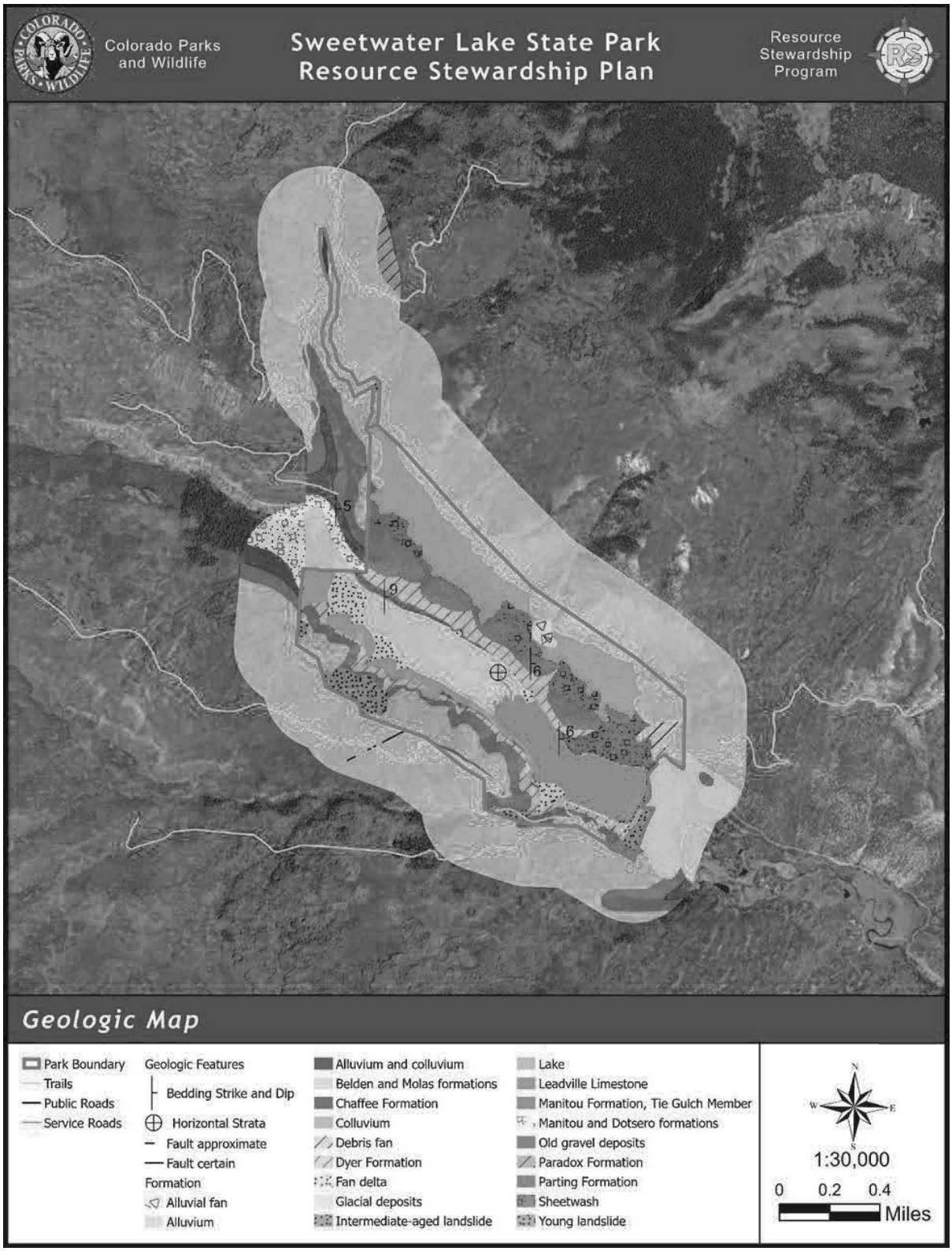
Knowledge of the geology that is present in the Property are a result of conducting surveys and monitoring that serve as the foundation for this Stewardship Plan and for CPW's ability to conserve resources at the Sweetwater Lake Property. **Table 18** below lists the surveys and monitoring efforts that have been conducted related to Geology. Sections following provide information about specific communities identified in the Property based on these efforts. **Chapter 5** discusses future survey and monitoring effort needs for the Property based on those that have been conducted.

Table 18. List of Surveys and Monitoring Conducted for Geology Resources at the Sweetwater Lake Property.

Resource	Description	Years	Performed by
Geology at the Sweetwater Lake Property	Desktop and field review of geologic resources	2023-2024	Karen Houck

Rock formations at the Sweetwater Lake property contribute greatly to the Property's scenic beauty, and to making the property a special place. The bedrock in the property was deposited as sediments on the floors of shallow seas in the Paleozoic Era. The ages of these sedimentary formations range from 488 to 306 million years old. The Property is also home to numerous surficial deposits that formed in the last two million years. They formed on land, either during or after ice ages. **Figure 10** shows how they are distributed in and around the Property.

Figure 10. Geologic Resources Map.



Rock Formations

Manitou Formation

The Manitou Formation was deposited 488-472 million years ago, during a time when shallow seas covered much of North America. Colorado was close to the equator, so the climate was much warmer than it is today. In the property, the Manitou Formation can best be seen along the northeast side of County Road 150, near the northwest boundary of the property. Its upper member (the Tie Gulch Dolomite Member) consists of about 50 ft. of gray to tan, finely crystalline dolomite. The dolomite is thinly bedded to laminated. Some of the laminae are wavy, and may have been deposited as stromatolites. Stromatolites form when blue-green algae grows in mats and traps sediment with sticky filaments. The photo below shows an outcrop of Tie Gulch Dolomite near the property boundary (Houck 2023a).

Photo 31. An outcrop of Tie Gulch Dolomite near the Property boundary.

Source: Houck 2023

A photo of a man standing in front of a rock formation with scattered vegetation.

Parting and Dyer Formations

The Parting and Dyer formations were deposited 385-345 million years ago, when shallow seas again covered much of North America. Colorado was still positioned at warm tropical latitudes.

In the property, the Parting Formation can be seen along county road 150, though it is poorly exposed. It is about 63 to 95 ft. thick, and consists of interbedded sandstone, shale, and dolomite. The sandstone is tan, gray, or light greenish-gray. The sand grains are fine to coarse, and are made of quartz and chert. They occur in laminae, or

thin beds about 4-6 inches thick, or in cross-bed sets about 3-6" thick. Shale in the Parting Formation is black or light greenish-gray. Dolomite is tan or light greenish-gray, and occurs in beds up to three feet thick. A variety of fossil fish remains have been found in the Parting Formation, in places near the property. These include the primitive armored fish *Bothriolepis coloradoensis*, and fragments of lobe-finned fish that are related to modern lungfish and coelacanths. In the property, the Dyer Formation can be seen along county road 150, and along the northeast shore of the lake. It also occurs in the cliffs along the southwest side of the lake, though it is not very accessible. It consists of thick beds of limestone or dolomite that may be sandy or cherty, and is about 170-205 ft. thick. The lower 40-75 ft. are composed of massive, dark gray, nodular limestone that forms a cliff (Houck 2023a).

Photo 32. A partially buried, spiny brachiopod can be seen above the lens cap, located in the Parting and Dyer Formations.

Source: Houck 2023

A photo of a lens cap on a rock near a fossil of an invertebrate.

The limestone cliff is overlain by 10-30 ft. of light tan, sandy dolomite in beds 4-6 inches thick. The sandy dolomite forms the bedrock beneath the observation point on the southwest side of the lake. Above the sandy dolomite is approximately 100 ft. of interbedded gray limestone and dolomite. Above the gray limestone and dolomite are another 20-30 ft. of gray limestone and dolomite with abundant rounded quartz grains (Houck 2023a).

Leadville Formation

The Leadville Formation was deposited about 350-326 million years ago. Colorado was still positioned at warm tropical latitudes and mostly covered by shallow seas (Houck 2023a).

In the property, the Leadville Formation forms the upper cliffs around the lake. The lower 40 ft of the formation consists of gray limestone and dolomite with thin beds and fist-sized chunks of black chert. Above the cherty limestone and dolomite are approximately 100 ft. of medium-gray oolitic limestone. It occurs in beds 6 inches to 10 ft. thick. Sparse marine invertebrate fossils can be seen in it. Bass and Northrop (1963) reported findings of corals, bryozoa, brachiopods, snails, sea lily stems, and fish teeth in the Leadville Formation (Houck 2023a).

After the Leadville Formation was deposited, Colorado's land surface began to rise. The tropical sea drained away and left the top of the Leadville Formation exposed to rainwater. Rainwater is a weak acid, and the rainy tropical climate in Colorado caused the upper part of the limestone to slowly dissolve away. Caves and sinkholes formed, causing streams to flow through underground passages, rather than on the land surface (Houck 2023a).

A landscape with soluble bedrock that shows these features is called karst topography. It is named for a place in Germany where the features were first documented. Today Colorado is too dry for limestone to dissolve much, if at all. However, karst topography is actively forming today in the midwestern and southeastern United States (Houck 2023a).

Though the prehistoric karst topography at Sweetwater Lake shows many of the common features of modern karst topography, it also has unusual small, steep-sided hills, known as karst towers. These can be seen in the photo below, above the vehicles and the cabin (Houck 2023a).

Photo 33. Karst towers located in the Property.

Source: Houck 2023

A photo of rocky outcroppings in the Property.

Karst towers require special conditions to form. They require a thick layer of limestone, a very warm and rainy climate, a land surface that is slowly rising, and a system of fractures in the limestone. There is no place in the U. S. where these conditions occur today. However, they are widespread across southeast Asia (Houck 2023a).

Molas and Belden Formations

Limestone contains small amounts of impurities like silt and clay. When large amounts of limestone dissolve, the impurities may accumulate in a layer. In some places around western Colorado, the layer of impurities on top of the Leadville Formation is thick enough to be a formation (the Molas Formation). In the property, the Molas Formation was identified in a sinkhole between two limestone towers. It is sandy, silty claystone that is reddish brown or yellowish brown. The shale is not bedded, and it breaks into small chunks. According to Bass and Northrop (1963), the Molas Formation is 1-25 ft. thick in the area around the Flat Tops (Houck 2023a).

As the Earth's continents came together to form Pangea, mountain ranges rose in the western United States. The mountains shed mud, sand, and gravel into seaways between the mountain ranges. The property is at the site of a former seaway that existed around 315 million years ago (Houck 2023a).

From 315-306 million years ago, large quantities of mud accumulated in the seaway, burying the karst towers and forming the Belden Formation. It consists mainly of dark gray to black shale and limy shale, and is about 1000 ft thick in the area around the property. The lower 2/3 of the formation contains sparse beds of limestone and gypsum, whereas the upper 1/3 contains beds of micaceous and feldspathic sandstone and granule conglomerate. The Belden Formation is poorly exposed in most of the property, but crops out prominently on the ridges northeast of the property (Houck 2023a).

Though sedimentary rocks were probably formed in the area around the property during the Mesozoic and Cenozoic eras, they were removed by erosion when the White River uplift formed (Houck 2023a).

Surficial Deposits

Numerous surficial deposits have formed in the property during the Quaternary Period. By this time, North America had moved up to its present latitude. The climate was much cooler, and ice ages occurred repeatedly (Houck 2023a).

Alluvial Deposits

Alluvium is sand, gravel and mud that is deposited from running water. It is generally layered and sorted by size, and the gravel is rounded from being tumbled in the water. Both Sweetwater Creek and Turret Creek have alluvial deposits associated with them in the property. Because the land surface in and around the property is slowly rising, older alluvial deposits are found at higher elevations. Old gravel deposits were found at two locations in the property. The photo below shows a layer of rounded gravel at the top of the cut along the irrigation ditch near Turret Creek (Houck 2023a).

Photo 34. A layer of rounded gravel at the top of the cut along the irrigation ditch near Turret Creek.

Source: Houck 2023

A photo of a man sitting on a rocky hillside in the Property.

Gravel deposits were seen about 200 and 400 feet above the present elevations of the local creeks, though some are too small to map. They are generally less than 15 ft. thick. On the adjoining Dotsero quadrangle, gravel deposits approximately 280 ft.

above local streams have a 620,000-year-old ash bed in them. Thus, the gravel deposits in the property are probably around this age or older (Houck 2023a).

Today, Sweetwater Creek is depositing alluvium at the northwest end of the lake. Tributary streams also are depositing alluvium in places where topographic slopes decrease abruptly. The deposits occur as fan-shaped bodies of sand and gravel. If the fan-shaped deposits occur on land, they are called alluvial fans. If they occur where tributary streams enter lakes, they are called fan-deltas. An alluvial fan occurs on the northeast side of the property, and numerous fan-deltas occur on both sides of the lake (Houck 2023a).

When a large rainstorm occurs, stream channels may not be able to contain all of the runoff, and it will spread out over the land surface, carrying sediment with it. The deposits formed by the sediment-laden floodwater are called sheetwash deposits. In the property, sheetwash deposits occur at the bases of steep slopes on the northeast side of the lake. They consist of thin layers of light grayish-brown, sandy, silty clay. Pebble layers may be present, but large gravel is lacking (Houck 2023a).

Mass-wasting Deposits

In addition to alluvial deposits formed by running water, the property contains deposits formed by gravity acting on loose rock material. These mass-wasting deposits are not layered or sorted by size, and the gravel is not rounded. Landslides are particularly abundant in and around the property, especially on the southwest side. There, the Belden Formation, which contains relatively weak shale bedrock, is tilted in the downhill direction. The landslide deposits are composed of angular cobbles and boulders of basalt, in a matrix of sandy, silty, gray mud. Landslide deposits have a distinctive hummocky form and commonly have aspen trees growing on them (Houck 2023a).

The natural dam on the southeast end of the lake was likely formed by a landslide. Bass and Northrop (1963) thought the lake was dammed by a moraine formed by a glacier that moved down the valley of Sweetwater Creek. However, the dam doesn't have rock types from further up the valley and doesn't have the form of a moraine. The rock types in the dam are like those in the adjacent landslide deposits. The dam has the hummocky form of a landslide, and even appears to be contiguous with a large landslide complex to the south of it (Houck 2023a).

At least one of the landslides on the southwest side of the property appears to be actively moving. It has relatively young trees on it, and the trees are tilted at odd angles. They are shown in **Photo 35**. When rock and soil debris accumulates gradually at the base of a slope, it forms a deposit called colluvium. The colluvium in the property occurs mostly at the base of the Belden Formation on the northeast side, and at the base of the Leadville/Dyer cliffs on the southwest side. It consists of angular cobbles and boulders of limestone, sandstone, and basalt oriented randomly in a matrix of brownish-gray sand, silt, and clay. It forms relatively smooth slopes (Houck 2023a).

Photo 35. A landslide area in the southwest side of the Property.

Source: Houck 2023

A photo of a hillside with scattered trees.

Alluvial and Mass-wasting Deposits

Some surficial deposits, including debris flow deposits, form through a combination of alluvial and mass-wasting processes. Debris-flow deposits form when a large rainstorm occurs over a stream drainage that has lots of rock and soil debris in it. The waterlogged debris moves rapidly downhill in a muddy mass. If the debris spreads out at the base of a slope, it becomes a debris fan. In the property, a debris fan occurs northeast of the restaurant. It forms a low hill covered with gambel oak (Houck 2023a).

Resource Conditions

Geologic features in the Park are relatively undisturbed and in good condition. Due to its steep slopes, the rock formations and surficial deposits in the Park are vulnerable to erosion. There is not much that can be done to prevent the erosion that is occurring naturally in the Park, but it will be important to avoid doing things that make erosion worse. Erosion mitigation should be an important part of any development plans for the Park. The landslides, sheetwash, and debris flows are prone to mass movement. The movement can damage the deposits, and also damage any infrastructure in the paths of the moving deposits. Some of the mass movement is probably inevitable, but the odds of it can be lessened. Avoid oversteepening slopes in these deposits and in the Belden Formation (which is the source of most of the landslides). Insofar as is possible, avoid adding water to the deposits and to the Belden Formation. Keep slopes vegetated and revegetate them as quickly as possible after a fire (Houck 2023a).

Table 19. List of Geology Resource Conditions at the Sweetwater Lake Property.

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. Erosion naturally occurs due to the types of geology present at the Park. No prevention measures can be implemented to stop the degradation of this resource.
Geological Hazards		Update once Geo Hazards report received

Discussion and Conclusions

The geology at the Sweetwater Lake property includes features that are highly significant. The most significant features in the property are the karst towers. Isolated karst towers (fenglin karst) occur in other places, but as far as is known, this is the only place in the United States where a landscape with numerous karst towers together (fengcong karst) can be seen. The fact that it is a well-preserved 325-million-year-old landscape and not a modern one is also significant. Another significant aspect of the property's geology is that, if a management agreement is reached, this would be the only Colorado state park to feature lower and middle Paleozoic rocks. These rocks display approximately 200 million years of Colorado's geologic history that can't be seen at any other Colorado state park. The property is also a good place to see a variety of interesting surficial deposits, such as landslides, debris flows, fan deltas, and ancient stream deposits (Houck 2023a).

The Manitou, Parting, Dyer, and Leadville formations in the property are relatively durable, and are not likely to be damaged by the activities of property visitors. Due to steep slopes, natural erosion will probably cause rocks in these formations to fall from cliffs at times. The Belden Formation's soft shale is especially vulnerable to erosion, resulting in landslides. Trails on the Belden should be designed to minimize erosion as much as possible (Houck 2023a).

Though Sweetwater Lake is not a geological feature, it is the focal point of the property, and can be threatened by geological processes. Both Turret and Sweetwater creeks are slowly filling the lake with alluvium. Intermittent drainages are also contributing alluvium to the lake in the form of fan deltas. If erosion is minimized in the drainage basins of these two creeks, that will extend the life of the lake (Houck 2023a).

The property's interesting geology offers many opportunities for interpretation. The scenic overlook on the southwest side of the lake would be a good place for interpretive signage with general information about the property's geological features. The property's unique karst tower landscape could be interpreted on site or in the visitor center. The property's numerous surficial deposits could also be interesting topics for interpretation, especially the landslide that forms the lake's natural dam.

The geologic history recorded in the property's Paleozoic rock formations would be a good topic for a display at the visitors' center (Houck 2023a).

Soils

Description

The soils present at the Sweetwater Lake Property are typical of the mountainous setting with several different parent materials and landforms, resulting in different soil types. **Table 20** below outlines the soils that comprise the majority of the area within the Property. Most of these soils are a result of parent material flowing down a river or creek and being deposited over time (alluvium). Colluvial soils are those that are deposited from parent material without the assistance of water, usually coming to rest at the bottom of a steep slope.

According to the custom soil survey report for the Property (NRCS 2022), there are eight soil types at the Sweetwater Lake Property (**Figure 11**). Attributes in this table are helpful for planning and management at the Property. Several soil types have a severe hazard rating for trails and roads and should be avoided during development if possible.

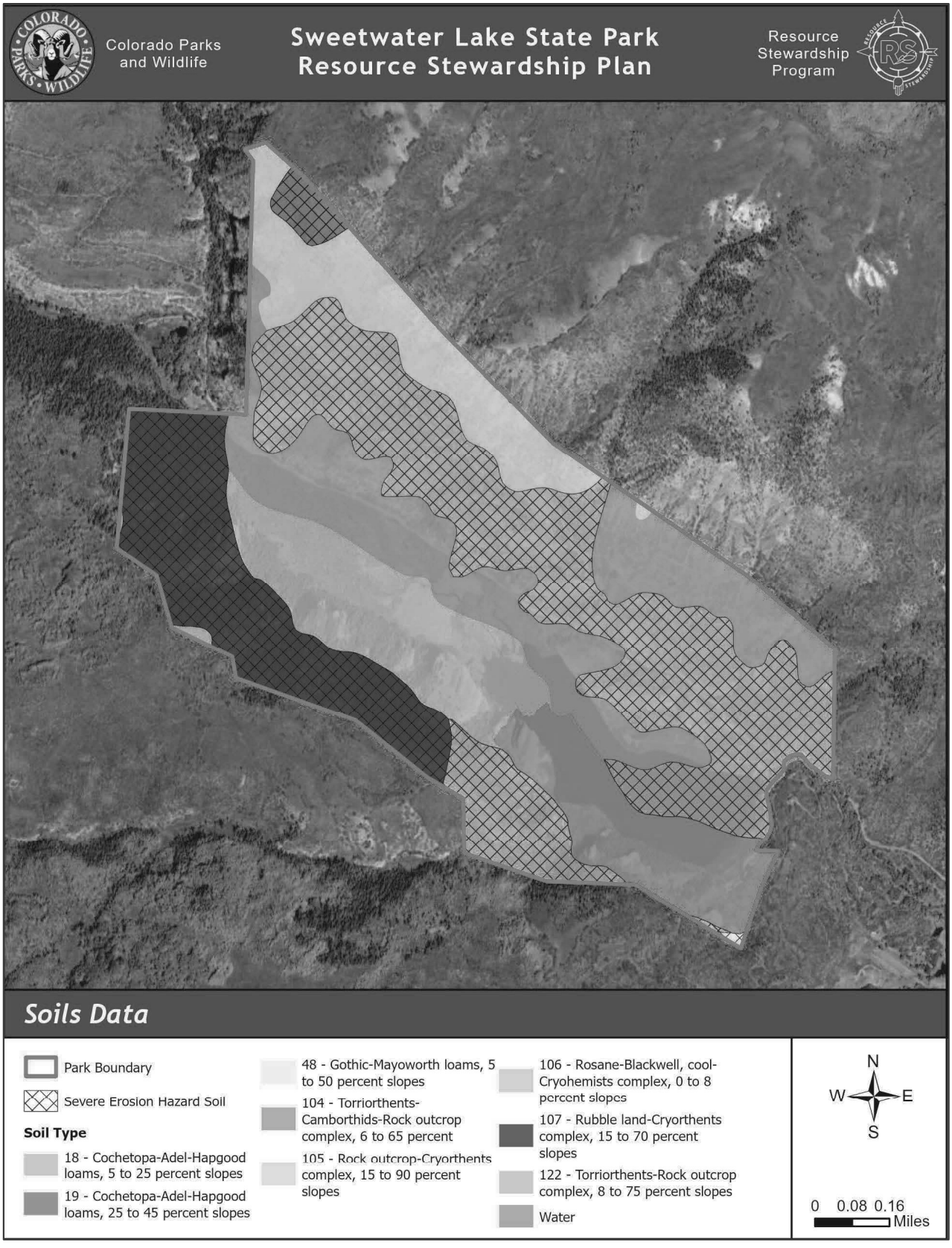
Table 20. Soil Types Present at the Sweetwater Lake Property.

MUSYM	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard*
18	Cochetopa-Adel-Hapgood loams, 5 to 25 percent slopes	Mountain slopes, ridges	Well Drained	Moderate
19	Cochetopa-Adel-Hapgood loams, 25 to 45 percent slopes	Mountain slopes, hillslopes	Well Drained	Severe
48	Gothic-Mayoworth loams, 5 to 50 percent slopes	Mountain slopes, ridges	Well Drained	Severe
104	Torriorthents-Camborthids-Rock outcrop complex, 6 to 65 percent	Mountains, ridges	Well Drained	Not Rated
105	Rock outcrop-Cryorthents complex, 15 to 90 percent slopes	Cliffs, bluffs	Well Drained	Not Rated
106	Rosane-Blackwell, cool-Cryohemists complex, 0 to 8 percent slopes	Alluvial fans of mountain valleys	Poorly Drained	Slight
107	Rubble land-Cryorthents complex, 15 to 70 percent slopes	Drainage ways on mountain valleys	Poorly Drained	Severe

MUSYM	Soil Complex	Landform	Soil Origination (Parent Material)	Erosion Hazard*
122	Torriorthents-Rock outcrop complex, 8 to 75 percent slopes	Mountain slopes/canyons	Well Drained	Severe

Source: (NRCS 2023)
**Erosion hazard rating for trails and roads*

Figure 11. Soils Data Map.



Resource Conditions

Soil conditions play an important role in the functioning of ecosystems and the health of soil is essential to support biodiversity and ecosystem services. Soil conditions may be inferred based on what is seen in the Property, but it is difficult to assess as no surveys have been conducted on soil health. Human activities have caused impacts on the habitats in the Property, and the degree of these impacts varies from one side of the lake to the other. Overall, much of the Property is undeveloped and protected from disturbances to soils, and attempt to maintain that condition should be made.

The western side of Sweetwater Lake has minimal human impact on soils, limited only to a low-use recreational trail, which is closed for much of the year to protect nesting and fledging raptors, including bald eagles. The ecosystem components, including soils, are intact and functioning well, providing high-quality resources for wildlife.

On the eastern side of Sweetwater Lake, however, human impacts on habitats are much higher. Ecosystem processes have been compromised by alterations to vegetation, soils, and hydrology. In much of the Property's upland habitat on the east side of the lake, human disturbance has affected soil health through compaction and erosion. Soil compaction can have negative effects on soil health and quality, as well as vegetative growth. Heavy grazing and development can result in soil compaction, reducing the ability of the soil to absorb water and support plant growth. Erosion is another issue in this area. Erosion removes the topsoil, which is rich in organic matter and nutrients that are essential for plant growth. This can result in reduced soil fertility and productivity, making it more difficult for native plants to thrive. Overall, the conversion of native ecosystems to unnatural systems can severely diminish ecosystem processes and function, resulting in excessive erosion, reduced water infiltration, increased runoff, and nutrient pollution.

The wetlands to the north and west of the Property contain the invasive plant, reed canarygrass. The presence of reed canarygrass can affect flooding regimes and soil nutrient properties. By forming dense stands and outcompeting native vegetation, reed canarygrass can reduce the diversity of plant species and the associated soil microorganisms that contribute to soil health. This can result in changes to soil structure, nutrient cycling, and water retention, potentially reducing the overall health and resilience of the soil.

Table 21. List of Soil Resource Conditions at the Sweetwater Lake Property.

Resource	Condition / Status	Description
Soils		More data should be collected on this resource in order to better understand its condition. Erosion and compaction issues were documented during the 2022 vegetation assessment. Severe erosion soil types are present in the Property and should be avoided when building trails or infrastructure. Although issues are present, the overall impacts to soils in the Property is minimal but soil conditions are likely to decrease with increased visitation.

Discussion and Conclusions

The NRCS soils data for the Property indicate 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 one of the most significant impacts of Property activity on the geology and soils. Social trail development may be of concern as visitation increases, especially in campgrounds, and will in turn increase the chances of soil compaction becoming a major problem. Proper trail construction and maintenance procedures should be implemented on all new and existing trails. This will keep erosion at a minimum as well as assuring proper routing of new trails. Avoid building or allowing new trails on terrain with soils or geology that may be difficult to sustain. Extensive mitigation efforts may be required to develop trails on the old railroad grade, as there is visible evidence of erosion and instability. Limit construction on uplands surrounding the Property. This will preserve scenic cliffside and maintain aesthetically-pleasing atmosphere for Property visitors (CPW 2003).

Despite disturbance, ecosystem functions can be restored with changes in management practices. Remedies for excessive erosion may include trail and/or road realignment, construction of various structures within trails, paving of roads, additional streambank stabilization, and working with adjacent landowners and other agencies (e.g. CDOT) to address erosion problems. Restoration of the vegetation and soils in the upland areas on the east side of the lake to prevent excessive sedimentation and nutrient pollution in Sweetwater Lake is a possibility for future management(CNHP 2022). These remedies would improve water quality and habitat in Sweetwater Lake and downstream in Sweetwater Creek. An assessment of sediment sources and movement within and outside the Property could also be conducted. In the future, additional changes to soil and geology may be a result of stream channels becoming more incised or altering their course within their floodplain, as well as further development of soil from the granitic bedrock.

Paleontology

Description

The Sweetwater Lake Property contains sedimentary rock formations of Paleozoic age that were deposited between 488 and 306 million years ago. In the middle and late parts of the Paleozoic Era, Colorado was near the equator at tropical latitudes, and was frequently covered by shallow tropical seas. It also contains a variety of surficial deposits. Four of the rock formations contain fossils, either in or near the park. These are the Parting, Dyer, Leadville, and Belden formations.

Knowledge of the paleontological resources that are present in the Property 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 Sweetwater Lake Property. **Table 22** below lists the surveys and monitoring efforts that have been conducted related to Paleontology. Sections following provide information about specific communities identified in the Property based on these efforts. **Chapter 5** discusses future survey and monitoring effort needs for the Property based on those that have been conducted.

Table 22. List of Surveys and Monitoring Conducted for Paleontology Resources at the Sweetwater Lake Property.

Resource	Description	Years	Performed by
Paleontology at the Sweetwater Lake Property	Desktop and field review of geologic resources	2023-2024	Karen Houck

Parting Formation

The Devonian-aged Parting Formation is known for its fossils of primitive fish (Houck 2023b). The two most common kinds are placoderms and rhipidistians. Placoderms are primitive armored, jawed fish. Placoderms in the Parting Formation are most commonly identified as *Bothriolepis coloradoensis*. Rhipidistians are a type of lobe-finned fish. They are distantly related to lungfish and coelecanths, and are thought to be ancestral to amphibians. Rhipidistians in the Parting Formation are most commonly identified as *Holoptychius*. Bass and Northrop (1963) collected fish fragments from two localities near the park, or possibly in it. The localities are described as "junction of Sweetwater and Turret creeks, above Currier's Ranch." During the field survey, no additional fish fragments were found in the Parting Formation within property boundaries. However, it is likely that natural erosional processes will eventually expose more (Houck 2023b).

Dyer Formation and Leadville Formation

The Devonian-aged Dyer Formation and the Mississippian-aged Leadville Formation contain a wide variety of marine invertebrate fossils. The common forms of sea life in the Paleozoic tropical oceans were different from those today (Houck 2023b).

In the Devonian reconstruction below, courtesy of Falls of the Ohio State Park, the orange disk-shaped objects are solitary corals (horn corals). The pink, stalked objects on the right side of the picture are crinoids (sea lilies). A snail and a nautilus can be seen between the sea lilies and the corals. Twig-like bryozoa (moss animals) can be seen in the lower left corner of the picture.

Photo 36. Devonian reconstruction of marine invertebrates that were once present where the Property is located.

Source: Houck 2023b

A photo of a marine environment with a variety of marine invertebrates.

Bass and Northrop (1963) collected a large number of brachiopods, snails, and bryozoa from the Dyer Formation at U. S. National Museum locality 26963. It is a short distance up the hill from the Parting Formation localities 26961 and 26962, near the junction of Sweetwater and Turret creeks. Note that Bass and Northrop identified a new species of brachiopod and a new genus of bivalve at locality 26963.

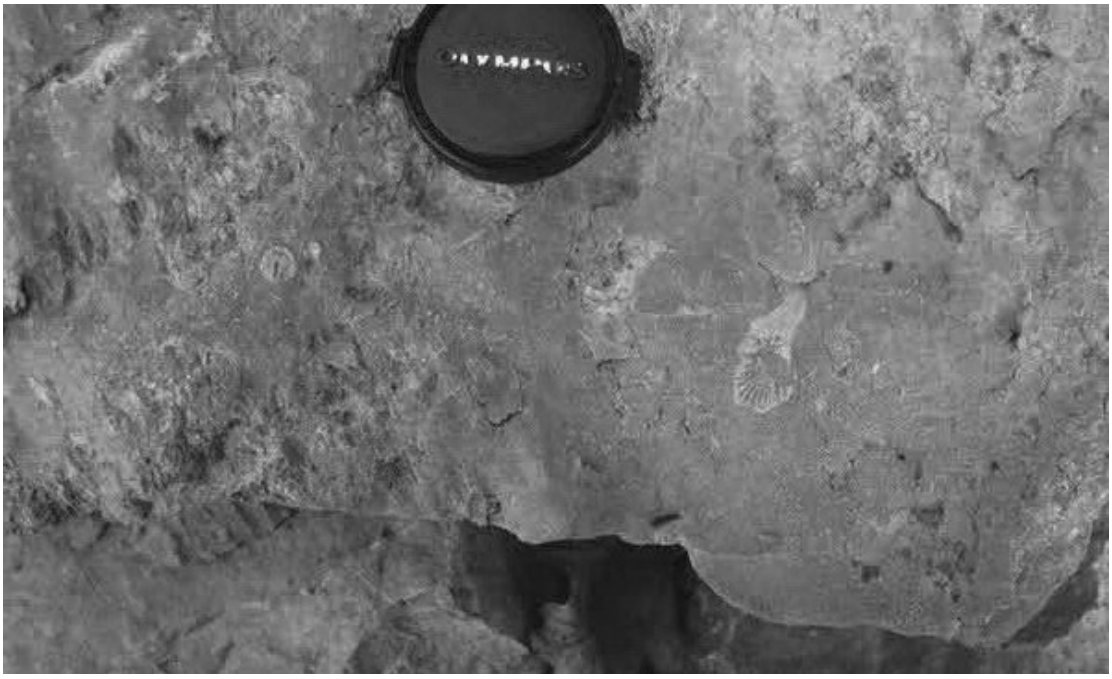
In 1958, R. H. Flower collected brachiopods, bryozoa, snails, cephalopods, and bivalves from the Dyer Formation. He listed the locality as "Sweetwater Lake," but the exact spot isn't known. It is U. S. National Museum locality 26952.

During the field survey, brachiopods, crinoids, and bryozoa were found in the Dyer Formation along the northeast shore of the lake. Bass and Northrop (1963) also reported finding corals, bryozoa, bivalves, cephalopods, and fish teeth in the Dyer Formation near the park.

Museum locality searches did not yield any Mississippian fossil localities in the park, but marine invertebrate fossils were found in the Leadville Formation at two localities. At locality 2, crinoid fragments and solitary corals were found. The photo

below shows longitudinal and cross-sectional views of solitary corals below the lens cap.

Photo 37. Longitudinal and cross-sectional views of solitary corals.



Source: Houck 2023b

A photo of a fossil in a rock and a lens cap.

Belden Formation

The Pennsylvanian-aged Belden Formation was also deposited in a shallow tropical sea. However, the nearby mountains were shedding mud and sand into the sea. This caused changes in the types of animals that could live there. Corals and crinoids are not very common in the Belden Formation. Bryozoa and brachiopods are common, as in the Dyer and Leadville formations. However, bivalves and snails are much more common, as they are better suited for life in muddy conditions. Bass and Northrop (1963) made extensive fossil collections in the Belden Formation, in the area around the Flat Tops. However, no localities were logged within park boundaries. A new species of crinoid was discovered in the Belden Formation, approximately 8 miles southeast of the park (Webster and Houck, 1998). During the field survey, no fossils were found in the Belden Formation within property boundaries. As it is poorly exposed on the property, this is not very surprising. However, fossils may be found in the future because the Belden Formation contains numerous fossils and erodes easily.

Paleontological Significance

The results of the paleontological significance ratings are shown on the map below. Fossils were not found in the Manitou Formation or in the surficial deposits in the Property. Thus, their paleontological significance is rated as low. The Parting, Dyer, Leadville, and Belden formations have yielded common invertebrate body fossils in

and near the Property. These formations have also yielded scientifically significant fossils at localities near the Property. Thus, the paleontological significance of the fossils in these four formations is rated as medium. No paleontologically significant fossils were found at any localities that are known to be within park boundaries, so no formations were given a rating of high paleontological significance.

Resource Conditions

Paleontological resources at the Sweetwater Lake Property are in good condition and relatively undisturbed. A survey for paleo resources was conducted for the first time in 2023 and found several fossils in the Property.

Table 23. List of Paleontology Resource Conditions at the Sweetwater Lake Property.

Resource	Condition / Status	Description
Paleontological resources		The overall condition of paleontological resources in the Property has remained constant and is considered good. Visitation, trail use, and other activities have not been found to impact potentially sensitive areas of the Property.

Discussion and Conclusions

Sweetwater Lake is the only Colorado State Parks property with a record of life in the Devonian, Mississippian, and early Pennsylvanian periods. For that reason, the property is unique among the Colorado State Parks properties. However, the fossils that have been found on the Property are relatively common, and most are fragmentary. They tend to be firmly embedded in their respective rock formations, so are not at much risk of theft by visitors. The fossils at locality 2 are at some risk of damage from falling rocks, but the falling rocks will also supply more fossils. At this time, no special protections are recommended (Houck 2023b).

The fossils at the Property are amenable to interpretation. Paleozoic sea animals were very different from sea animals today, and visitors may be interested to learn about these strange prehistoric creatures. The idea of a tropical sea floor preserved at an elevation of approximately 7800 feet above sea level, on the edge of the snowy Flat Tops, is also intriguing. When not underwater, the fossils in the Dyer Formation at locality 63 on the northeast side of the lake are easy and safe for visitors to see. The fossils in the Leadville Formation, at localities 2 and 9, are a little more problematic. Due to steep slopes and loose rock, neither is safe for visitors. With heavy equipment and some effort, some of the fossil-bearing boulders at locality 2 could be moved to a safer area to make a “rock garden” where visitors could walk around and see fossils in the boulders. On-site interpretation could be appropriate at locality 63 or the “rock garden.” An exhibit about the Property’s fossils would also be a welcome addition to the visitors’ center (Houck 2023b).

Another state park that showcases Paleozoic fossils is Falls of the Ohio State Park in Indiana (https://www.fallsoftheohio.org). Though their fossil beds are more extensive, they are similar to the ones at Sweetwater Lake. Property staff and

volunteers have developed numerous exhibits and visitor activities. See especially the "Discover" and "Resources" section of the website for examples. Some of the exhibits and visitor activities at Falls of the Ohio would also be appropriate for Sweetwater Lake, especially the ones about fossils, rock formations, geologic time, karst topography, archeology, and human history (Houck 2023b).

Cultural Resources

Resource Summary

Significant Features

Previous archaeological investigations conducted from 1997 and resulted in the determination that one was eligible for a listing on the State and National Register of Historic Places (SRHP/NRHP). While a number of sites are not eligible, they are significant for the role they played in local history; as a result they offer a number of interpretive and educational opportunities for visitors.

Threats

- Structures-Some historic structures in the property 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 habitation or recreational activity.
- Collection of Artifacts - The collection of artifacts significantly alters a site's integrity making it difficult to determine significance without time consuming and costly excavations.
- Disturbance of Undiscovered Sites - All development and use 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

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

Before Euro-American settlement, the land that the Sweetwater Property is on was Ute land, and the Eastern Shoshone, Timpanogos, Dine (Navajo), Cheyenne, and other tribes lived nearby. Sweetwater Lake was part of the Parianuche Ute homeland before their dispossession. Before their removal, the Ute practiced a highly mobile lifestyle, moving based on resource availability and wildlife migrations. The cave at Sweetwater Lake contains Ute cave art. Following the end of the Mexican American War in 1848, American interest and settlement in the western United States increased. This resulted in conflicts between settlers in Colorado and the Ute, which culminated in the United States government forcibly driving the Ute away from the area in 1881.

Beginning in the 1880s and 1890s, the land around Sweetwater Lake was purchased by various entrepreneurs and ranchers, many of whom, like Hiram Marks and John Root, opened resorts on the lake. Property around the lake was privately owned apart from a small parcel of USFS land on the lake. Property ownership of the lake has changed many times since the 1890s, however, resorts have remained the primary land use at the lake. Celebrations, weddings, community events, and more have long been held at Sweetwater Lake, making it a local cultural and economic hub.

Ranching activities have also influenced the area around the lake since the 1880s. Ranching operations developed in the area alongside resorts, and many ranches shifted to a "dude ranch" business model, housing tourists to the lake during the summer. In 1919, Denver Post cartoonist Paul Gregg purchased the Sweetwater property. From 1926-1932, it was owned by noted gangster Leland Varain, who ran a dude ranch. The property was subdivided in the 1950s into numerous properties as separate resorts. In the early 1960s, the land was reconsolidated by General Anderson. There have been multiple threats to the resources on the property, including a 1965 proposal to create a hydroelectric power plant at Sweetwater Lake. The Property was purchased in 2021 by the USFS. A unique land management agreement with CPW is being negotiated at the time of this writing.

Description

This Stewardship Plan and the CPW's cultural resource conservation at Sweetwater Lake is based in knowledge of the cultural resources and conditions in the property, which largely comes from archaeological surveys and monitoring. Survey and monitoring serve as the foundation for this Stewardship Plan and are crucial for CPW's ability to conserve resources at Sweetwater Lake. The sections that follow provide information about specific cultural resources identified in the Property based on these efforts. The section on resource conditions discusses future survey and monitoring efforts needed for the Property, based on previously conducted surveys and monitoring.

In the following section, a brief overview of the history of the property is given, from the earliest occupation thousands of years ago through the present. It is important to acknowledge that Colorado and Sweetwater Lake have been the traditional homelands of Indigenous peoples since time immemorial. The State of Colorado works in partnership with over 48 sovereign nations who continue to call this land home. Sweetwater Lake lies on the ancestral and native lands of the Ute People. You can learn more about this history at https://native-land.ca/. While native people have been dispossessed of these lands, they still hold significance for them. Therefore, we align with History Colorado in their goal to create exhibits; collect, preserve, and interpret artifacts; do archaeological work; tell the stories of Colorado's original peoples in our publications; and create educational programs to share the history of Colorado tell the story of Colorado's original inhabitants ("Native American History & Heritage" 2021).

Indigenous groups were the first to use the land that became the United States, and understanding their story is necessary to understand the history of American land use. These lands, with their abundant resources such as game and plants, diverse ecological regions, year-round water, and sheltered areas, have been home to native peoples for thousands of years. It is important to remember that the history of these lands is closely tied to the history of all Native Americans. Conquest, broken treaties, forced relocation, and attacks on cultural ways of life mark this history. These events

had a significant impact on the history of the native people originally inhabiting these lands.

Locals currently enjoy Sweetwater Lake, and the creation of the publicly-accessible Property will likely many bring additional visitors. Interpretation is an important tool for acknowledging the complex history of the area, and teaching it to visitors. This stewardship chapter facilitates this by identifying cultural resources and providing a historic context explaining their relevance to the parks' history. By learning about the Property's history through land development, Property management gains a tool for facilitating interpretation.

Understanding the cultural resources and historic context of Sweetwater Lake and the surrounding region can benefit staff. Staff can use this knowledge of the Property's resources to create accurate, engaging, and inclusive historical interpretations highlighting cultural resources. Doing this can foster goodwill within the local community and public support for the Property. Interpretation could also leave lasting impressions on out-of-town visitors, explaining why they should support and protect the Property. Updating interpretation might attract new and more diverse visitors, especially those seeking historical connections to the land.

The chapter is divided into two chronologically overlapping parts: Indigenous prehistory and post-removal history. These are divided chronologically and thematically. For the prehistoric, the chronology starts with the Paleo-American Era. Here, Era (or stage) is used to designate a long period of time wherein people shared certain characteristics and cultural traditions. Eras are then sub-divided into periods and phases. We note that although we call this a period of prehistory, Indigenous peoples changed over time in response to shifting social, political, economic, and cultural contexts. Native societies were not simply determined by the environment nor were they static over the long term. That is, like everyone else, they were historical peoples (Barr, 2017). The division between Prehistoric Native American history and Historic Euro-American history is problematic, but it is the division used in resource management today.

The post-removal historical period sections revolve around themes of settlement by Euro-Americans. In sum, the chapter tells stories of changing and persisting land use patterns and how those patterns shaped the modern Propertys' landscape. Preserving and telling these nuanced histories can bring diverse peoples together today in recognition of their shared heritage while also highlighting their distinctiveness.

Prehistoric and Historic Native American Land-use (12,000 BCE – 1881 CE)

The history of land use in America cannot be fully understood without considering the Indigenous groups and their cultures. These lands, with their abundant resources such as plentiful game and plants, diverse ecological regions, year-round water from Sweetwater Lake, and sheltered areas, have been home to native peoples for thousands of years. The Sweetwater property falls in the cultural context called the "Northern Colorado Basin" (Reed and Metcalf 1999) and "Mountains" contexts (Guthrie et al. 1984). These can be used as references to learn more.

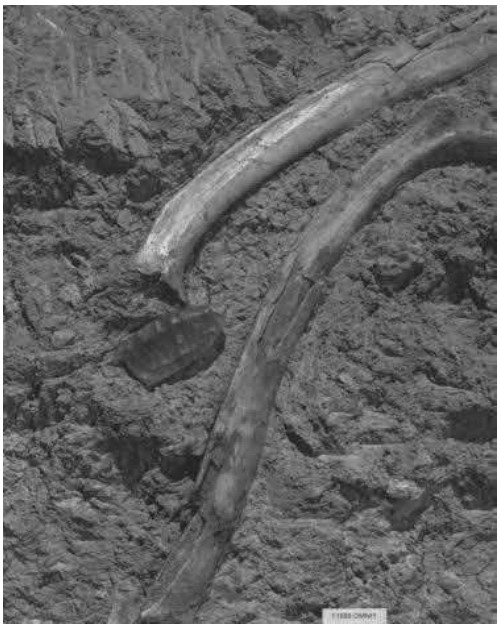
It is important to remember that the history of these lands is closely tied to the history of all Native Americans. This history is marked by events such as conquest,

broken treaties, forced relocation, and attacks on cultural ways of life. These events have had a significant impact on the history of the peoples who lived on these lands.

Paleo-American (11,500-6400 BCE)

To understand the history of Sweetwater Lake, we must go all the way back to when the first humans arrived in the Americas, over 11,500 years ago. Archaeologists believe that people first came to the Americas by boat, following the coastline from Siberia to the western coast of the Americas, which at the time were connected by a land bridge. Some believe that people crossed on foot over this land bridge, but this theory is less accepted now. Archaeologists refer to these people as Pre-Clovis, and we do not know much about them, as only a few of their sites have been found in the entire United States.

Photo 38. Folsom Point.



Source: History Colorado

A photo of a fossil located in a brown rock.

The earliest evidence of human habitation in western Colorado dates to the Paleo-American period, also known as the Paleo-Indian period, which lasted from 11,500 to 6,400 BCE. The people of Colorado during the Paleo-American period lived as nomadic or semi-sedentary hunters and gatherers, hunting large and medium-sized game. In the mountains and foothills where Sweetwater Lake is located, they focused on hunting deer and elk, rather than bison, which were mostly found on the Plains. The tools used by the Paleo-American people were designed for hunting large game, and were characterized by large, lanceolate-style points. While this was time of general continuity, small changes in tool technologies and mobility allow archaeologists to distinguish four Paleo-American phases: the Clovis, Goshen, Folsom, and the Plano (Reed and Metcalf 1999).

Archaic (6400-400 BCE)

People in Western Colorado made a major change in their lifestyle during the Archaic period. As the climate warmed up and large animals disappeared, people had to adapt their way of life. Instead of being nomadic, they became semi-sedentary or fully sedentary, relying on local plants and animals for food. This change also led to the development of new tool technologies, such as the bow and arrow, and an increase in plant processing tools, like groundstone. Archaic people developed new styles of projectile points. Common point types include lanceolate, stemmed, corner, and side notched (Reed and Metcalf 1999). People began constructing new types of formal and informal dwelling structures, like pithouses, basin houses, and rock shelters. People also started burying their dead in elaborate ways and creating rock art. These changes reflect the adaptations to a new way of life and the growing diversity of cultural practices.

Formative (400 BCE-1300 CE)

The Formative period in Western Colorado is marked by the arrival of horticultural groups, who cultivated plants for food rather than solely gathering them from nature. While not all peoples practiced horticulture, this was a significant transition for some groups within the study region. This was also a time of diversity of cultural traditions. Archaeologists have inferred the presence of at least three cultural groups present in this region of Colorado at this time, known as the Fremont, Gateway, and Aspen.

The horticultural groups in the region near Sweetwater were part of the Fremont Tradition. The Fremont cultural group describes a group of Native American peoples who lived in what is now the Western United States, particularly in what is now Utah, Nevada, and Colorado. They are considered to have lived from about 600 to 1300 CE. The Fremont peoples are characterized by a number of cultural features, including horticulture, basketry, moccasin-style footwear, trapezoidal anthropomorphic figurines and rock art, and high-quality coiled pottery. They had substantial habitation structures, trading practices, storage facilities. A regional drought may have caused the decline of Fremont culture around 1300 CE (Reed and Metcalf 1999). In the wake of the Fremont tradition, the Ute moved into this part of Colorado (Conner and Hutchins 1992).

Hunter-gatherer people of the Gateway Tradition lived in the region concurrently with horticultural groups like the Fremont. These groups are identified by the presence of ancestral Puebloan pottery, masonry structures, reliance on wild plants and animals, corner-notched projectile points, lack of ceramic production, shorter-term habitation, circular and/or rectangular stone masonry construction, and rock art (Reed and Metcalf 1999:131). Sites with links to both the Fremont and Gateway Traditions have been documented. These sites have included a variety of artifacts, such as domesticated squash plants, granaries, and Ancestral Puebloan (formerly known as Anasazi) ceramics, Fremont ceramics, and two handed manos.

People of the Aspen Tradition also lived in this part of Colorado in the Formative period. This cultural tradition is characterized by their specific set of material culture, including pottery, stone tools, and distinctive architectural styles, such as circular semi-subterranean structures. The Aspen Tradition represents a unique blend of influences from both the Plains and the Great Basin cultural traditions.

While the relationship between all three groups is not always clear in the archaeological record, it is clear that Western Colorado during the Formative period was characterized by the arrival of horticultural groups and a diverse cultural landscape (Reed and Metcalf 1999).

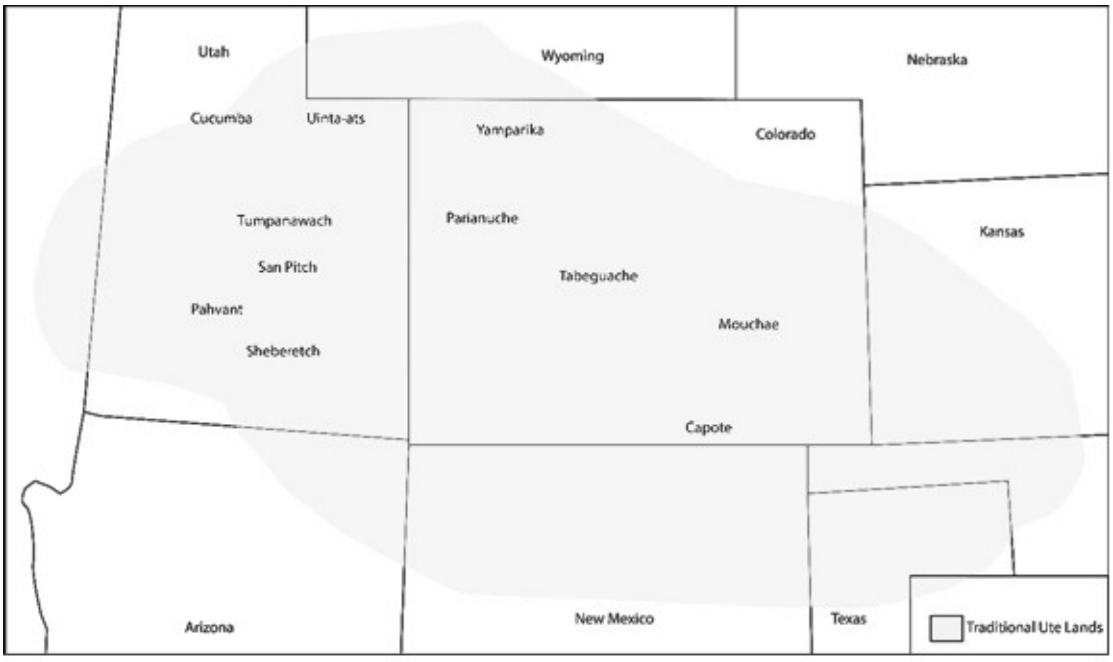
Protohistoric (1300-1862 CE)

The Protohistoric period in Western Colorado refers to the period between the decline of horticultural practices and the permanent settlement of Euro-Americans. During this time, the presence of historically documented Native American tribes in the region becomes identifiable. The Ute were the primary inhabitants of Western Colorado during this period. This period witnessed the transition from pre-European contact indigenous cultures to those impacted by European colonization and expansion.

During this time, the region was primarily inhabited by the Ute people (Reed and Metcalf 1999). These sites are characterized by the use of obsidian, Uncompahgre brown ware pottery, and small triangular and side notched points (Conner and Hutchins 1992). The Ute at this time maintained a highly mobile lifestyle, moving based on available resources and subsisting off of hunting and gathering. Habitations were often wikiups, and later Tipis. Socially, the Ute were organized into bands, typically consisting of multiple family groups, with the size varying according to resource availability. The Ute band who called Sweetwater Lake home was the Parianuche, or "elk people" (Colorado Encyclopedia). They would later become known as the White River Utes, along with the Yamparika.

Ute lifeways underwent significant changes during this period, largely due to interactions with Europeans. The arrival of horses brought by Europeans would become a major part of Ute culture and help the Ute expand their territory and participate in emerging economies. Interactions with Europeans also introduced materials and technologies such as new types of pottery, metals, and glass. However, these interactions also brought about negative consequences, including slave trading, forced labor, warfare, and disease, which ultimately dealt a major blow to traditional Ute lifeways and led to their eventual removal from their homelands in Colorado.

Photo 39. Ute Bands of Colorado.



Source: R. Egan, CPW

A photo of a map of Utah, Wyoming, Colorado, Nebraska, Kansas, Arizona, New Mexico, and Texas and the traditional Ute land range in yellow.

Historic Ute (1862-1881)

Euro-Americans came west seeking gold and other valuable minerals, as well as land for farming and ranching, encroaching on Ute lands. The Federal government responded by pressuring tribes into signing treaties whereby the Ute forfeited their

land in exchange for promises of protections and support from the federal government. These treaties were often broken by the Government. The Tabeguache band of Utes signed the 1863 Conejos Treaty, which ceded the land east of the Rocky Mountains to the United States. The Ute were removed from the front range, and were resettled on the western slope. They remained greatly stressed economically due to the shortage of game, which was still their primary means of subsistence (Baker et al, 2007).

Ouray was chief of the Tabeguache Ute from 1860 until his death in 1880. He believed that the Ute could not stop the westward expansion of Euro-Americans, and that the best way to protect his people was to negotiate with the U.S. Government for better treaty terms. He was known for his diplomacy, and he represented the Utes in negotiations with the U.S. Government. While many Ute supported him, he also faced threats to his leadership and his life from other Utes, including his brother-in-law Sapinero (Jocknick, 1998; Varnell, 1999).

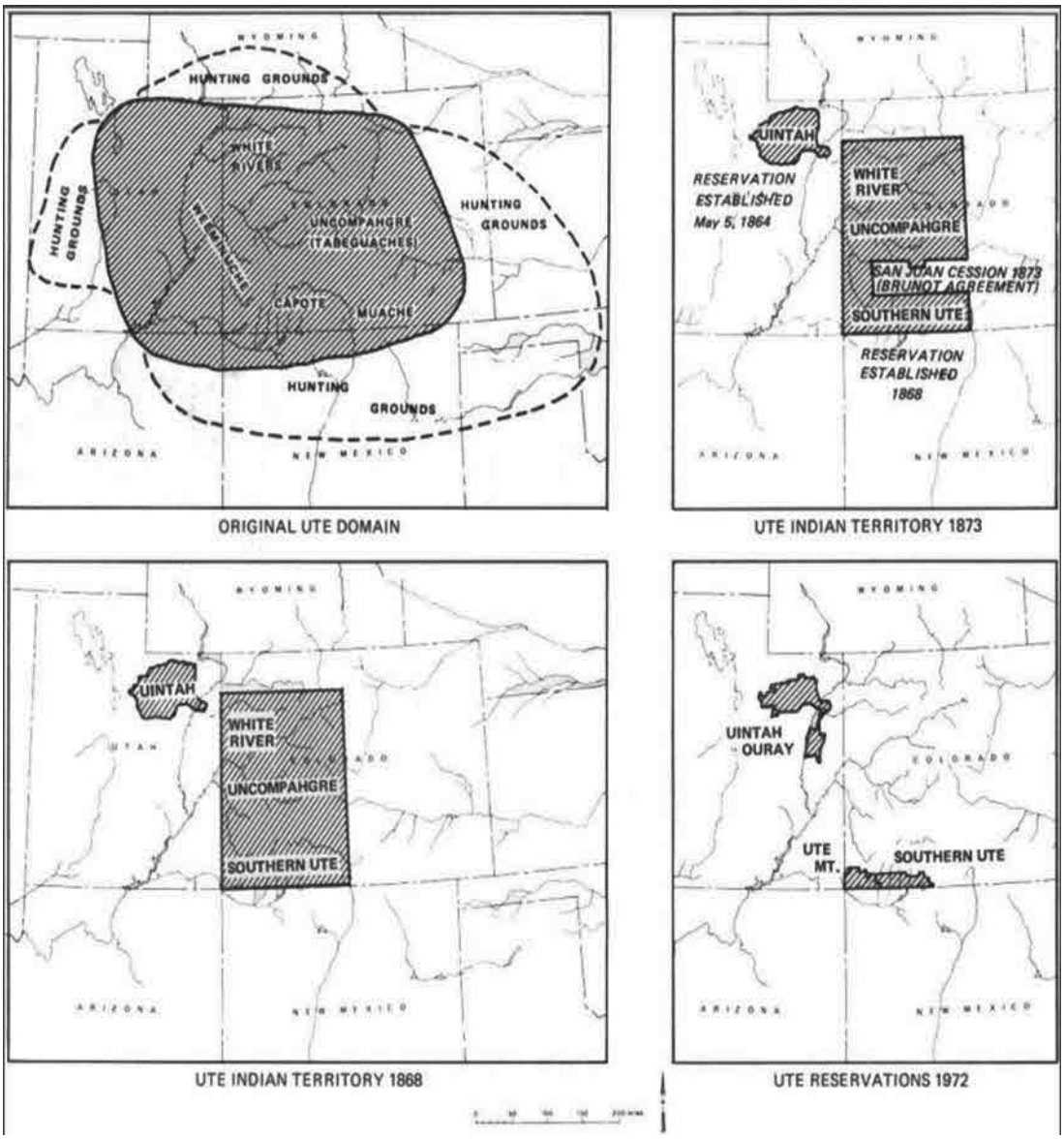
As Euro-Americans pushed further west they encroached on the lands which had been promised to the Utes by the Conejos treaty. The U.S. Government pushed forward a new treaty, which would undermine the Conejos treaty and take more lands from the Ute peoples. Ten Ute chiefs, including Ouray, signed the Treaty of 1868. This treaty stated that all of the Ute should be moved onto a smaller area, about one-third of the territory of Colorado. The Indian Agency was established at White River Rio de Los Pinos.

On this newly founded reservation, schools were established, and the Indian Agency attempted to push the Utes to adopt farming instead of their traditional subsistence strategies by gifting land, money, and seeds to any family that wished to participate. Agencies were also given money in order to supplement food, clothes, and other necessary items. A key stipulation of this treaty was the promise that non-Natives would not “occupy or pass through the reservation” (Colorado Encyclopedia). The U.S. Government routinely failed to provide the support and protections they promised to the Ute. It is also important to note that the U.S. Government required Ute children to attend boarding schools in order for the tribe to receive annuities. The forced removal of children to schools was an overt attempt by the U.S. government to fully dispossess native people of their lands through erasure of their language and culture.

Sweetwater Lake remained a part of the reservation. Despite the 1868 treaty, Euro-Americans continued to search for mineral wealth in western Colorado, and encroachment into Ute lands continued. In 1873, the Brunot Agreement ceded parts of the Ute lands in the San Juan and La Plata Mountains to the United States. This agreement officially removed some 3.7 million acres from the Ute Reservation in western Colorado, leaving some 12 million acres of western Colorado and land along the New Mexico border to the Ute, as well as hunting rights in the San Juan Mountains. The agreement also allocated money to the Ute and made other stipulations requiring them to live according to Euro-American notions of civilization.

This series of treaties established Ute lands and hunting rights and dictated that the Utes should live according to non-Native ways. As a result, they significantly altered Ute lifeways, reshaping everything from food sources to leadership. Prior to the arrival of non-Native peoples, the Ute were organized into a series of bands, each organized around one or more central leaders. However, the United States often made treaties with only a single Ute leader or a single Ute band, failing to acknowledge the complexity of the Ute political system.

Photo 40. Maps showing Ute territories shrinking through treaties.



Source: O'Rourke, 1980

A photo of a map of Utah, Wyoming, Colorado, Nebraska, Kansas, Arizona, New Mexico, and Texas and the traditional Ute range changing over time.

The discovery of mineral riches in the mountains of Colorado led to more and more encroachment into Ute territory and tensions and conflicts ensued. In 1873, tensions between American settlers and the Ute tribe in Colorado came to a head. Nathan Meeker, the Indian Agent at the White River Indian Reservation, attempted to force the Ute people to abandon their traditional hunting and gathering lifestyle and adopt farming practices. Meeker, like many other Americans at the time, viewed the Ute as "savages" who needed to be civilized, and he went to great lengths to impose his will on them. Meeker attempted to force the Utes into western lifeways by restricting their

movement, hunting, trading, and equestrian culture, as well as plowing Ute lands for crops (Andrews, 2015).

The situation was further exacerbated by the fact that the Ute had signed treaties with the U.S. government that promised them annuity goods, clothing, and provisions in exchange for their land. However, these promises were not always kept, and delays in delivering these goods only added to the Ute people's frustration and anger towards the government.

In 1879, Meeker's attempts to control the Ute resulted in deadly conflict. When Major T.T. Thornburgh and his men arrived at Milk Creek in September 1879, they were warned by the Ute not to cross into reservation lands, but they ignored the warning and continued forward. This resulted in a six-day battle between a group of Ute and the army, during which 17 whites and approximately two dozen Ute people were killed. Thornburgh's troops were pinned down under fire, and they were reinforced by the 9th cavalry, consisting of African-American "Buffalo Soldiers", who helped hold back the Ute for four more days until a larger Army contingent arrived (Colorado Encyclopedia).

At the same time, another group of Ute attacked the White River Indian Agency, killing Meeker and several other agency men, and taking three women and two children captive. The attack was a direct result of Meeker's poor treatment of the Ute and his inability to understand their way of life. The captives were eventually released unharmed, but the incident was used by white Coloradans to argue that the Ute were dangerous and needed to be removed from their lands. The incident was dubbed a massacre, and "The Ute must go!" became a common refrain among white Coloradans (Decker, 2004). Local newspapers took this position as well as politicians. One of Governor Pitkin's statements summarizes the feeling: "My idea is that, unless removed by the government, they [The Ute] must necessarily be exterminated" (Emmitt, 2000).

After the Meeker incident and Battle of Milk Creek, the U.S. Government sought to solve the "Indian problem." Negotiations for the Ute Removal Act began in 1880, with Chief Ouray of the Uncompahgre Ute as the primary negotiator. The original agreement allowed the Uncompahgre Ute to stay in Colorado, but it was reinterpreted after Ouray's death in 1880 to mean reservation lands were in northeastern Utah, not Colorado. The U.S. government sent the army to force the Uncompahgre and White River Ute onto reservation lands in Utah. In 1881, 1,000 U.S. troops marched the Uncompahgre and White River Ute 350 miles into Utah, and their former lands were opened for Euro-American settlement (Simmons, 2011). The Ute bands in southwestern Colorado were restricted to smaller reservation land in the southwest corner of the state (Figure 3).

The Ute, once composed of disparate bands, whose territory spread across almost all of Colorado and parts of the surrounding states, had been subject to continual land dispossession, as their lands were repeatedly reduced and reorganized. The removed Ute did continue to make forays into western Colorado from Utah, but continued reconfiguration of Ute reservations paired with ongoing conflict, fear, and racism made it harder for the Ute to continue to visit their former home.

After the Ute were removed in 1881, more Euro-American settlers began to arrive. Among the settlements that popped up across the Colorado Rockies was Gypsum. Founded along the Eagle River in 1881, Gypsum would become the primary access point to Sweetwater Lake. Primarily a ranching town, Gypsum residents quickly began

grazing cattle through the mountains and growing crops to sustain themselves and their stock.

Sweetwater Indian Cave

Sweetwater Indian Cave (5GF.2), also referred to as the Gauss Site (Gauss 1981), is a limestone solution passage located above the southern edge of Sweetwater Lake in the Flattops Mountains, its south-facing entrance sits at an elevation of 8,000 feet, approximately 300 feet above Lake Creek. This cave is one of the area's most important cultural resources. It is believed to be associated with early historic Ute peoples, based on the artistic style (Conner et al., 2016).

In the late fall of 1881, Captain Dave Abrams was tracking murderer Bert Remington through the mountains of western Colorado. Abrams got a lead from a group of hunters that Remington was accompanied by armed men and hiding near Sweetwater Lake, so he recruited five men from Leadville and gave chase. Abrams and his group came upon a large cave on the side of a bluff and entered, looking for Remington and his gang. Petroglyphs and cave art depicting horse riders, animals, and more painted by the Ute adorned the cave walls. Amazed by what they saw, but no closer to finding the gang, Abrams and his group followed Sweetwater Creek and returned to Leadville. Abrams recounted this story to the *Leadville Weekly Democrat*, who published the first known record of the cave in 1881 ("Tracking a Murderer", 1881). Settlers began to create numerous folktales and local legends about the cave, including a story about a white trapper and a Ute woman supposedly put to death in the cave by natives, leading to the nickname "Weeping Maidens Cave" ("Weeping Maiden's Cave", 1889). There is no evidence to support the historicity of this story (Rhinehart, 2008).

The Sweetwater Cave has endured decades of vandalism. By 1925 local papers noted the destruction occurring at the cave. Sections of the cave paintings had been chiseled out, artifacts stolen, and graffiti chiseled or painted on the cave walls ("Indian Caves On Sweetwater", 1925). The cave continued to be visited by white tourists since its discovery and quickly became popular at the lake. The cave was mentioned in adverts for the lake, and many visitors considered it a highlight of their trip to Sweetwater.

Various owners and resorts have held cave tours at the lake, including A.J. Brink Outfitters. A.J. Brink Outfitters also hosted USFS personnel, who brought classes from nearby schools to the cave and taught them about Ute people, the importance of the cave, and the art depicted there (B. Kight, personal communication, May 15, 2023).

Decades of vandalism, trespassing by tourists, and harmful stories attributed to the cave and the Utes have done considerable damage to the cave and the culture and reputation of the tribe. The cave was closed to the public after the USFS acquired the land in 2021, while management plans were created. The cave should be treated with respect and in a manner befitting the desires and culture of the Ute tribe. Resource Stewardship can help facilitate this.

Historic (1880s to Present)

To understand the history of land use at Sweetwater Lake, it is essential to consider the influence of the Homestead Act of 1862, public access, resorts, tourism, and ranching. Each of these played a significant role in creating modern-day Sweetwater Lake. American settlers, ranchers, and resort owners utilized the Homestead Act of 1862 to acquire their properties. Ranching was among the most prominent early

businesses in the region, as the environment was ideal for grazing cattle. Lake resorts were built on the banks of Sweetwater Lake in the early 1890s and continued in operation until 2017. These resorts and the tourism they fostered drew international visitors and shaped Sweetwater Lakes' history.

Critical to understanding Sweetwater Lakes' history is public access to the lake, which has been threatened numerous times. On multiple occasions, privatization, industrial development, and attempts to block public use of the lake have resulted in coordinated efforts by communities and the USFS. Most famously, in 1924 resort owner Paul Gregg attempted to block community access to the lake. The USFS worked alongside communities in the region to create a public campground on the lake. The Homestead Act of 1862, resorts and tourism, ranching, and public access to the lake are important to consider in assessing the history of Sweetwater and its future management.

Historic Timeline

- **1862:** The Homestead Act of 1862 expands previous homesteading laws to enable individual farmers to claim up to 160 acres of land at low cost from the U.S. Government. Farmers could gain title to this land after meeting several requirements, such as improving the land, and cultivating the land for five years. This act enabled a large amount of homesteading in the west.
- **1890s:** The first resorts open along Sweetwater Lake. Early resort owners include Nathan Peel, Arthur Davenport, John Root, and Hiram Marks, who opened a thirteen-room hotel on the lake.
- **1919-1921:** The USFS constructs a Ranger Station and numerous other buildings and improvements at Sweetwater Lake. These included a barn, cabins for Forest Rangers families to stay, and telephone lines to the lake. This Ranger Station served as the USFS' primary access point for the Flat Tops region of the White River National Forest. Denver Cartoonist Paul Gregg purchases Sweetwater Lake Resort and most of the property surrounding the lake. Gregg makes numerous improvements to the resort, including constructing the Gregg and Westlake Cabins.
- **1924:** Sweetwater Lake Resort owner Paul Gregg attempts to restrict public access to the lake, demanding a $1 day use fee, ending over fifty years of public use. Local communities led by previous resort owner George Machin worked alongside the USFS to construct a public road and campground on the banks of Sweetwater Lake. This ensured that the public had free access to the lake.
- **1926:** Chicago gangster and wannabe cowboy Leland Varain, aka Diamond Jack, purchases Sweetwater Lake Resort from Paul Gregg. Varain's ownership of Sweetwater Lake Resort marks the most violent period at the lake in the historic era. Varain was involved in numerous shootouts and brawls during this time. New cabins, including the Honeymoon Cabin were constructed, and the Hilltop Cabin was constructed, or moved to its current site.
- **1932:** Varain is arrested and exiled from Colorado after nearly murdering three individuals in Glenwood Springs. Ownership of Sweetwater Lake Resort defaults back to Paul Gregg after Varain fails to make the mortgage payment. Gregg will own the resort for several more years.

- **1937:** A new USFS guard station is constructed upslope of the original station. This structure is still intact and remains in use today.
- **1944:** A fire burns down much of the USFS Ranger Station and adjacent buildings. By this time, the Sweetwater Ranger Station was largely unused. The remains of the previous Ranger Station were cleared from the site.
- **1955-1957:** A large fire burns down several buildings at Sweetwater Lake Resort, including the original fifty-year-old Sweetwater Lodge. Owner Phillip King constructed the new Sweetwater Lodge, which is still on site today.
- **1963:** The Kings sell Sweetwater Lake to a Denver and Dallas-based realty company that begins to subdivide the property. Air Force General Frederick Anderson and his son began to purchase subdivided properties on and around Sweetwater Lake. Within a few years, the Andersons reconsolidated the entire Sweetwater Lake Resort into a single property.
- **1965:** The Rocky Mountain Power Company attempts to purchase Sweetwater Lake to construct a hydroelectric power plant. The plan would flood the area around the lake, and was vehemently opposed by local communities and conservationists. The Federal Power Commission denied the proposal.
- **1968:** After being diagnosed with cancer, General Anderson sold his Sweetwater Lake Property and moved away. His son Travis Anderson continued to own and operate a ranch and summer camp near Sweetwater Lake until 1975.
- **1974:** A.J. Brink Outfitters begin leasing the Sweetwater Lake Resort property and offering horseback rides, cabin stays, guided hunts, and more. A.J. Brink Outfitters Adrienne and Jim Brink would operate a successful business for over four decades. They also became influential community members, hosting events, weddings, auctions, and more.
- **2017:** The Sweetwater Lake property is listed for sale, and numerous investors, including a water bottling company, real estate developers, and the USFS, show interest in purchasing the property. Local Communities begin fundraising efforts to help the USFS buy the lake. Most A.J. Brink Outfitters' services are closed in preparation for the sale.
- **2021 to Present:** With assistance from local communities, the Eagle Valley Land Trust, CPW, and the Land and Water Conservation Fund, the USFS purchased the Sweetwater Lake property and incorporated it into the White River National Forest. As of this writing, USFS and CPW are negotiating a unique management agreement which will establish a state park on USFS land at the lake.

Homesteading (1881-1896)

Settlement of the Western United States by Americans was driven in large part by the Homestead Act of 1862. Passed to encourage settlement in the vast American West, the Homestead Act of 1862 made it easier for settlers to acquire new property. Individuals could apply for 160 acres of land in the western United States for a nominal fee at most. Landowners then had to cultivate, maintain, and improve the land over

five years before they could fully claim the land as their property. This enabled the rapid acquisition and settlement of states like Colorado. Many of the early settlers and resorts along Sweetwater Lake moved to the region utilizing the Homestead Act.

Another primary drive in the settlement of Colorado was the Colorado gold rush beginning in 1858. The discovery of gold along the Colorado Front Range resulted in many prospectors, salesmen, and others moving to Colorado, hoping to strike it rich. Other rare and valuable minerals were discovered throughout the Colorado Rockies, encouraging settlement deeper in the mountains. As a result, mining towns appeared across the state and encouraged railroad expansion and further settlement.

Early Settlement

Among the earliest settlers and ranchers in the region was the Stephens family. At some point in the late 1890s, Henry and Alfred "Alf" Stephens moved from Wisconsin to the Sweetwater Lake region, likely claiming land under the Homestead Act of 1862. It's likely their property was alongside Sweetwater Creek and was not on the current property. The pair set up ranching businesses in the region and participated in mining operations nearby starting in 1898 ("Fifteen Men Fell To Instant Death, Sickening Horror at Independence", 1904). In 1907 Alfred had to defend his property ownership after his neighbor argued that Alfred had not made the necessary upkeep and improvements required to maintain legal ownership of the land ("Stephens-Renshaw Contest," 1907). The US government apparently confirmed Alfred's claim, and he retained his ownership of the property. The Stephens family still resides in the area and continues to play an active role in the community today.

Mining

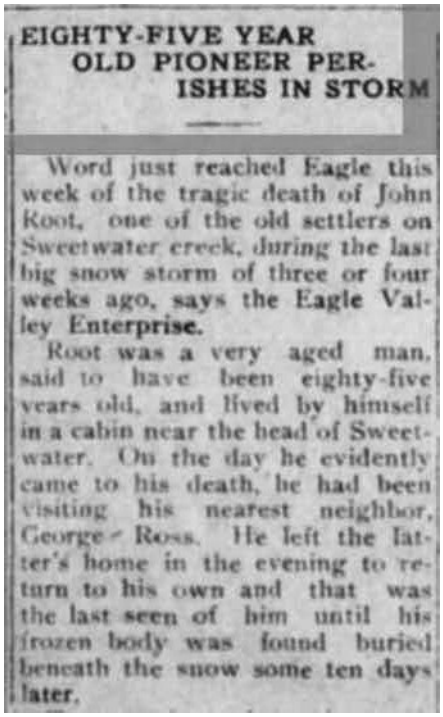
Western Colorado was shaped by the pioneers and prospectors which settled in the region. The Colorado gold rush began in 1858, when gold was discovered along the Front Range and prospectors soon began pushing further west in search of more untapped veins. As a result, nearby towns soon buzzed with activity. Thirty miles southwest of Sweetwater Lake, New Castle became a locally important mining town, alongside others near the Denver and Rio Grande Railway (D&RG). There are no historical resources related to mining in the property. However, mining plays an important role in the greater history of the region, and the possibility of mineral wealth is what initially brought settlers to the area, including early resort owners.

Hiram Marks and John Root were two of the earliest settlers in the Sweetwater Lake region. These early pioneers moved to Colorado in 1860, hoping to strike it rich in the Colorado Gold Rush. Having little luck as prospectors, Marks and Root, alongside their new partner Almon Colburn, became trappers and hunters in the Colorado mountains. In the 1860s, Marks and Root were traveling in a caravan when the group encountered a party of Utes. According to later accounts, the two parties traveled for some time in peace before a member of the westbound caravan assaulted a young Ute woman. In response, the Utes reportedly killed the young man and demanded two hostages from the group to deter any further attacks against the Utes. Root and Marks were chosen as the hostages and were taken from the convoy ("Eagle County Yesterdays: Squaw Men", 1960). This report is unverified, and similar accounts were often falsified or exaggerated to fit common narratives about Ute culture at that time.

Once the tribe had safely left the area and the caravan was no longer nearby, they released Root and Marks. The pair decided to stay with the tribe and travel with them. A few years later, they reportedly married women in the tribe. They remained with the tribe for roughly twenty years, during which their wives died during an epidemic ("Eagle County Yesterdays: Squaw Men", 1960). The pair left the tribe around 1880, shortly before the Meeker Massacre. They relocated to a spot near Burns, Colorado, about twenty-five miles northeast of Sweetwater Lake. They made two large dugouts in the cliffside along the Colorado River and lived there for a few years, hunting and trapping in the region ("Root and Marks", 1926).

Root and Marks left their dugouts near Burns and purchased properties near Sweetwater. They opened a resort on the lake and began advertising it in 1896 as a fisherman's haven ("Do You Like To Fish?", 1896). Root would run the resort operation in the summer months and trap during the winter. The pair were also among the first settlers to begin ranching in the area. Eventually, they sold their resort on the lake, and Root retired to his home and small ranch along Sweetwater Creek. Marks moved to Glenwood Springs and became a justice of the peace and constable ("Judges of Election", 1893). Root and Marks were among the most influential settlers in the region, and their lives are an important part of Sweetwater Lake's history.

Photo 41. The Avalanche Echo reports on the death of John Root in a 1920 article.



EIGHTY-FIVE YEAR OLD PIONEER PERISHES IN STORM

Word just reached Eagle this week of the tragic death of John Root, one of the old settlers on Sweetwater creek, during the last big snow storm of three or four weeks ago, says the Eagle Valley Enterprise.

Root was a very aged man, said to have been eighty-five years old, and lived by himself in a cabin near the head of Sweetwater. On the day he evidently came to his death, he had been visiting his nearest neighbor, George Ross. He left the latter's home in the evening to return to his own and that was the last seen of him until his frozen body was found buried beneath the snow some ten days later.

Source: Colorado Historic Newspapers Collection, 2023

A photo of an old newspaper heading with typewrite text.

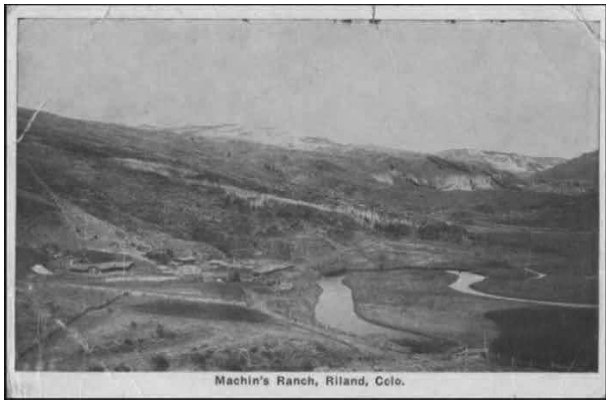
Ranching

As Colorado's population expanded in the nineteenth century, so did its agriculture and ranching businesses. Sweetwater Lake and the nearby communities like Gypsum were shaped by the ranching businesses. Ranching quickly became one of the primary business ventures for settlers in the Sweetwater region in towns like Gypsum and Dotsero.

Ranching was the dominant business in Gypsum and the surrounding region, and farmers prioritized crops that could be used to feed cattle. Crops like hay, alfalfa, rye, and sugar beets could grow in the mountainous soil of the region while still providing animals with sustenance. Rye and hay can be grown in rugged soil and colder climates, making ideal cattle feed. Sugar beets could be separated from their leaves or "roughage" which were fed to cattle while the beet itself was processed into sugar.

This same tactic was used throughout Colorado, including on the plains, to help supplement cattle feed (Weeks, 2022, p. 50).

Photo 42. George Machin's Ranch along Sweetwater Creek. Circa. 1900.



Source: Eagle Valley Library District Digital Archives, 2023

A black and white photo of rolling hills and a stream.

Ranching in the mountains was an appealing prospect due to the abundant land and ideal grazing conditions (Abbott et al., 2013, p. 104). Ranchers and herders flocked to the mountain region, pushing cattle and sheep across the Rockies, settling wherever they could get cheap land and access to water. As one 1879 rancher noted, "Wherever there is any water there is a ranch."(Westermeiner, 1948, p. 157). This would have made Sweetwater Lake an ideal place to set up ranching operations, as the lake and creek provided access to water and grazing land. The lake flowed into Sweetwater Creek, which ranchers and farmers used to irrigate crops and provide water to their cattle. The first ranches along Sweetwater Lake and Creek appeared around the same time Gypsum was founded in 1881 and multiple thereafter. By 1885 these included the Milner Ranch, George Machin's Ranch, the Babcock Ranch, and Knight Ranch, a ranch owned by Garfield County judge James "Pap" Riland, and one owned by two English immigrants ("A Garfield County Man", 1885).

One of the largest ranch operations in the area was Emmerson Gee's, which grazed around 3,000 head near the lake. Gee noted how well-suited the region was for ranching; In a year when snowstorms wreaked havoc on stock in Kansas and the great plains, Gee told a reporter that "not a hoof of stock had been lost the past season on account of the storms in any part of Garfield County," and the Sweetwater region was "particularly adapted to the raising of stock." ("A Garfield County Man", 1885). In 1911, a visitor to one of the resorts at Sweetwater mentioned the "good ranch country, not a farming country, but one where a ranchman can raise sufficient hay to feed his cattle during the winter and all of the ranches are picturesquely located" (Schall, 1911). The quality of land around Sweetwater was clear even to non-ranchers.

Despite the seemingly ideal conditions, conflict inevitably surfaced as ranchers claimed contested territories, and land disputes became common in the region. These conflicts were not easily resolved and occasionally violence broke out. In 1888, Judge James Riland was shot to death by neighbor C.A. Babcock over a land dispute ("Stonewall Settlers", 1888). Babcock was sentenced to be hanged in what newspapers called a "necktie social" ("At Death's Door", 1888). The Colorado Supreme Court ordered a retrial, and sentenced Babcock to eight years in prison, of which he served two (Kane, n.d.).

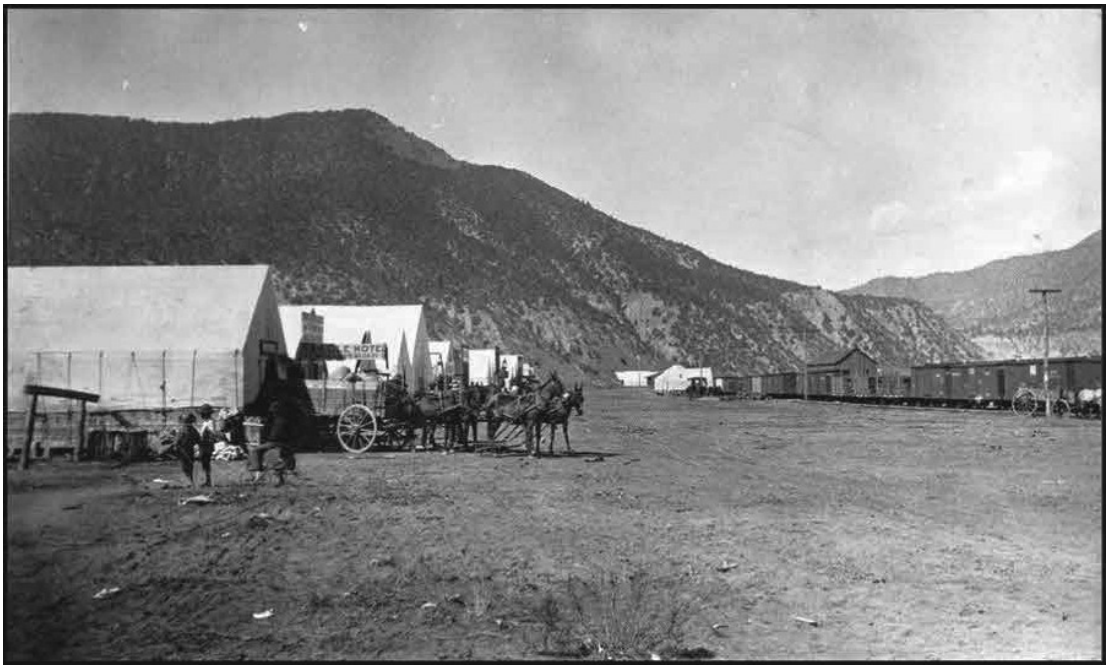
Ranching was the first industry widely adopted by residents of Sweetwater, allowing the community to flourish in the isolated mountain region. The needs of ranchers sparked the development of infrastructure in the area, as the lack of quality roads made transporting crops and cattle difficult. Today there are still ranches on both sides of Sweetwater Creek, providing idyllic views along the road to the lake and continuing to shape the community they have been part of for over a century.

Transportation

Railroad Development

The secluded mountain communities, like Gypsum and Sweetwater struggled until they were invigorated by the Denver and Rio Grande rail line in the 1880s. As the railroad reached these isolated mountain towns, it offered easier access to supplies, labor, and the ability to ship off goods in higher quantities than by stage, breathing new life into the region (Abbott et al., 2013, p. 105). The railroad expansion in central Colorado in the late nineteenth century did more than revitalize towns in the area, it revolutionized travel and business. The D&RG railroad played a critical role in the development of Sweetwater Lake by providing greater access to the lake via the nearby train stop, twenty-four miles away in Gypsum. In a mad dash to link the east and west coasts by railroad, the Rockies were covered in a web of interconnected rail lines. The railroad that connected eastern and western Colorado through the Glenwood Canyon was the D&RG Western Railway. The company completed the line linking Grand Junction to Denver and the eastern United States, in 1887 (Abbott et al., 2013, p. 111). This opened the door for new business, tourism, and more accessible travel through the Rocky Mountains. The D&RG Railroad connected Gypsum and the surrounding area to national systems of trade like never before. Gypsum relied heavily on the railroad to sustain the town. From traveling, reliable access to supplies, and shipping goods like cattle and crops to markets in the east, the railroad was a crucial addition to Gypsum.

Photo 43. Gypsum in 1900, the train depot is visible in the background.



Source: Eagle Valley Library District Digital Collection

A black and white photo of horse-drawn carriages, white tents, and the train depot with mountains in the background.

The D&RG railroad was initially intended for the line to serve as a secondary line through the mountains, not their primary route. The original rail was built in a narrow

gauge to cut costs and increase the speed of construction, as well as traverse mountain passes more easily. This meant trains had to carry smaller loads and travel more slowly. This quickly changed, and in 1890 the rail line was upgraded from a narrow-gauge track to a standard gauge (*Railroad History of the Western Slope*, n.d.). This allowed larger trains hauling more people and goods to use the pass. This made the original route through Marshall Pass obsolete, and it became a second track to the more efficient Glenwood Canyon route. The train made the Rockies more accessible than ever, and with it came more tourists. The train line had stops at Gypsum, Rifle, Glenwood Springs, and most towns along what is now the I70 corridor. The stop at Gypsum gave easy access to Sweetwater Lake, and word spread quickly about the lake, as visitors from as far east as Kansas City began to visit in 1892 ("On the Sweetwater", 1892).

Automobile Road Development

Getting to Gypsum was only the first step in reaching Sweetwater Lake, which is nearly twenty miles north of town. Businesses quickly adapted and began offering carriage rides to the lake from the train depot in Gypsum. These carriages were operated by ranches and resorts at the lake that needed to get patrons from the train station to the lake but also offered service to locals visiting the lake. Resort owners George Machin and E.D. Slaughter offered carriage rides to Sweetwater from Gypsum (Machin, 1901, Slaughter, 1899). Despite the rise of carriage access, locals and tourists desired better roads to reach the lake. The original route to Sweetwater Lake cut through the woods and lacked bridges to cross Sweetwater Creek. An 1892 newspaper article describing Sweetwater Lake noted, "Were the wagon road improved and a good bridge made, Sweetwater would become a great resort." ("A Fishing Party", 1892).

A road from Deep Creek, near Dotsero, to Sweetwater was built in the early 1900s, but the route to the resorts remained arduous and rugged, despite the upgrades (Schall, 1911). Sections of the road have been owned by private owners, the USFS, and Garfield and Eagle counties. Garfield County upgraded portions of the road less than a decade later to accommodate automobiles. By 1916, motorists could reach the lake from Glenwood Springs without ever stepping out of their cars within just three hours ("Auto Road to Sweetwater", 1912). One visitor remarked in 1916, "They report fishing at the Lake first class, the road in fairly good shape." ("A Merry Party", 1916). However, the road quickly deteriorated due to the rough

Photo 44. An account of a visitor to Sweetwater Lake in 1899, which comments on the quality of resorts and the road to the lake.

A Fishing Party.

The fishing party which left last Saturday was composed of E. L. Daniels, F. E. McCollum, T. Motz, Terry Conners, John F. Christian and D. W. Gee. They were met at Dotsero by Mr. Davenport, who took them across the Grand river to Sweetwater lake, a distance of twelve or fourteen miles. The fishing was splendid, and the lake being fairly alive with the speckled beauties. The party camped out and had a jolly time, returning Tuesday evening. Were the wagon road improved, and a good bridge made, Sweetwater would become a great resort.

Source: Colorado Historic Newspapers Collection

A black and white photo of an old newspaper article.

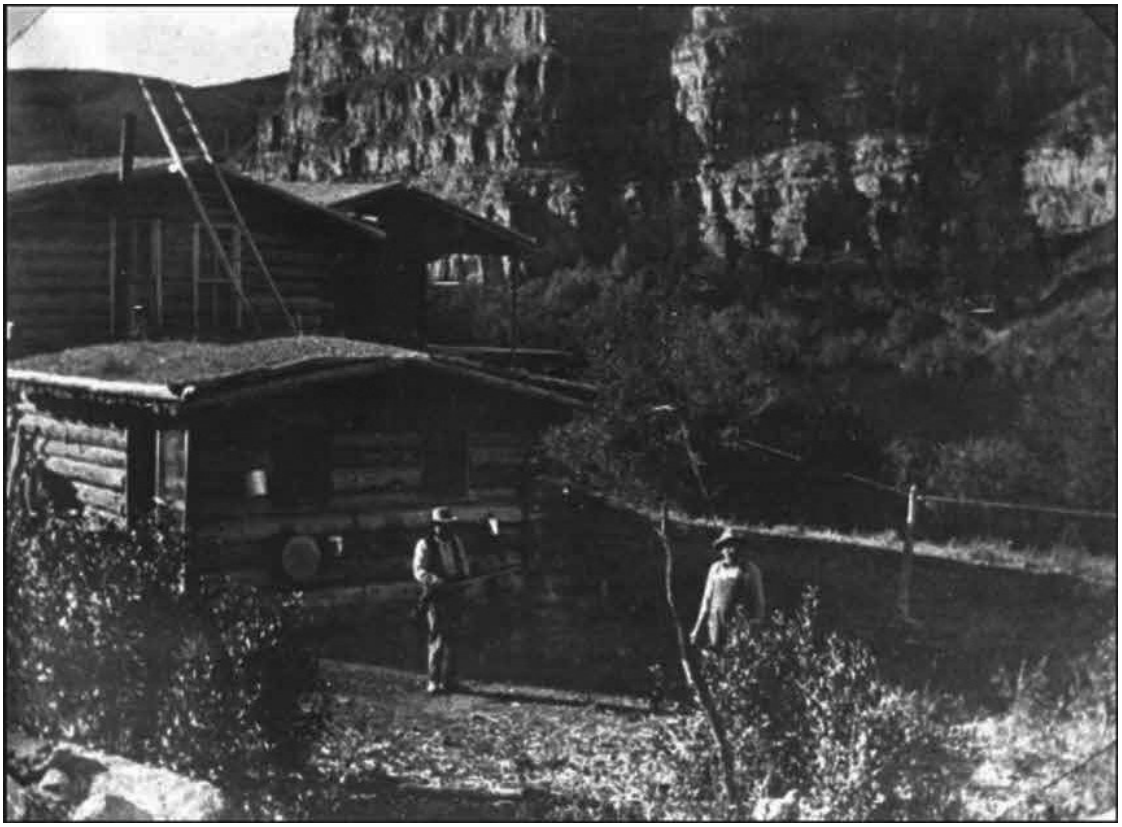
mountain climate and the heavy use. Today's Sweetwater Road follows the same route that was laid out in 1906.

Early Tourism/Resorts (1889-1945)

Idyllic views helped Sweetwater Lake develop a long history of recreation and tourism. The lake had attracted visitors even before roads snaked through the mountains or the first resorts overlooked the water. Sweetwater's bountiful fishing, abundant and diverse wild game, and awe-inspiring vistas began appearing in Colorado newspapers in the late-nineteenth century. In 1889, Colorado Senator Edward Wolcott proposed a bill to Congress to designate the area surrounding Trappers Lake including Sweetwater Lake, as a national park ("Chats With Citizens", 1889). The bill failed to pass, but its proposal highlights the lakes potential for tourism and recreation.

In the late 1880s and 1890s, proprietors, including Hiram Marks, George Machin, and Nellie Davenport, began establishing resorts on Sweetwater Lake. By 1900, Sweetwater Lake had become quite popular but accessibility was poor, as it was roughly twenty miles on rough roads from Gypsum. Anglers were among the most frequent visitors to the lake. Newspapers from the late nineteenth century to today have frequently praised the fishing at the lake. In 1904, two couples reportedly caught more than 175 trout in five days ("Current Events: Town and County", 1904). Road improvements and carriage services brought even more anglers to the lake.

Photo 45. Andrew Gerard and Tom Chipman's hotel on Sweetwater Lake circa 1910.

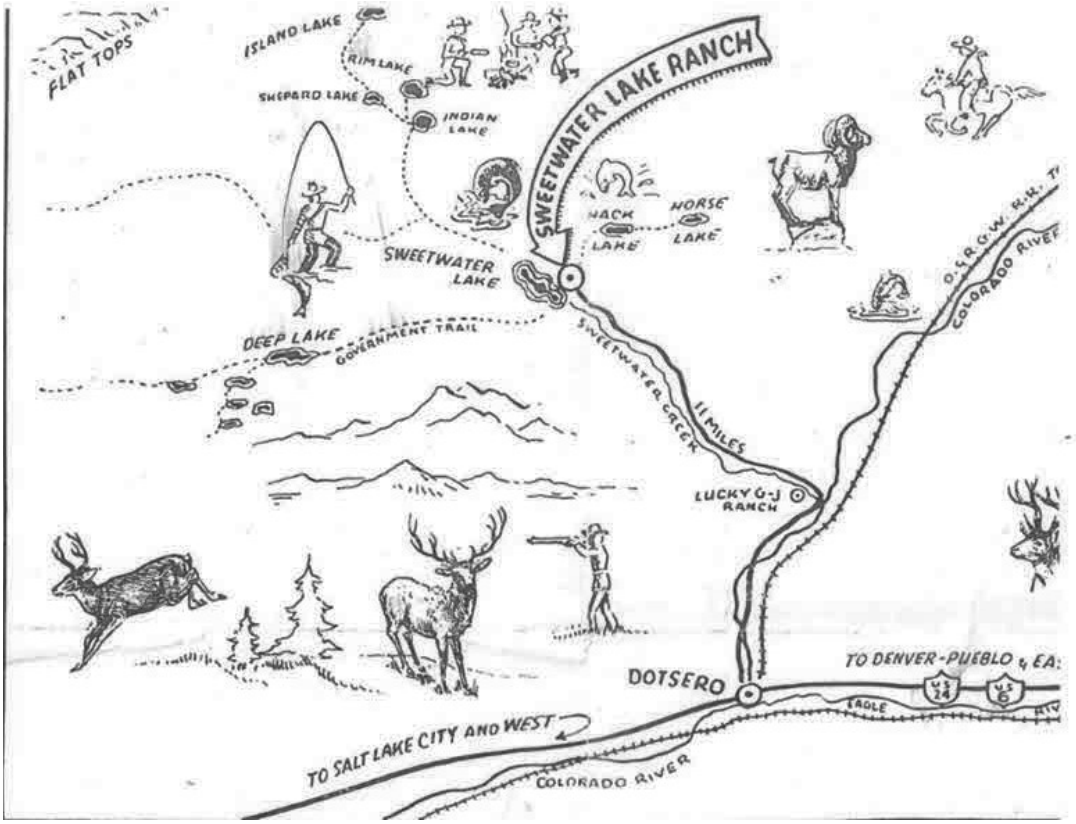


Source: Eagle Valley Library District Digital Archives, 2023

A black white photo of two men standing in front of a log cabin and rocky hillsides in the background.

Large-scale resorts along the lake would soon overtake ranching operations. George Machin and Nellie Davenport had successful businesses on the lake during the late nineteenth and early twentieth centuries. Locals frequented the lake on day trips, on holidays like the 4th of July, and for special events, exercising a long tradition of public access to the lake. By 1911 hotels had become popular destinations for visitors. Some of the most frequent visitors came from Leadville, Colorado.

Photo 46. A map with directions to Sweetwater Lake, circa 1927.



Source: Map courtesy of Tom Fuller.

A historic photo of a map to Sweetwater Lake with drawings of animals, mountains, and people recreating.

Paul Gregg

The period of multiple privately owned resorts on the lake ended in 1919. Paul Gregg, a cartoonist for the *Denver Post,* purchased three shoreline ranches and resorts. This gave him ownership of nearly all the land surrounding the lake. The only remaining public access was a small piece of the USFS property at the north end of the lake ("Artist Buys Ranch", 1919).

Gregg specialized in Western-style paintings depicting cowboys, pioneers, hunters, western landscapes, mountains, Native Americans, buffalo, and more. The Denver *Post* estimated that in forty-seven years, Gregg produced roughly 2,000 paintings (Kreck, 2017). Using his success as a cartoonist and illustrator, Gregg gathered his funds and purchased the Sweetwater Lake property in 1919.

Gregg began to renovate the site before opening his resort ("Riland-Sweetwater", 1920). One of the cabins he constructed, known as the Gregg Cabin, still stands along the lake shore. Construction on the cabin finished sometime in the 1920s, and Paul Gregg used it as his home on the lake when he visited (*Shaw, 2019b*). The Westlake Cabin, adjacent to the Gregg Cabin was also constructed during this period. This cabin has remained in use by resorts at the lake since its construction between 1920 and 1930 (*Shaw, 2019b)*. In February of 1924, Paul Gregg hired a caretaker and blocked the public from accessing the lake without paying a fee ("Game and Fish Club Is Active", 1924). Gregg's plan outraged locals, who had long enjoyed free public lake access.

A local initiative led by the Lions Club and George Machin rallied support for construction of a road to the USFS land along the lake's north end. In April 1924, a new public campground with lake access was constructed on the USFS property on the lake's east side. The access road cut through Gregg's property, but the county granted an easement allowing public use **(**"Would Monopolize Sweetwater Lake," 1924). This meant locals could again access the lake without paying Gregg's entrance fee ("Sweetwater Lake to Be Opened to Public", 1924).

Photo 47.Paul Gregg, painting a cover for the Denver Post. Circa. 1940.

A black white photo of a man painting a picture.

Photo 48. An illustration made by Paul Gregg in 1948 depicting a herd of bison crossing the railroad as a train approaches.

Source: The Denver Post, 2023.

A color photo of bison running over train tracks.

Photo 49. The Gregg Cabin.

Photo 50. The Westlake Cabin.

Source: Adam Thomas, 2023.

Two photos of dark brown cabins with turquoise wooden framing around windows and green vegetation surrounding the buildings.

Sweetwater Guard Station

White River National Forest was established in 1902. A plan to construct a ranger station at Sweetwater Lake was announced in 1919 and included cabins for rangers and their families to stay in during the season ("Government Improvements at Sweetwater Lake", 1919). At the time, the National Forest included a portion of Sweetwater Lake's east bank. Extra rooms not used by rangers or their families were also open to tourists. The Sweetwater Lake outpost became the USFS' primary ranger station for the White River National Forest when it was completed in 1919. Rangers typically brought their families, as did construction workers.

Photo 51. The original Ranger Station at Sweetwater Lake alongside three Forest Rangers, circa 1920.

Source: Eagle Valley Library District Digital Archives, 2023.

A black white photo of three men standing next to a cabin with Sweetwater Lake and rocky hillsides in the background.

In 1920 the USFS constructed a barn for the ranger's horses and gear. Local newspapers reported that all construction crew members brought their families along to stay at the lake for a week while the barn was constructed ("Sweetwater: Ranger Station Barn Constructed", 1920). In 1927, telephone lines were run from Gypsum to the ranger station. This also gave residents along Sweetwater Lake and Creek access to phone lines, enhancing communication to the area ("Phone Lines Heading to Sweetwater Lake", 1928).

The current Sweetwater Guard Station was constructed in 1937-38, about 800 feet from the original 1919 station. The USFS was undergoing major changes at the time,

and the New Deal helped provide funds and labor to expand their administration, including design, planning, and construction of new structures. This new guard station was constructed in the "rustic" style, intended to compliment the natural landscape. The building was modified in 1985 to house more USFS employees (Hartley & Schneck, 1993).

Photo 52. Postcard of Sweetwater Lake circa 1961. The current Ranger Station is visible in the center.

Source: Photo courtesy of Tom Fuller.

A black white photo of sagebrush shrublands, a road, a cabin, and Sweetwater Lake.

The original 1919 guard station burned down during a fire in 1944 ("Sweetwater News", 1944). Most of the remaining buildings, including the barn, were torn down shortly thereafter. Although the USFS no longer had rangers at the lake, its presence was still felt through the phone lines it helped bring to the lake, the public campground it maintained, and the Sweetwater Guard Station, which remains at the site today. The USFS also played a crucial role in opening public access to the lake after Paul Gregg attempted to privatize Sweetwater Lake.

Photo 53. The USFS Guard Station.

Source: Photo courtesy of RJ Hillman, 2023.

A photo of a log cabin surrounded by short grasses, with shrubby hillsides in the background.

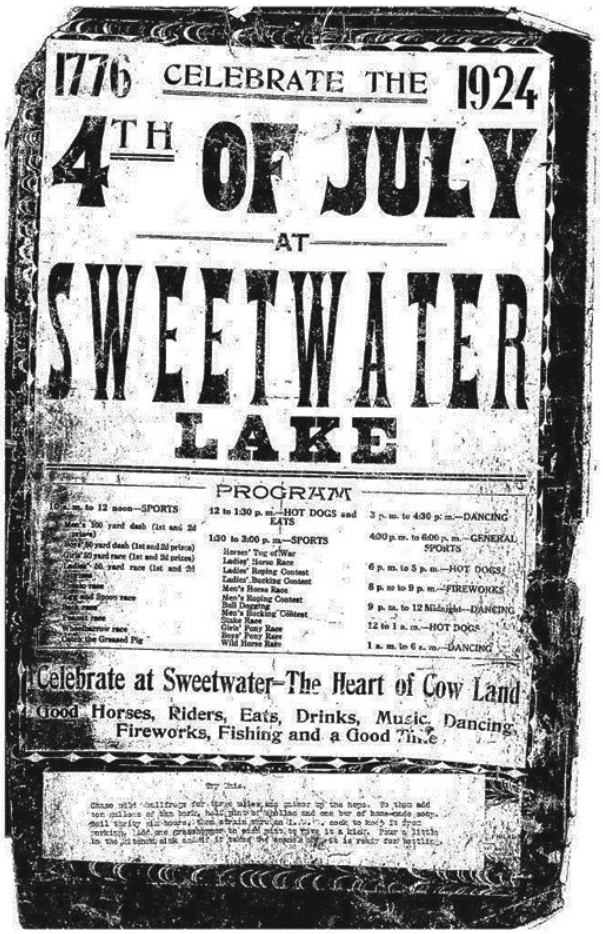
Dude Ranching & Diamond Jack

In 1924, the road to the USFS access opened, despite the ongoing legal battle over public access. The community held a 4th of July festival at Sweetwater Lake, complete with games, activities, food, and fireworks throughout the day. Locals enjoyed games like catch-the-greased-pig, wheelbarrow races, horse races, dancing, and more.

Fishing was another draw for tourists. In 1924, the Glenwood Springs Game and Fish Club introduced 45,000 non-native rainbow trout to the lake ("Game and Fish Club Is Active", 1924). Newspapers from the region also raised concerns of overfishing, and called for more stocking ("Sweetwater Driblets", 1928). In 1930, a rancher near the lake purchased 30,000 trout and put them in the lake ("Sweetwater Driblets", 1930). The stocking of non-native species had considerable consequences for Sweetwater Lake, as non-native species soon began to out-compete the native fish.

Mountain resorts like Paul Gregg's offered a place to fish, hunt, hike, and relax, and played a crucial role in the history of tourism at Sweetwater Lake. In the early twentieth century, however, dude ranches rose in popularity and soon dominated Sweetwater Lake. In 1926 Paul Gregg sold Sweetwater Lake Resort to Chicago gangster Leland Varain, who immediately laid plans to turn Sweetwater Lake Resort into the west's largest dude ranch.

Photo 54. Poster advertising the community 4th of July party at Sweetwater Lake, circa 1924.



Source: Courtesy of Tom Fuller.

A black white photo of a poster for a fourth of July celebration.

Dude ranches offered visitors the chance to live as a rugged western cowboy from the stories of the "Wild West". These resorts provided horseback rides, hunting guides, hikes, fishing trips, and more to give visitors an authentic western adventure. The first dude ranches appeared in the West around 1915, beginning with the Eaton Ranch outside Glacier National Park in Montana (Downey, 2022, p. 293). These ranches were inspired and popularized by traveling shows, including Buffalo Bill's Wild West show. These shows glorified the animals, sights, and adventures possible in the American West.

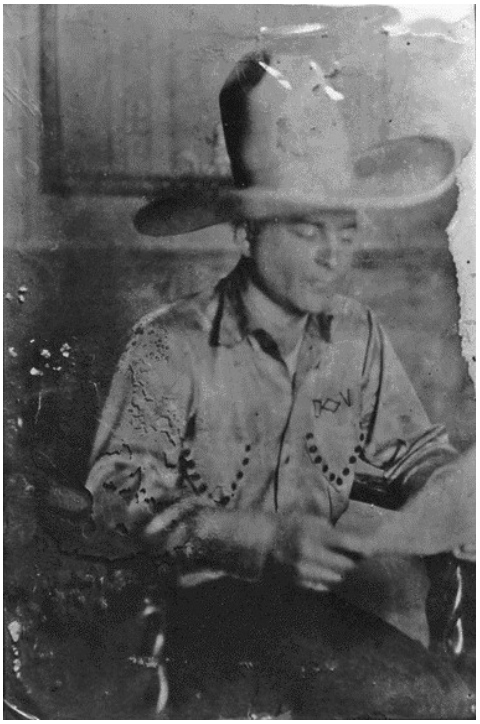
Doctors at the time often suggested patients travel west for healthful outdoor vacations and adventures, which further invigorated interest in dude ranches and early

western tourism. The “go west and seek rest” model was pioneered by the late nineteenth-century physician Silas Weir Mitchell who believed traveling in the West and participating in “Masculine” outdoor activities would alleviate Neurasthenia. Neurasthenia, no longer a diagnosis in modern medicine, was defined as anxiety or depression caused by America’s swift adoption of new industrial technologies like automobiles and factories during the nineteenth century. The condition was seen as a temporary “overstrain” of one’s mind (Will, 1998). Doctors like Weir Mitchell believed males should perform physical labor that is "productive, strenuously uplifting, and purposeful.” (Will, 1998, p. 303). The goal of treatment was to “simulate the mythic vitality of rustic outdoorsmen”, and this was accomplished through guided outdoor tourism (Will, 1998, p. 301). However, women were typically dissuaded from participating in the “go west and seek rest” prescription. They were instead encouraged to return home and recover through rest, eating more food, and continuing their domestic duties (Will, 1998, p. 293).

Dude ranches would go to great lengths to perfect the rugged western experience and cater to the desires of their clientele. This meant building their ranches to match the image tourists expected. Dude ranches offered horses, rustic living accommodations, western sights and vistas, and even encouraged employees to dress the part of western cowboys. By the 1930s, dude ranches featured employees dressed in leather chaps, wide-brimmed cowboy hats, and bandanas (Downey, 2022, pp. 55–56). Many dude ranches were actual working ranches that ran resorts as a side business, which added to the image of authenticity. Many dude ranches survived the Great Depression by increasing cattle production and offering tourists longer stays for less money (Downey, 2022, p. 52). Thanks to such measures, dude ranching flourished more than most tourist and recreation industries during the Great Depression, making it a staple of western tourism into the mid-twentieth century.

Colorado’s dude ranches, however, were often exclusive to white clientele, reflecting the segregation common in recreation at the time. Historian Ariel Schnee noted that during the twentieth century, “The value of the guest ranch experience was rooted in

Photo 55. Leland Varain, known for wearing flamboyant cowboy hats and attire.



Source: Glenwood Historical Society, 2023.

A black white photo of a man reading a piece of paper while sitting in a chair and wearing a large cowboy hat.

an understanding of ranches and the lands they occupied as white racial space." (Schnee, 2020). These ranches thoroughly vetted their customers to ensure only privileged white clientele would stay at their lodges. As Schnee notes, "On western ranches, ranchers 'tended to avoid public scrutiny' about their operations as a general rule, but it is likely that they informally practiced some degree of racial and ethnic discrimination." (Schnee, 2020).

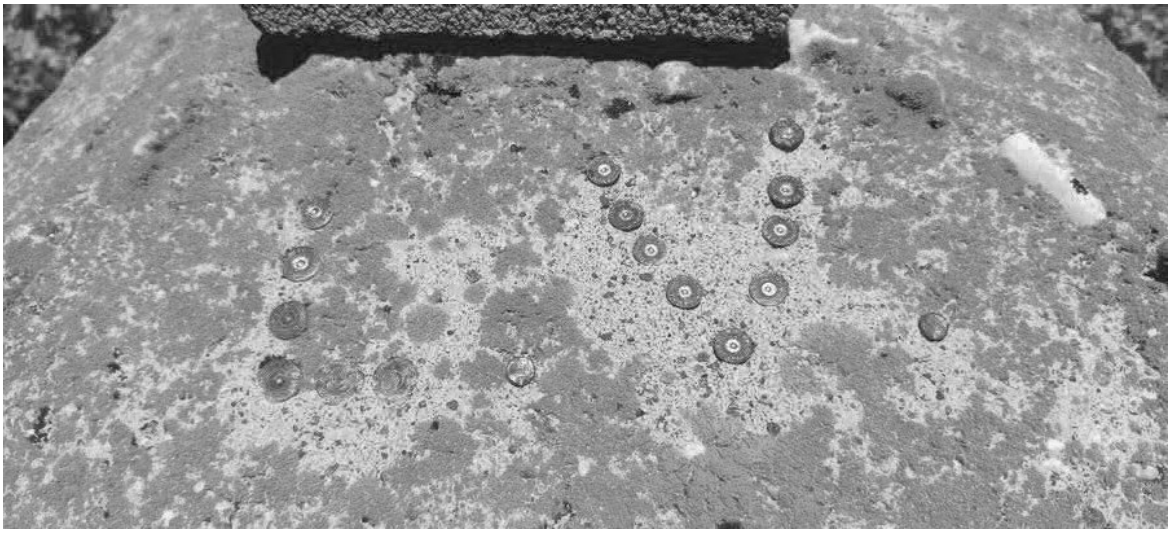
Sweetwater Lake's first dude rancher was the dangerous and flamboyant Leland Varain. Born in California in 1886,he moved to Chicago at a young age and soon aligned with the infamous North Side Gang, rivals of Al Capone. Here Varain picked up his numerous aliases, including "Diamond Jack Alterie," a moniker he earned from by wearing expensive diamond jewelry, and Louis "Two Gun" Alterie, referring to the pair of revolvers he always carried. Varain caught the attention of gang leader Dean O'Banion and became his lieutenant, cementing Varain as one of the most powerful gangsters in Chicago. O'Banion was gunned down in his florist shop by rival gangsters in 1924, infuriating Varain. Varain called for the assassins to step forward and face him even if it started a gang war. The angry and hasty response, alongside the power vacuum left by O'Banion, placed a target on Varain back. Under the advice of other North Side Gang leaders, he left Chicago.

Varain moved to a property outside Denver known as "Moonlight Ranch," and began to set up enterprises in Colorado and ingratiate himself with the state's residents. In 1926 he purchased Sweetwater Lake from his friend Paul Gregg, who described him as "One of the most picturesque figures in Colorado." ("Around The City", 1926). Others echoed similar sentiments towards Varain, who frequently hosted lavish parties and became an influential figure in Colorado. Varain moved into the Gregg Cabin and used that as his primary residence in the area. Varain likely constructed a fence around the cabin with stone pillars for gates, and embedded bullet casings into the stone cap of one pillar in the form of his initials. The pillars remain; however the fence is no longer present.

Then-forty-year-old Varain married seventeen-year-old Ermina Rossi shortly after arriving in Colorado. Ermina was the daughter of an alleged underworld crime boss and owner of Moonlight Ranch, Mike Rossi ("Diamond Jack Alterie Back From Chicago", 1927). Rossi was serving a life sentence in Cañon City, Colorado for the murder of his wife, and his ownership of Moonlight Ranch defaulted to Ermina and her sisters ("Diamond Jack Alterie Back From Chicago", 1927). Residents along Sweetwater Creek were reportedly also quite close with Varain, and warned him of suspicious vehicles or unfamiliar faces heading towards the lake (K. Heicher, personal communication, May

16, 2023).

Photo 57. A stone fence post outside the Gregg Cabin with embedded bullet casings The USFS Guard Station.



Source: Photo courtesy of RJ Hillman, 2023.

A photo of bullet casing ends embedded into a tan and orange stone.

Photo 56. The Honeymoon Cabin.

Source: Photo courtesy of RJ Hillman, 2023.

A photo of a log cabin surrounded by shrubby vegetation.

However, not all Coloradans were excited to see Varain set roots in the state and at Sweetwater Lake. The lake, which had been open to the public for over fifty years, was now privatized, and Varain barred locals from accessing the lake. Varain asserted he had been granted a permit from the Colorado State Fish and Game Commissioner to operate the resort business on the lake, which he claimed gave him control over access to the lake ("Diamond Jack Privatizes SWL", 1930). George Machin once again raised concerns over access to the lake and stated he would contest this permit. A 1930s newspaper noted that others in the community were also displeased. "The turning of [Sweetwater Lake] over to private interests by the state is generally resented by the public and if Mr. Machin finds he has any legal grounds to contest this permit, a lawsuit will be started to test the matter." ("Diamond Jack Privatizes SWL", 1930).

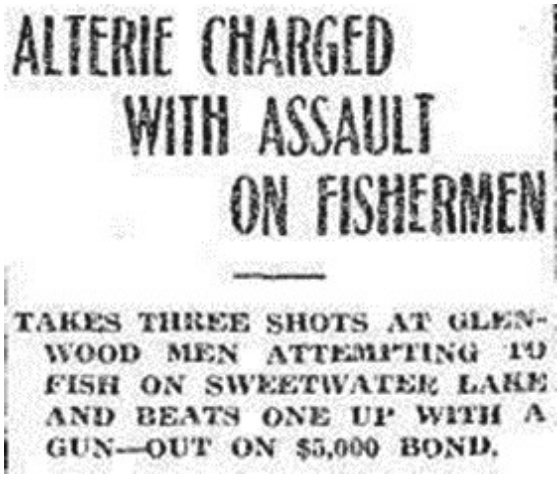
Despite local pushback, Varain set up Sweetwater Lake as a dude ranch resort, boasting in 1927 that "twenty-five customers have already booked accommodations at

the ranch for June, July, and August. I will see that they have everything they desire in the way of cowboy life." He hoped to turn Sweetwater Resort into "The biggest dude ranch the west has ever seen" and considered constructing a $7,000 hotel there ("Diamond Jack Alterie Back From Chicago", 1927). Varain moved into the Gregg Cabin on the banks of Sweetwater Lake and made it his home when not handling business in Chicago or Denver. Although he never built the grand hotel he envisioned, Varain appears to have made improvements to the resort. The Honeymoon Cabin was probably built in this period, and renovations were likely made to the Westlake Cabin as well.

Despite leaving Chicago to lay low, Varain would encounter his fair share of violence in Colorado. In 1927, his brother Bert Valary shot him in the shoulder at Sweetwater Lake, likely in front of the Gregg Cabin, during an argument over the resort's management ("Diamond Jack Scorns Aid of Law", 1927). His wife brought him to Glenwood Springs Hospital, where he recovered. His left shoulder was partially paralyzed by the incident ("Diamond Jack Alterie Shot by Brother", 1927). Varain did not assist the sheriff in tracking down Valary, and the resort workers reportedly refused to speak with the sheriff. Varain also rejected the opportunity to charge his brother with assault. The sheriff, however, filed charges and, armed with a search warrant, arrested Valary at his home a few days after the shooting ("Diamond Jack Scorns Aid of Law", 1927). Newspapers noted that Valary would likely be released, as his brother refused to press charges against him, and the wound was not fatal. Whether Valary was convicted or released is not known ("Diamond Jack Scorns Aid of Law", 1927).

In 1932 Varain lived up to his "Louis Two-Gun" nickname ("News of Silver State", 1932). While staying at the Denver Hotel in Glenwood Springs, he ran drunkenly through the building. Varain beat and shot three individuals who attempted to halt his rampage. He was arrested, and agreed to pay a fine and leave Colorado instead of facing jail ("Banishes Diamond Jack Alterie From State of Colorado", 1932). Varain returned to Chicago permanently, and soon failed to meet payments on his resort at Sweetwater Lake. Ownership then returned to Paul Gregg. In 1935, Varain was gunned down, outside a hotel in Chicago by rival gang members.

Photo 58. A newspaper headline from The Eagle Valley Enterprise ("Alterie Charged With Assault on Fishermen", 1931).


ALTERIE CHARGED WITH ASSAULT ON FISHERMEN

TAKES THREE SHOTS AT GLENWOOD MEN ATTEMPTING TO FISH ON SWEETWATER LAKE AND BEATS ONE UP WITH A GUN—OUT ON $5,000 BOND.

A black white photo of a newspaper heading.

Varain's ownership of Sweetwater Lake marks a violent period in the history of the lake. In one example, Varain shot at three fishermen from Glenwood who had not paid to access the lake, and beat one of them with his pistols. Diamond Jack was arrested again but released on a $5,000 bond ("Alterie Charged With Assault on Fishermen", 1931). Other reports suggest Varain used the resort as a hideout for other gang members and stored several crates of firearms and ammunition there (Ludlin, 2017). The Hilltop Cabin, today

located near the entrance to Sweetwater Lake, was reportedly moved to its current location by Varain to serve as a guard outpost overlooking the road coming up to Sweetwater Lake. The Hilltop cabin did not appear at the top of the hill in maps or photographs until after 1928 (*Shaw, 2019b*). While his business was turbulent and short-lived, Varain was the first to introduce dude ranching to Sweetwater Lake.

Photo 59. The Hilltop Cabin.

Source: Photo courtesy of RJ Hillman, 2023.

A photo of the side of a log cabin surrounded by shrubby vegetation.

Following in Varain's footsteps, Gregg announced his plan to remodel Sweetwater Resort and continue operating it as a dude ranch ("John Green to Again Manage Sweetwater Lake", 1932). Gregg owned the Sweetwater resort until 1945 when he sold it to the Currier family ("Sweetwater Lake Changes Hands", 1945).

Post World War 2 Tourism & Sweetwater Lake Resort (1945 – 1975)

After World War II, America saw a massive spike in tourism as the postwar economic boom allowed Americans to travel more than ever before, and Colorado became a favorite destination. While Sweetwater Lake had long been a popular tourist destination, after WWII, its tourism industry grew (Philpott, 2014, p. 4). The rustic styled Hartz Cabin, located next to the Gregg Cabin, was built in this period. In addition to bringing new visitors, tourism encouraged people to move to Colorado and the places they grew attached to on vacation (Philpott, 2014, pp. 7–8).

The resorts frequently used the lake for community events and festivals during the mid to late twentieth century. In 1954 Sweetwater Lake Resort, then owned by Phillip King, hosted the Glenwood Springs and Minturn VFW branches at the lake for their annual disabled veterans' outing. The resort rented out its lodges for three days, gave the veterans free use of their boats, and worked to ensure they had every amenity they desired ("Seven Vets Guests at VFW Outing", 1954). These events appear to have been hosted annually at Sweetwater Lake throughout the 1950s, as newspapers from 1958 also mention the VFW retreat at Sweetwater Lake ("VFW Disabled Vets Outing in September", 1958).

Photo 60. The Hartz Cabin.

Source: Photo courtesy of RJ Hillman, 2023.

A photo of a log cabin with turquoise wood framing the windows and doors.

While ownership frequently changed during the 1950s and 1960s, the resort continued operations. However, numerous fires caused significant damage to the property. In 1954 a fire burned down the original Miller Cabin, which was replaced by a new cabin in 1957. The new Miller Cabin, which still stands today, was built in the mid-century ranch style (*Shaw, 2019b*).

Photo 61. The Miller Cabin.

Source: Photo courtesy of RJ Hillman, 2023.

A photo of a brown building made of cinder blocks with turquoise framing accents, surrounded by tall grasses.

In the early 1950s the Williams Cabin, also known as the Bunkhouse was constructed, likely by the King family or another resort owner to expand their business (*Shaw, 2019b*). In 1955, the sizeable twelve-room hotel built in 1905 burned to the ground along with a few other smaller buildings near the hotel ("Sweetwater Lodge Burns to Ground", 1955). Construction of a new lodge began soon after, and that structure is today the lodge/restaurant located on the site today (*Shaw, 2019b*).

Photo 62. The Williams Cabin.

Source: Photo courtesy of RJ Hillman, 2023.

A photo of a building with a brick chimney, surrounded by shrubby vegetation.

The Kings also constructed numerous other cabins after the fire in 1955, including the Sweetwater Mote, replacing the burned Miller Cabin. The Clayton Cabin was built or renovated at this time as well (*Shaw, 2019b*). The current barn located at Sweetwater Lake was constructed at some point after the 1955 fire, likely in the summer of 1961 (*Shaw, 2019b*).

Photo 63. The current lodge.

Source: Photo courtesy of Adam Thomas, 2023.

A photo of a brown building with turquoise framing accents, surrounded by tall grasses.

Photo 64. The Sweetwater Lake Motel.

Source: Photo courtesy of RJ Hillman, 2023.

A photo of a brown building made of cinder blocks with turquoise framing accents, surrounded by shrubby vegetation

Photo 65. The barn at Sweetwater Lake Resort.

Source: Photo courtesy of Adam Thomas, 2023.

A photo of a brown building with a dirt path in front and a corral gate, and rock outcroppings in the background.

Photo 66. The Clayton Cabin.

Source: Photo courtesy of RJ Hillman, 2023.

A photo of a brown building with a large wooden deck, a road traveling in front and on the right side of it, surrounded by tall grasses.

Anderson Family Purchases SWL

In 1963, the Kings sold the property to a group of businessmen from Denver and Dallas ("Sweetwater Lake Lodge Sold", 1963). As the resort changed hands, it was subdivided into smaller properties. However, a pair of investors, retired Air Force General Frederick Anderson and his son Travis, reconsolidated it. In 1962, the Andersons began purchasing properties around Sweetwater Lake. Travis overhauled the Lucky GJ Ranch outside of Gypsum into the "Colorado River Ranch for Boys," also known as "The Anderson Ranch." ("Sweetwater: Andersons Buy GJ Ranch", 1962). The ranch, located at the Colorado River and Sweetwater Creek confluence, ran cattle, and operated as a summer camp for boys. The family opened other camps in the area, welcoming campers of all genders from the local region and internationally.

General Frederick Anderson had an illustrious military career, coordinating bombing campaigns again Germany during WWII. After retiring in 1947, he served as the U.S. Ambassador to NATO. In the late 1950s, he entered the corporate world, and pioneered venture capitalism in Silicon Valley (Shaw, 2019a).

Photo 67. Air Force General Frederick Anderson.

Source: US Air Force Biographies Website, 2023.

A black and white portrait photo of a man wearing an Air Force uniform.

The Andersons became active community members, hosting community card nights and attending town halls and meetings of various regional ranching groups ("Sweetwater: Anderson Card Party", 1963). They likely constructed and renovated numerous buildings at Sweetwater Lake. One building probably constructed by the Andersons is the Yellowhouse. Garfield County assessors date the construction in 1950, but this is most likely incorrect. The Yellowhouse is in proximity to the buildings which burned down in 1955, and likely would have been caught in the blaze. Further, photographs from the USFS and topographic maps from August 1961 do not include the Yellowhouse Cabin. We do not know for sure when the Yellowhouse Cabin was constructed; however, evidence points to construction in the 1960s (*Shaw, 2019b*).

The Andersons sold their properties on Sweetwater Lake in the 1960s. However, Travis held on to the Anderson Ranch property along Sweetwater Creek, which is outside of the current boundaries of the Sweetwater property. In 1962, he opened the Anderson Camps summer camp, on the confluence of the Colorado River and Sweetwater Creek. In 1968 Travis returned to California for some time after his father was diagnosed with cancer ("Sweetwater: Andersons Return to CA", 1968). In March 1969, General Anderson passed away, and Travis returned to Colorado to continue his work at the Anderson Ranch ("Gen. Anderson Died in Houston", 1969). Two years later, General

Anderson was honored at the United States Air Force Academy in Colorado for his service as Brigadier General in World War II and his post-retirement years advising presidents Truman and Eisenhower ("General Anderson Honored", 1971). The Andersons sold Anderson Camp in 1979, but it continued operating under new ownership (*Anderson Western Colorado Camps, n.d.; Bureau of Land Management, 2023*). The Anderson family were influential members of the Sweetwater community in 1960s and 70s post-war America.

Photo 68. The Yellowhouse Cabin.

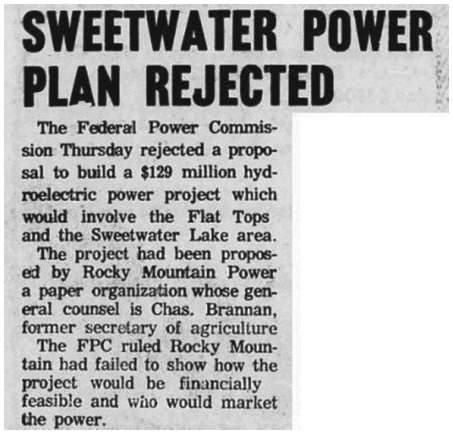
Source: Courtesy of RJ Hillman, 2023.

A photo of a brown building with a large wooden porch.

Hydro Electric Power Plant Proposal 1965

In 1965 Rocky Mountain Power Company began examining Sweetwater Lake as a potential site for a hydroelectric power plant ("Conservationists Oppose Hydro Project," 1965). The plan would fill Sweetwater Lake with 11,000 acre-feet of water and flood much of the publicly accessible shoreline and resorts. The Eagle Valley *Enterprise* argued that if the plan were approved, it would ruin "some of this area's most beautiful country." ("Conservationists Oppose Hydro Project", 1965). They further encouraged residents to protest the project by mailing the Federal Power Commission stating their opposition. Numerous local papers and groups opposed the plan, alongside the Colorado Mountain Club and conservation groups based in Denver, who argued the lake and surrounding area were better utilized for public wilderness than for power production ("Conservationists Oppose Hydro Project", 1965). The project was rejected by the Federal Power Commission in 1967, arguing that "Rocky Mountain [Power Company] had

Photo 69. An Eagle Valley Enterprise newspaper article announcing the proposed hydroelectric power plant was rejected ("Sweetwater Power Plan Rejected", 1967).



SWEETWATER POWER PLAN REJECTED

The Federal Power Commission Thursday rejected a proposal to build a $129 million hydroelectric power project which would involve the Flat Tops and the Sweetwater Lake area.

The project had been proposed by Rocky Mountain Power a paper organization whose general counsel is Chas. Brannan, former secretary of agriculture

The FPC ruled Rocky Mountain had failed to show how the project would be financially feasible and who would market the power.

A black and white photo of a newspaper article.

failed to show how the project would be financially feasible and who would market the power." ("Sweetwater Power Plan Rejected", 1967). Despite citing financial concerns as the reason for rejecting the project, the rallying cry by local communities against the power plant construction shows local initiative to protect Sweetwater Lake from development.

Modern Tourism (1975 – 2017)

Ownership of Sweetwater Lake changed hands frequently during the late twentieth century. While ownership changed often, the resort appears to have operated in some capacity throughout this time. Resort owners also expanded operations at Sweetwater, as one advertisement announced that Sweetwater Lake Resort would be open during the winter for ice fishing, skiing, snowmobiling, and ice skating ("Sweetwater Lake Resort Open for Winter", 1975). It also opened the restaurant and bar to visitors. In 1975, Adrienne and Jim Brink began to lease the resort, and opened A.J. Brink Outfitters, offering guided hunts, horseback rides, lodging, boat rentals, and other services.

The restaurant continued to operate and was popular among the community as a spot for a hot meal, cold drink, and great pie. Employees at the resort filled multiple roles, and one local noted that it was common for the employee who saddled the horses and guided horseback rides to serve as the restaurant cook that evening (K. Heicher, personal communication, May 16, 2023). In 1985, they hired a full-time chef from Seattle ("Learn to Make a Spook House on Oct. 19", 1985). A.J. Brink Outfitters also renovated and expanded the Sweetwater Lake Restaurant and Lodge. In the 1970s the building was expanded to include a full bar area, and again in the 1980s to expand the size of the kitchen. The small boathouse was also constructed during the 1970s or 1980s at its current location to store equipment (*Shaw, 2019b*).

Photo 70. Sweetwater Lake Boathouse.

Source: Courtesy of RJ Hillman, 2023.

A photo of a brown log cabin with turquoise accents, surrounded by large grasses and a dirt road.

By 1981 locals in Sweetwater and wildlife biologists had noticed the declining native fish population in the lake. Non-native species like rainbow, brown, and brook trout,

kokanee salmon, and white suckers had largely overtaken native fish populations. In response, the Colorado Game and Fish Department announced a plan in January 1981 to poison Sweetwater Lake with rotenone and construct a fish trap. The project aimed to eradicate the fish populations in Sweetwater Lake before reintroducing native species, particularly the cutthroat trout, whose population was dwindling across the state ("Poison May Be Used to Make Way for Cutthroat", 1981). The fish trap was designed to track the spawning migration and population of trout, and potentially catch trout to help reintroduce elsewhere. The project needed approval from the USFS and the property managers at Sweetwater Lake. To prevent toxins from entering the Colorado River through Sweetwater Creek, biologists set up a station downstream from the lake, adding detoxifying chemicals to the water that would neutralize any leftover rotenone from the lake ("DOW Preparing to Poison Sweetwater Lake", 1981). It is unknown if the poisoning plan was implemented.

During the late twentieth century, the lake continued to serve as the economic and cultural center of the local community. The lake and resort hosted numerous festivals, holiday celebrations, weddings, and other events. The resort hosted auctions and annual community yard sales. A.J. Brink Outfitters also hosted Halloween parties during this period, including a 1985 community costume party at Sweetwater Lake Resort, with music, food, drinks, and prizes for the best costumes (Rivera, 1985). The varied use of Sweetwater Lake by the community demonstrates the importance of the lake to communities in the region as center of their community activities. Under Adrienne and Jim's leadership, A.J. Brink Outfitters operated successfully, became an influential business, and offered services to the community as event hosts, but also by supporting groups like Small Champions.

Small Champions is an Eagle Valley-based charity organization founded in 1996 that works to empower, educate, and provide memorable experiences to children in the region with physical or cognitive disabilities. Small Champions brings children on summer and winter outings to play sports, rock climb, fish, swim, horse ride, and more to engage them in nature. In the summer of 2017, A.J. Brink Outfitters hosted the Small Champions annual summer camp. The summer camp consisted of a few days of boating, fishing, hiking, horseback riding, and other activities at the resort. A.J. Brink Outfitters employees worked with the children, teaching them to ride horses, drive boats, fish, and helping them explore the property (Weiss, 2017).

Present Day

In 1919, Arthur Carhart, a recreation engineer who pioneered the modern wilderness conservation movement, wrote a memorandum urging the USFS to protect access "for scenic reasons" (Carhart, 1919). Plans for its protection began in 2017 when the remaining 488 acres of private holdings on the lake went up for sale for $9.3 million, and numerous private companies and conservation groups, such as the Eagle Valley Land Trust, considered purchasing the lake (Blevins, 2020a).

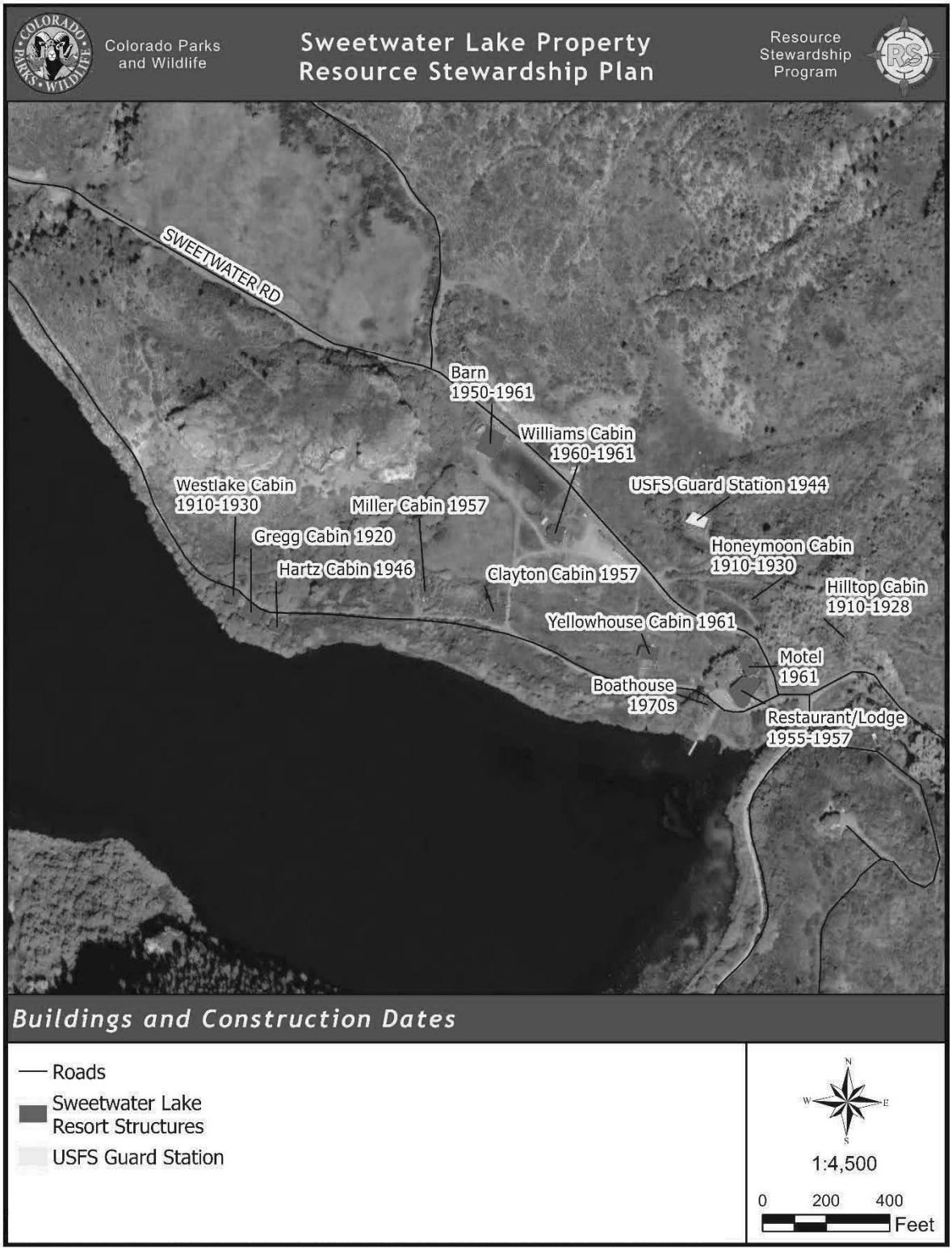
The USFS was interested in buying the property to incorporate into the White River National Forest. The USFS and Sweetwater community have always had a close relationship when managing the lake. "…Our range staff works with the different ranchers out there that have permits to move their cattle or sheep onto USFS land out of that area… We have wilderness and trail staff that works out of that area. And then we have general recreation staff that goes in and checks out the campground." (T. Fuller, personal communication, March 31, 2023). The Land and Water Conservation

Fund (LCWF) worked alongside the USFS and the Eagle Valley Land Trust to purchase the property and protect Sweetwater Lake. The project needed public support to raise the full $9.3 million sale offer. They contacted local communities for support and created the “Save the Lake” fundraising campaign hoping to generate $3.5 million in donations. The community responded in force.

Though the fundraising campaign was planned to last three years, within just a few months, local communities raised over $1 million. Eagle County committed $500,000, the town of Gypsum committed $20,000, Eagle gave $10,000, and an anonymous donor donated $200,000 to the cause (Blevins, 2020). Garfield County Commissioners’ office also voiced its approval of the plan. When asked why they approved the plan, County Commissioner John Martin responded, “It’s been a community for hundred-something years up there and they don’t get much support and the lake is the heart of the community.” (Blevins, 2019).

In 2020, the USFS got approved to purchase the rest of the land surrounding Sweetwater Lake (Boyd, 2020). After nearly a century of pressure from the local community, Sweetwater Lake was now fully protected as a public space. Colorado Governor Jared Polis stood atop a cliff overlooking Sweetwater Lake to announce that Sweetwater Lake would become Colorado’s forty-third state park, as part of a unique agreement. As of this writing, this cooperative agreement is still under consideration. This partnership between the State and Federal Governments will not transfer the Sweetwater Lake property to Colorado ownership. Instead, it will remain part of the White River National Forest, but will be managed by Colorado Parks and Wildlife. This arrangement, however, alarmed some in the local community, who feared park status would lead to additional traffic and crowd out local use.

Figure 12. Map of Sweetwater Lake Buildings and Construction Dates Discussed in Cultural Resource Section.



Discussion

Sweetwater Lake has a long history of settlement. Local communities have long sought to protect the lake and public access to it. Today, the locals have a deep respect and appreciation for the lake. However, it is important to remember that this land has been Ute land since time immemorial. Management should take every opportunity to interpret the tribe's historic and ongoing connection to the land for visitors.

Today, ranchers rely heavily on Sweetwater Lake and Creek for water and the surrounding open fields to graze their cattle. The lake attracts tourists from across Colorado and the nation, bringing economic opportunity to the region. Resorts at the site have historically hosted community events and celebrations. The lake is the center of the community, economically and culturally.

Public access to the lake has long been a concern; beginning with calls for better road conditions to reach the lake, and legal battles against resort owners, the communities around Sweetwater have been willing to fight for the lake. Local towns like Gypsum, Eagle, and others played essential roles in protecting the lake as public property. Without Sweetwater Lake, the communities would lose much of their identity. The community has played a crucial role in protecting resources at Sweetwater, like the Lake itself, public access, the numerous cabins, archaeological sites, and the local environment. The Ute tribe also has a significant cultural heritage in the region, and the presence of the Sweetwater Indian Cave highlights Utes' use and connection to the area. For this reason, it is imperative going forward to involve the communities and Ute in the management of Sweetwater Lake.

Resource Conditions

The degree of past impact to the Property'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. This is in part the result of a misinformed or uninformed public that may purposefully, inadvertently, or unknowingly cause damage to fragile nonrenewable cultural resources. The Cabins and buildings on the site during our visit were free of graffiti and signs of vandalism. The Sweetwater Indian Cave, however, has been closed off to the public due to consistent vandalism (see Appendix 7.6 for Cultural Resource Laws and Regulations).
- **Development** - The early development of the area, including farming, ranching, tourism, road development, and the development of USFS infrastructure significantly impacted the Cultural Resources at the site. This includes the construction of numerous cabins along the lake, roads, and USFS buildings for use by Forest Rangers. As of this writing, plans for the anticipated state park are still under development.
- **Natural** – Environmental processes such as rain, snow, wind, sun, erosion and vegetation can significantly affect cultural resources. These environmental impacts are most concerning in regard to the preservation of historic structures. Some buildings show signs of

weather damage, including the Restaurant/Lodge which has significant ice and water damage on the interior due to roof damage. Many buildings including the Restaurant/Lodge, Miller Cabin, Honeymoon Cabin, and others are surrounded by very thick vegetation making maintenance difficult.

Sweetwater Indian Cave

Since its initial documentation, official reports, USFS personnel, and local residents have noted vandalism as an on-going problem for the cave.

The types of vandalism present in the cave are numerous; there is graffiti, dating back to 1880, bullet holes, scratches, and dis-coloration on panels (perhaps from fires). Visitation by CPW in 2021 noted a clear and well-established trail leading directly to the cave and on-going cave use, including a rope in the back of the cave to assist cave exploration. Comparison to photos taken in 1998 shows that there has been considerably more damage done this site since then. This shows on-going use and vandalism in the cave.

The desired future condition is for this cave to be preserved for future generations. The reality is that vandalism is hard to curb, especially in places where it has been on-going. Without robust education programs and controlled access, this site will continue to degrade. Furthermore, with the property now open to the public, an increase in visitation could rapidly accelerate the degradation of this resource. If we are to comply with best management practices to preserve the heritage of Colorado, and the Ute people, we need to take immediate action. In this case, this means going against the wishes of local cavers and A.J. Brink Outfitters, who would like to see the cave open for cultural heritage visitation and/or spelunking. Without immediate and significant management of this resource, the pictographs will continue to degrade, and we could lose this valuable cultural resource.

Desired Future Conditions

As of this writing, the fate of the historic structures is still being decided. While adverse effects to the cultural resources are likely unavoidable, through careful planning and stewardship, mitigation efforts, and by monitoring impacts to the known and recorded sites, it should be possible to maintain the Sweetwater property's connection to the past through maintenance and recordation of cultural resources. The best possible future includes responsible stewardship, where impacts to significant sites will be avoided whenever possible and mitigated where avoidance is not possible. Some sites, especially the Sweetwater Indian Cave, need additional management to protect visitors as well as the resource, while others can be protected from harm through appropriate trail and development locations, visitor management, and resource interpretation.

The site managers can protect 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 Property (see Appendix for Historic Preservation Laws and Regulations).

Identifying and Minimizing Resource Impacts and Hazards

Recreational

Sweetwater Lake Resort has a long history of recreational use, beginning in the 1890s and continuing to the present. The Sweetwater Indian Cave has also been visited by tourists and locals alike since its discovery in the nineteenth century. Vandalism of prehistoric sites is evident in Sweetwater Indian Cave. Publicizing sensitive resources can often lead to an increase in resource vandalism, and greatly reduce the efficacy of inventorying new sites. As a result, the public should not be made aware of sensitive sites in the property that cannot be closely monitored. Recreational impacts are mostly preventable through fencing, interpretation/signage, periodic monitoring by volunteers or staff, and outreach to visitors.

Development

All developments on the property, including Sweetwater Lake Resort, the Sweetwater Ranger Station, and the Sweetwater Indian Cave, are on USFS property, meaning they are beholden to requirements of the National Historic Preservation Act. Development and construction impacts can be prevented through collaboration, and through analysis of project locations in a Geographic Information System during project planning processes. Consultation with USFS, Resource Stewardship, the State Historic Preservation Office (SHPO), local governments and other stakeholders is ongoing, and it is legally required prior to any ground disturbance or cultural resource projects. The goal of this process is to limit irreversible impacts on sites in or near the project area. USFS will help coordinate any consultation with the Ute tribe and other stakeholders.

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

If new sites are identified during a project and not properly documented the scientific and historic value can be greatly reduced, if not completely destroyed. If unidentified artifacts are unearthed during any ground disturbing project, all work should stop immediately until the site can be properly evaluated for significance. Otherwise, it is a violation of Section 106 of the National Historic Preservation Act.

Environmental

Environmental 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 resources. This should not be done without first contacting Resource Stewardship, which can mediate consultation with a professional historic architect/archaeologist to avoid unintentional and permanent damage to the resource. 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.

Some buildings at Sweetwater Lake Resort have been significantly damaged by natural elements such as snow, ice and rain. The Restaurant/Lodge, in particular, has been damaged significantly in the interior due to rain and ice damage. Other buildings, such as the Hilltop, Williams, and Westlake cabins, are threatened by overgrown vegetation.

Hazards

Archaeological and historic sites may contain hazardous materials including barbed wires, broken glass, ceramics, etc. These hazards can often be mitigated, but before doing work of this nature, please contact CPW Resource Stewardship, who are qualified to properly remove or displace this material. Please also contact USFS archaeologists. Please do not pick up artifacts or otherwise disturb archaeological or historic sites without a qualified archaeologist, as this can destroy the historic value, and in many cases is illegal.

The Sweetwater Ranger Station and Indian Cave are largely free from hazards to visitors. However, there are some hazards related to the Sweetwater Lake Resort. Several buildings are not fit for use due to damage. The Honeymoon Cabin has heavily deteriorated and the stairs to access the porch were removed to prevent entry. A social trail leads up to the rock overlook at the Northwest side of the Resort, which is popular for wildlife viewing. There are no guard rails or warning signs near the ledge of the overlook. This is a significant hazard as the area is visited frequently and lacks any form of protection to prevent visitors from falling.

Resource Management

Cultural Resources are managed by collaboration between CPW, USFS, and the State Historic Preservation Office (SHPO), as well as Native American tribes and other stakeholders. The National Historic Preservation Act (NHPA) mandates this relationship and the process for managing cultural resources for cultural resources with federal involvement. Other federal and state laws also protect cultural resources (Appendix).

Archaeologists work to assess cultural resources, and to provide management recommendations in accordance with cultural resource laws, as well as best practice. The Office of Archaeology and Historic Preservation (OAHP), which is part of the SHPO, works with archaeologists and land managers to provide guidance and support for the management of cultural resources (“Office of Archaeology and Historic Preservation”, n.d.).

Table 24. Management Recommendations for Cultural Resources at Sweetwater Lake Property.

Site Number	Significance	Management Recommendation
Sweetwater Indian Cave (5GF.2)	Significant	Support USFS efforts in tribal consultation on management plans. All plans implemented regarding the cave should be respectful of Ute culture and history.
Sweetwater Lake Resort (5GF.5734)	Significant	The resort contains numerous buildings from poor to good condition. Some buildings should be preserved such as the Gregg Cabin.
Sweetwater Guard Station (5GF.1484)	Limited Significance	The guard station is in good condition and remains in use by the USFS. It is recommended that the USFS continues to use the guard station.

Cultural Resource Laws and Regulations

Please Refer to Appendix 7.6 for laws and regulations pertaining to cultural resources. As the Sweetwater property is owned by USFS, please contact USFS to determine which laws apply and the proper course of action.

Cultural resources in state parks are protected by federal and/or state laws. The State of Colorado has title to all historical, prehistorical, and archaeological resources on state lands. On federal lands, the Federal Land Manager is responsible for the management of cultural resources.

"*To knowingly disturb a historical, prehistorical, and archaeological resource on public land*" is illegal under the National Historic Preservation Act, and the Colorado Historical, Prehistorical, and Archaeological Resources Act.

The Colorado Parks and Wildlife environmental/cultural review directive (Environmental Review, 2010) should be referenced prior to the commencement of any ground disturbing Property projects. This directive is in place to assist Property management and Property development projects and to ensure legal compliance with statutes and to aid in the protection of these valuable *nonrenewable* resources.

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

A resource's eligibility for inclusion to the National and State Registers of Historic Places should not be considered overly restrictive (see Appendix 7.6 for National and State Register Benefits and Restrictions), in many cases in order to prevent damage to a significant cultural resource. SHPO can offer strategies on how to minimize this impact. A file search of previously recorded resources and past surveys in the project area can greatly reduce the impact on significant resources. This process is easier and

clearer if all of the Property's cultural resources are appropriately surveyed and inventoried.

Interpretive Opportunities

Sweetwater Lake currently has few signs relating to cultural resources. In addition to the specific cultural resource signs, CPW Resource Stewardship strongly recommends 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. Below are several themes that should be considered for possible interpretive signs.

Sweetwater Lake currently has one small sign present at the USFS campground, which interprets some of its history. Signage can be created portraying the lake's history of Indigenous occupation, tourism, resorts, and public access. We recommend signage be created highlighting some of the buildings at the lake, especially the Gregg Cabin which has been home to several locally important historical figures such as Paul Gregg and Leland Varain. Ute history should also be highlighted in interpretational signage.

We recommend that management create signage highlighting the general history of the lake and highlight community involvement in protecting public access, such as when Paul Gregg attempted to privatize the lake in 1927. Signage could be placed near the entrance of the property, though we also recommend the creation of a trail along the lakeshore beginning at the entrance of the property leading to the Gregg Cabin. An interpretive trail could provide visitors with an opportunity to explore the property and learn its history. A trail could also make available several locations along the lake for signage and reflective spaces to be placed. A map of a proposed route for this trail is in appendix 7.8, figure 49.

We also recommend the creation of a brochure highlighting the lake's history. A brochure could help educate visitors on the lake's rich history, encouraging them to care about the property thanks to a deeper understanding of its importance in history. The brochure should also include a history of the Ute who have a long standing connection Sweetwater Lake, as evidenced by the Sweetwater Indian Cave. The brochure can be made available online and at the office to ensure the property's history is easily accessible to visitors.

Further interpretive opportunities related to Ute history include the creation of a reflective space, near the entrance of the property. This reflective space could include a small bench, with signage highlighting Ute history and home at the lake. The site should also contain native vegetation important to Ute culture or their land management practices. Further, the signage could include powerful verbiage translated into numerous native languages to further educate visitors on native culture.

The idea for a reflective space highlighting native cultures was created at a 2023 workshop for Indigenous youth and elders, sponsored by Colorado Parks and Wildlife and the American Indian Academy of Denver. The goal of these reflective spaces is to make visitors aware that Sweetwater Lake is the home of the Ute, and for Indigenous visitors to feel welcome and respected within the property. If CPW or USFS move forward with the creation of a reflective space, they should reach out to coordinate closely with the Ute Tribe to help design the reflective space. See Appendix 7.8 for more interpretive ideas.

Data Management and Management Practices

The best management practices for preserving the prehistoric and historic legacy of Sweetwater Lake for future generations include the continued maintenance of the sites, and where appropriate, sanctioned improvements and/or modifications, particularly for sites eligible to be listed on the National Register of Historic Places (NRHP) or State Register of Historic Places (SRHP). Due to their current condition, without intervention many of the property's sites will likely be lost. If the resources cannot be preserved, mitigation efforts can help preserve the connection of the property to its historic heritage. CPW has compiled analysis of significance, but notes that consultation with the USFS on current status is required.

Resource Significance

Colorado Parks and Wildlife considers a site's significance based on the NRHP and SEHP eligibility assessments provided by qualified professionals as well as the resources' contribution to the history of the Property. 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 the Property (see **Table 25** for more details about resource significance).

- **Significant Sites** - are sites which are listed on, or eligible for listing on, the NRHP or SRHP. Impacts should generally be avoided to these sites and unavoidable impacts should be managed through close consultation with SHPO.
- **Unknown Significance Sites** – are sites where the eligibility for listing on the NRHP or SRHP has not been assessed. They should be treated the same as significant sites unless the funding is available for proper testing to determine eligibility. Additional recording and evaluation through archaeological surveys is required prior to disturbance.
- **Limited Significance Sites** – are sites that are not eligible for the NRHP or SRHP. However, "Field Not Eligible" assessments can potentially be reversed. 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 Property resource, meaning visitors are interested in the resource, it is recommended that staff make at least some preservation efforts.

Table 25. Cultural Resource Significance at Sweetwater Lake Property.

Site Number	Significance	Notes
Sweetwater Indian Cave (5GF.2)	Significant	-
Sweetwater Lake Resort (5GF.5734)	Significant	Pending USFS survey results.
Sweetwater Guard Station (5GF.1484)	Limited Significance	Guard station has been renovated, and is still in use by the USFS.

Site Barriers

Many of the cultural resources at Sweetwater Lake are fragile. Even moderate foot traffic can have a devastating effect on a resource. Not publicizing the location 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.

Additional site barriers, such as fencing, as well as interpretive signage will also help mitigate further impacts from recreational activity. Signs and site barriers should be placed around the historic structures that visitors can easily access. Site barriers should be appropriate to the time period the site is associated with. Historic fences were often constructed from local materials, and it is recommended that barriers around historic resources should be constructed in the same manner. As discussed in "Identifying Resource Impacts and Hazards", above, USFS and Resource Stewardship must be contacted prior to any work on near cultural resources.

New Discoveries

When new archaeological discoveries are made, they should not be disturbed or removed from where they are found. See Appendix for the procedure for unanticipated discovery of cultural resources. Please fill out the Cultural Resource Identification Form (Appendix) and submit to USFS and CPW Resource Stewardship to help archaeologists find and document resources.

To properly document a new resource, it is necessary for an archaeologist to record and report it to the OAHP. If for any reason staff feels as though a resource is in immediate danger, USFS archaeologists should be contacted immediately to complete the documentation. Resource Stewardship should also be contacted.

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 staff assigned to monitor the area. The Resource Stewardship Program has a relationship with the OAHP, and can help to locate qualified personnel. As the Sweetwater Lake property is on USFS land, USFS must be contacted early in this process.

Inadvertent Finds and Human Remains

If suspected human remains are discovered, refer to appendix. Contact USFS immediately. Secure the area, and do not take photographs.

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. The county coroner must be contacted as soon as possible, as well as White River National Forest Archaeologists. USFS and the SHPO will direct the rest of the process.

Work on Cultural Resources

Work on cultural resources, including archaeological sites and historic structures, should follow treatment plans from a qualified professional to prevent irreversible damage,

which can affect the NRHP and SRHP eligibility of a resource. Therefore, work should not be conducted on any cultural resources without consulting a qualified professional archaeologist. Through consultation, potential adverse effects to the resource are assessed and proper treatments prescribed, ensuring that the historical integrity and characteristics of the structure will remain intact. When adverse effect is unavoidable, proper mitigation is performed. Resource Stewardship can help facilitate this effort.

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

Conclusions

Through careful planning and stewardship, mitigation efforts, and by monitoring impacts to the known and recorded sites, it is possible to maintain the Sweetwater property's connection to the past. The best possible future includes responsible stewardship, where impacts to significant sites will be avoided whenever possible and mitigated where avoidance is not possible. Some sites, especially the Sweetwater Indian Cave, need additional management to protect visitors as well as the resource, while others can be protected from harm through appropriate trail and development locations, visitor management, and resource interpretation.

Sweetwater Lake Resort has buildings of historical significance. The Gregg Cabin, for example, contains great potential as a site for interpreting the history of tourism and land use conflict at Sweetwater Lake Resort. Other buildings in good condition include the USFS Guard Station, which is still in use by the USFS. The threat of disrepair and disuse is present as the buildings will continue to deteriorate over time. Some buildings, including the Gregg and Westlake Cabins, are nearly a century old and will require consistent maintenance to maintain their present condition. In the future, each building will need assessment to develop a plan for addressing disrepair, damages, and other issues. Some historic buildings may require greater repairs including structural stabilization including roof repairs, foundations, siding, and potentially regrading the site to better support the building.

Sweetwater Lake 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 property (see Appendix for Historic Preservation Laws and Regulations).

This chapter highlights the influences affecting the condition of the natural resources at the Sweetwater Lake Property. The ability to balance the use and the conservation of Property resources is a central theme of this stewardship plan. The following information outlines the sources of the most significant influences to certain Property 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 Property, and may be independent of, or result from, human influence.

Regional Influences

Population Growth and Development

Colorado's population as of 2021 was estimated to be 5.814 million people (CDLA 2021a). In 2021, Colorado's population grew by 0.5 percent, which ranked Colorado as having the 17th highest growth in the U.S (CDLA 2021a). The Property is situated in Garfield County but is very close to the boundary of Eagle County. Residents and visitors to both counties visit the Property. Population trends and predictions are provided in **Table 26** for Garfield and Eagle Counties. As of 2021, Garfield County was the 13th fastest growing county and Eagle County was the 15th fastest growing county in the state per capita (CDLA 2021b). Although both counties are growing quickly, much of the population growth is in the urban regional areas, such as Glenwood Springs, and not near the Property. Growth is expected to slow down in the near future. Overall, Colorado's growth is still much faster than the rest of the country.

Table 26. Estimates of Population Growth for Garfield and Eagle Counties.

Year	2019	2020	2021	2022	2023	2030	2040	2050
Garfield County Population	60,031	61,685	62,161	63,019	63,659	77,404	89,933	105,711
Eagle County Population	54,819	55,667	55,785	55,291	55,634	63,912	71,273	77,347

Source: (CDLA 2022a, 2022b, 2022c)

Adjacent and Nearby Land Uses

At the Sweetwater Lake Property, adjacent lands are mostly owned by public land management agencies (USFS, BLM). The WRNF surrounds the Property to the north, west, and south. The Flat Tops Wilderness Area boundary, which is operated by the USFS WRNF, is located a few miles to the north. BLM lands are present to the east of the Property.

Lands that are privately owned are present in small pockets surrounding the Property and are used for agricultural production. Cattle grazing on open rangelands takes place in the sagebrush shrublands where palatable grasses can be found in the winter months. Portions of the surrounding lands have been subdivided to allow for more

single-family homes to be built, but the majority are large parcels and privately-owned parcels are small in comparison to the size of publicly owned land. Cattle production is a major agricultural use in surrounding areas, where irrigation water can be delivered to fields, landowners irrigate grass pastures for hay production or cattle to graze on.

Natural Impacts and Influences

Aquatic Nuisance Species

ANS "(sometimes called exotic, invasive, nonindigenous or non-native) are aquatic organisms that invade ecosystems beyond their natural, historic range. Their presence may harm native ecosystems or commercial, agricultural, or recreational activities dependent on these ecosystems (USFWS 2015)." Impacts can be widespread and profound because ANS spread easily through many pathways, making the issue of prevention and control important.

Recent observation and reports of illegally introduced fish species have occurred in Sweetwater Lake, most notable are Goldfish and Yellow Perch (Bakich 2023). Threats posed by the release of pet fish and restricted sportfish species include introduction of pathogens that can cause disease in resident fish species and population impacts from competition for food resources and predation. CPW prohibits the movement of live fish and crayfish on the Western Slope of Colorado through regulation (Bakich 2023).

White Suckers are an abundant nuisance fish species in Sweetwater Lake (Bakich 2023; Lehman & Thompson 2023). These non-native suckers are a threat to downstream native sucker populations where they often hybridize with Flannelmouth and Bluehead Suckers in the Colorado River (Bakich 2023). Furthermore, these fish consume food that would otherwise benefit other lake organisms, reducing resources that would enhance managed fish species within the lake. At this time, mechanical removal of illegally introduced fish and non-native suckers is exercised during fish monitoring surveys and anglers are encouraged through unlimited harvest of these fish through regulation on the Western Slope (Bakich 2023).

Photo 71. White sucker are a nuisance fish species found in Sweetwater Lake.

Source: Montana Fish, Wildlife and Parks
A photo of a gray fish underwater, near a tree branch and cobble stones.

As of October 31, 2022, CPW has confirmed the presence of an extremely invasive zebra mussel in Highline Lake at Highline Lake State Park during routine invasive species sampling and species identification was confirmed by two CPW experts. This is the first time an adult zebra mussel has ever been found in Colorado waters. Mussel larvae have been detected in eight different reservoirs in Colorado since 2008, the most recent occurrence was in Green Mountain Reservoir in 2017, but that reservoir was declared mussel free after three years of negative testing (Colorado River District 2022). Numerous states neighboring Colorado have tested positive for the species. Zebra and quagga mussels could be transported to the Property on a boat that has been used on a lake that is infested with the invasive species and would compete with native mussel species for resources.

To avoid damaging and costly control operations in perpetuity, Colorado has implemented an effective watercraft inspection and decontamination prevention system to stop ANS introduction, specifically zebra and quagga mussels, by inspecting watercraft before they enter our waters, decontaminating those with ANS attached, educating boat operators, and ensuring that users clean, drain and dry watercraft. All boats that use the lake must be inspected for ANS (CPW 2017b). Boat owners are required to purchase the ANS Stamp and operators must retain proof of purchase (electronic or printed receipt) on his or her person, the motorboat or sailboat, when operating the vessel (C.R.S. 33-10.5-104.5). CPW's statewide ANS inspection policies are as follows:

Resident Boaters

- You must pass a state-certified boat inspection if:
- You have traveled outside of the state to boat.
- You have launched on any of the Colorado lakes or reservoirs where mussels have been detected. You must submit to an inspection for aquatic nuisance species prior to leaving the body of water.
- You enter a reservoir where inspections are required. See the List of Statewide Watercraft Inspection and Decontamination Sites. Boaters should expect to be inspected at any lake or reservoir in the state.

Out-of-State Boaters

You must pass a state-certified boat inspection if you plan on launching in any Colorado lake, reservoir or waterway.

Climate Change and Drought

Climate Change

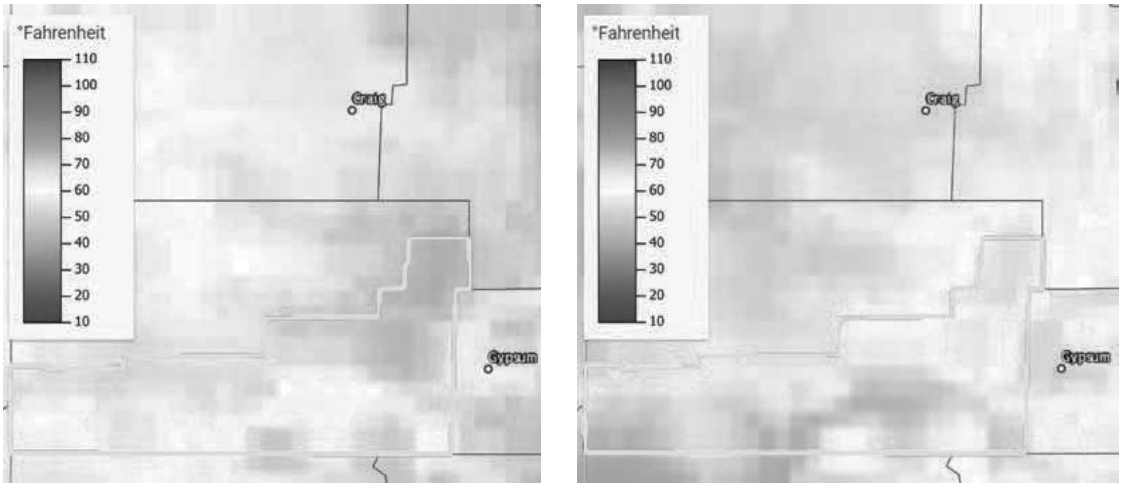
As a result of human development and increased greenhouse gas emissions, climate change has been documented to alter global temperatures, and that associated events, such as changes in precipitation, evapotranspiration rates, humidity are predicted to increase along with severe weather events like hurricanes, tornadoes, floods, and droughts (Hughes 2000; IPCC 2013). The effects of this changing climate are anticipated to be felt across all systems of the Earth. Consequences of climate change would affect natural resources both directly and indirectly, and are expected

to worsen over time (Hughes 2000; Williams et al. 2008). Although impacts are not fully understood, research suggests that changes are impacting plant and wildlife species' physiology, phenology, and distributions (Hughes 2000). Climate change impacts to wildlife and plants is a global threat, and therefore will affect the Sweetwater Lake Property'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). **Figure 13** displays data for Garfield County where the Property is located on average daily maximum temperatures predictions under the scenario where emissions continue to rise into the year 2050.

According to Climate Explorer, Garfield County's average daily maximum temperature is expected to increase to 61°F under higher emissions levels and 59.3°F under lower emissions levels. In comparison, the observed average temperature during 1961-1990 was 54.8°F. These projections suggest that if greenhouse gas emissions are not curbed, Garfield County will experience a significant increase in temperatures by the 2050s. However, if lower emissions levels are achieved, the temperature increase may be slightly mitigated (NOAA 2021).

Figure 13. Average daily maximum temperature changes predicted for the continued high emissions scenario for Garfield County (highlighted in blue). The historical average temperature from 1961-1990 (left) and the predicted average temperatures for 2020-2050 (right).



Source: (U.S. Climate Resilience Toolkit 2022).

In response to climate change, the Property 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 Property or existing issues with resources at the Property include:

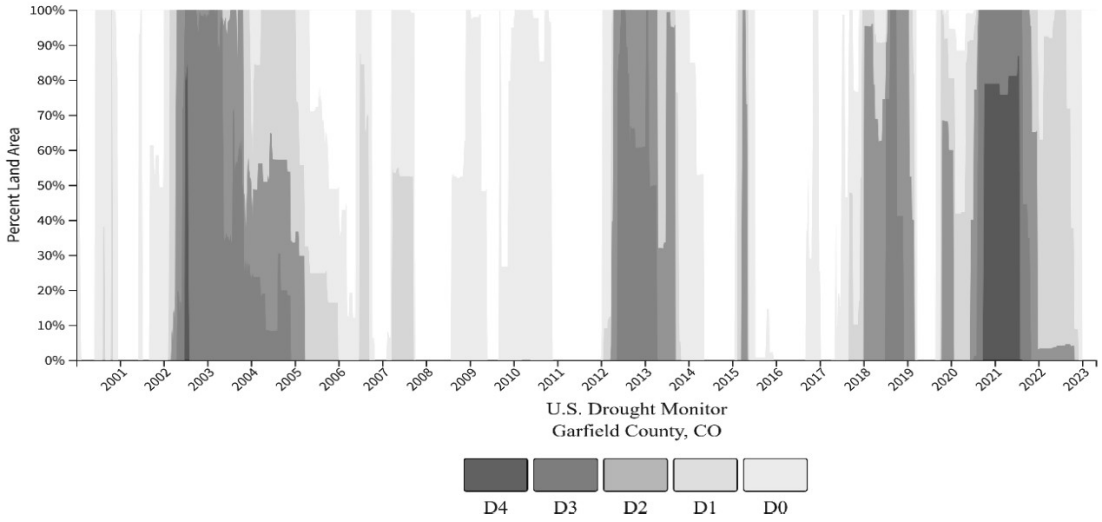
- Reducing greenhouse gas emissions
- Increasing water conservation efforts
- Implementing forest management strategies that mimic natural processes and take account of wildlife wellbeing.

Drought

Drought is a natural hazard caused by a prolonged period of below-average precipitation, and it's not as rare or unpredictable as some people might think. It can happen in any climate, but its characteristics vary depending on the region. Drought usually occurs with extreme heat, which can cause significant problems for society, the economy, and the environment. Compared to other natural hazards, drought is slow to develop and its impacts are non-structural, affecting more people and spreading over a larger area. Detecting and warning people about drought conditions is difficult because it lacks a universal definition and it's harder to see the impacts (JEO Consulting Group 2022).

Extended drought is one of the most serious of the environmental conditions facing many of Colorado's State Parks. Although Garfield County was in a D4 Severe Drought from late 2020 to 2021, as of May 2023 the portions of Garfield County where the Sweetwater Lake Property is located are currently classified as not being in a long-term drought (The National Drought Mitigation Center 2021).

Figure 14. Drought Trends in Garfield County Since 2000.



Source: (The National Drought Mitigation Center 2021)

Flooding

Floods happen when a combination of factors such as climate, weather patterns, geology, and hydrology cause water to overflow from its usual path. This results in temporary inundation of normally dry areas of land. There are different types of floods, such as riverine floods (overflow of streams), urban floods (accumulation of surface water runoff), and mudflows or sudden collapse of shoreline land. The rate of rise, magnitude, duration, and frequency of floods are influenced by specific geographic characteristics. Floods can occur due to various reasons like precipitation, rapid snowmelt, or man-made structures' failure, such as dams or levees. The causes of floods due to precipitation are further classified into different types, such as rain in a general storm system, rain in a localized intense thunderstorm, melting snow, rain or melting snow, and ice jams. Garfield County is most at risk of riverine and sheet flooding in steep sloped regions (JEO Consulting Group 2022).

Different types of floods have unique characteristics related to factors such as flow rate, volume, duration, rate of rise, and flood season. General rain floods, for example, are characterized by a slow, steady increase in stream level and a long-lasting peak flood. They often occur from moderate to heavy rainfall over a broad geographic area for several days. On the other hand, thunderstorm or flash floods are sudden and intense, caused by heavy rain over smaller basins, and have little or no warning time. Snowmelt floods happen when winter snow melts in high mountain areas, often over a few weeks and yield a larger total volume compared to other types of floods in Colorado. Ice jam floods can occur when frozen water abruptly melts due to warm Chinook winds, causing blocks of ice to form a jam that forces water to be diverted from the stream channel or cause a surge of water. Each flood type has its flood season, with the risk for flooding in Garfield County coming mostly from riverine and sheet flooding in steep sloped areas (JEO Consulting Group 2022).

The present weather patterns are anticipated to bring about a decline in the flow of Colorado's principal rivers, which may reduce the danger of riverine flooding. However, it is possible that the state will undergo an upsurge in winter precipitation's frequency and intensity. Coupled with the warming air and surface temperatures, this may result in an earlier onset of spring runoff. Consequently, the risk of riverine flooding may increase in the early months of the year and decrease towards the end of the year (JEO Consulting Group 2022).

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.

OG-6 Invasive Species Management is a guideline that mandates all CPW properties, to have and maintain a comprehensive Invasive Species Management Plan. The plan should clearly prioritize the prevention, containment, control, and eradication of invasive species. It should also have detailed maps showing the distribution of invasive species, integrated management techniques, treatment schedules, and funding sources for implementing the plan. CPW employees are required to actively manage invasive species through proactive prevention, containment, and control. This should be achieved using integrated methods such as mechanical, biological, cultural, and chemical methods. Additionally, the employees should use revegetation and restoration techniques to promote competition by native species (CPW 2022c).

OP-6 Native Revegetation guideline mandates the use of native vegetation whenever possible in landscaping, reclamation, and restoration projects. Resource Stewardship should be consulted for advice on the appropriate tree, shrub, forb/wildflower, and grass species for landscaping and restoration projects (CPW 2022c).

Garfield County is responsible for managing weeds at the Sweetwater Lake Property and is a partner in this effort. CPW also seeks to maintain positive relationships with neighboring entities. Garfield County has a Noxious Weed Management Plan since February 2016 and reclamation standards and revegetation guidelines since May 2001, which CPW adheres to. For more information, interested parties can reach out to the Garfield County Vegetation Management or visit their website (CPW 2022c).

Photo 72. Bull thistle (left) and field bindweed (right) are two state-listed noxious weeds found in the Property during 2022 surveys.

Source: CNHP and iNaturalist
A photo of a pink thistle flower on top of a green stem on the left, and a photo of white bindweed flowers scattered among green leavy vegetation.

A noxious weed survey and management plan (Appendix) was completed in 2022. All exotic plant species documented at the Property throughout the 2022 weed survey are compiled in **Table 27** 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 Property (CPW 2022c).

During the 2022 weed survey conducted at the Sweetwater Lake Property, no A List or Watch List weeds were found. However, a number of weeds from the B List, C List, and Non-listed categories were identified in the terrestrial surveys. Further surveys

might be required for invasive aquatic plants. The top priority areas for weed control are those that involve removing individual and small populations of weeds through Early Detection Rapid Response (EDRR), treating weeds in areas slated for development, and dealing with any weeds that pose a threat to rare protected plants. Due to the equestrian usage of the Property, it is also essential to prioritize the removal of toxic plants such as poison hemlock and water hemlock. Although areas slated for development are deemed as the top five priority areas, the survey also found Harrington's beardtongue in the proposed Property area. The weed infestation is located in the vicinity of beardtongue habitats and adjacent to the Nursery Pasture. Therefore, this area should also be considered as a priority for weed control (CPW 2022c).

Table 27. List of Noxious Weeds Found at the Sweetwater Lake Property During the 2022 Survey.

Common Name	Scientific Name	Noxious Weed List
Black Medic	*Medicago lupulina*	NL
Bull Thistle	*Cirsium vulgare*	B
Canada Thistle	*Cirsium arvense*	B
Cheatgrass	*Bromus tectorum*	C
Clasping Pepperweed	*Lepidium perfoliatum*	NL
Common Burdock	*Arctium minus*	C
Common Mallow/ Cheeseweed	*Malva neglecta*	NL
Common Mullein	*Verbascum thapsus*	C
Curly Dock	*Rumex crispus*	NL
Field Bindweed	*Convolvulus arvensis*	C
Field Pennycress	*Thlaspi arvense*	NL
Flixweed	*Descurainia Sophia*	NL
Hoary Cress	*Lepidium draba*	B
Houndstongue	*Cynoglossum officinale*	B
Kochia	*Bassia scoparia*	NL
Lambsquarters	*Chenopodium album*	NL
Musk Thistle	*Carduus nutans*	B
Perennial Pepperweed	*Lepidium latifolium*	B
Perennial Sowthistle	*Sonchus arvensis*	C
Pigweed	*Amaranthus*	NL
Poison Hemlock	*Conium maculatum*	C
Prickly Lettuce	*Lactuca serriola*	NL
Redstem Filaree	*Erodium cicutarium*	C
Russian Knapweed	*Acroptilon repens*	B
Russian Thistle	*Salsola tragus*	NL
Scotch Thistle	*Onopordum acanthium*	B
Smooth Brome	*Bromus inermis*	NL
Spotted Knapweed	*Centaurea stoebe*	B
Tumble Mustard/ Jim Hill Mustard	*Sisymbrium altissimum*	NL
Water Hemlock	*Cicuta douglasii*	NL
White Campion	*Silene latifolia*	NL
Yellow Salsify	*Tragopodon dubius*	NL
Yellow Sweet Clover	*Melilotus officianalis*	NL
Yellow Toadflax	*Linaria vulgaris*	B

Source: (CPW 2022c)

Pests and Disease

Wildlife Disease

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 not been documented within GMUs that overlap with the Property, but Property managers should be wary of this disease.

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.

White Nose Fungus

Bat species are in severe decline worldwide due to the spread of White Nose Syndrome (WNS). WNS is a disease caused by a fungus (*Pseudogmnaoascus destructans*), which attacks the bare skin of hibernating bats. The fungus that causes WNS grows in cold, dark and damp locations and is obvious when bats are afflicted due to the presence of a "white fuzz" on bat's faces. WNS is believed to have been first identified in the US in 2006. Spores from the fungus can live for long periods on clothes, shoes, and gear, which makes humans a vector for spreading the fungus to new locations.

The fungus that causes WNS, has recently been detected in Colorado, and with mortality rates capable of reaching 75-98% for certain species of infected hibernating bat populations, it is imperative that we document and understand the life histories and habits of Colorado's bat populations before the disease spreads throughout the state. In addition, and as Colorado's human population continues to grow, state parks may become increasingly important refugia for bats as their habitat is fragmented and lost elsewhere (CPW 2022b). The fungus was detected in southeast Colorado, which is far from the Property, but it could still spread to the west side of the state. It is uncertain if bats are hibernating at the Property, but caves and

Photo 73. Caves and rock crevices that could provide hibernacula for bat species are present in the Property.

Source: CPW
A photos of a cave within a rock outcropping with scattered shrubby vegetation

crevices large enough to provide hibernacula could be present and precautions about WNS should be considered (Navo et al. 2018).

Whirling Disease

Whirling Disease (WD) is caused by a pathogen in freshwater that thrives in two hosts, trout and tubifex worms (Bakich 2023). WD is present in the Colorado River watershed and has population impacts to rainbow trout and cutthroat trout by limited trout fry survival past their first year of life. Efforts to protect WD- habitat include prevention of upstream movement of fish. Stocking of WD-resistant strains of rainbow trout is practiced locally, including those stocked in Sweetwater Lake (Bakich 2023).

Chytrid Fungus

Chytrid Fungus (Bd) has been implicated in the rapid loss of amphibians including toads and frogs around the world (Bakich 2023). It is currently the biggest threat to Colorado's boreal toad populations and is easily spread on materials worn and used by humans when exposed. Little is known about its persistence in the environment, but areas of high use by people are often associated with the presence of Bd (Bakich 2023).

Vegetation Pests and Diseases

At endemic levels, pests can act as nature's way of thinning out the stressed and less vigorous trees and vegetation across a landscape. But, at epidemic levels, they can decimate large pockets of trees and even entire vegetation communities. Current vegetation conditions, recurring drought, and increased temperatures are major factors that contribute to potential epidemic populations of insects and disease.

Insect activity appears to be correlated with extended periods of drought which predisposes large areas of host type to attack. Drought acts as a "trigger" triggering ecological processes which eventually leads to insect outbreaks that often extend over thousands of acres of susceptible host types. Although no diseases or infestations were reported in the CNHP vegetation survey (2022), the Property is susceptible to certain pests found in the region.

A Forest Management Plan has not been completed for the Property yet. However, data was reviewed from the 2023 USFS Region 6 Aerial Detection Survey for forest pests. Douglas-fir beetle was detected west of the Property in 2022 as a result of the surveys. Additionally, some aspen die-back was documented west of the Property in 2019 (USFS 2023). These two forestry issues should be documented if seen in the Property.

Wildfire

Fire is naturally a cyclical occurrence in northwestern Colorado and plays an important ecological role by reducing understory competition, promoting vegetative health, increasing seed production, and maintaining a mosaic of structural habitat niches beneficial to wildlife. Periodic fire regularly alters the habitat structure of the landscape, creating a heterogeneous ecosystem that supports a multitude of plant and wildlife species.

After fire, forb seeds, insects, vegetative productivity, and forb cover often increase, all of which provide benefit to avian herbivores and seed-eaters. Burrowing mice and

rodent populations can survive cyclical fires by retreating underground, and have been documented increasing reproduction rates post-fire in response to increased availability of forb seeds and insects. These smaller mammal populations support those higher in the food chain. Omnivores and carnivores are attracted to recently burned areas due to increased plant diversity and the associated small mammal populations, and levels of animal parasites have been found to be lower in burned habitats.

The present climatic conditions are likely to cause more frequent and severe wildfires in Colorado. There can be dry spells throughout the year, and summers are more likely to experience extreme heat conditions that can aggravate wildland fires. The Property area is susceptible to drought. In the presence of drought, dryness, and/or wind, large wildfires can spread more easily (JEO Consulting Group 2022).

Garfield County is more prone to fires during the period from April to October. The primary cause of ignition is lightning, but fires can also be started by human activities like agricultural burns. The fuels that can contribute to the spread of fires in the county include trees, ladder brush, underbrush, cheat grass, and beetle-killed trees. Although people cannot control the occurrence of fires, they can mitigate their impact by managing the fuels and ensuring the durability of structures. Therefore, most mitigation efforts are aimed at controlling the fuels and improving the strength of structures (JEO Consulting Group 2022).

No historic fires have occurred within Property boundaries, but one fire has occurred near the Property recently. The Grizzly Creek fire occurred in 2020 in the Glenwood Canyon area, and burned approximately 32,000 acres. A map of the Property location and this fire perimeter is provided on **Figure 15**.

Fire Intensity

The Fire Intensity Scale is a standardized tool used to assess the potential intensity of wildfires based on the density of fuel and associated hazardous fire behavior. Similar to the Richter scale for earthquakes, the FIS is divided into five classes, where each class is ten times more intense than the previous one. Class 1 represents the lowest intensity, with discontinuous flames less than one foot in length and easy to suppress. Class 5 represents the highest intensity, with large flames up to 150 feet in length, short and long-range spotting, and high potential for harm to life and property. The FIS does not consider past fire occurrences and only evaluates the potential fire behavior in a given area, allowing planners to identify high-risk areas and prioritize mitigation efforts to protect nearby homes and valuable assets (CSFS 2022).

The Fire Intensity data for the Property indicates that future wildfires in the area will likely have high impact. To mitigate the risk of high-intensity fire, it is important to reduce ladder fuels and increase spacing between trees and reduce cheatgrass cover in shrublands/grasslands (CSFS 2022).

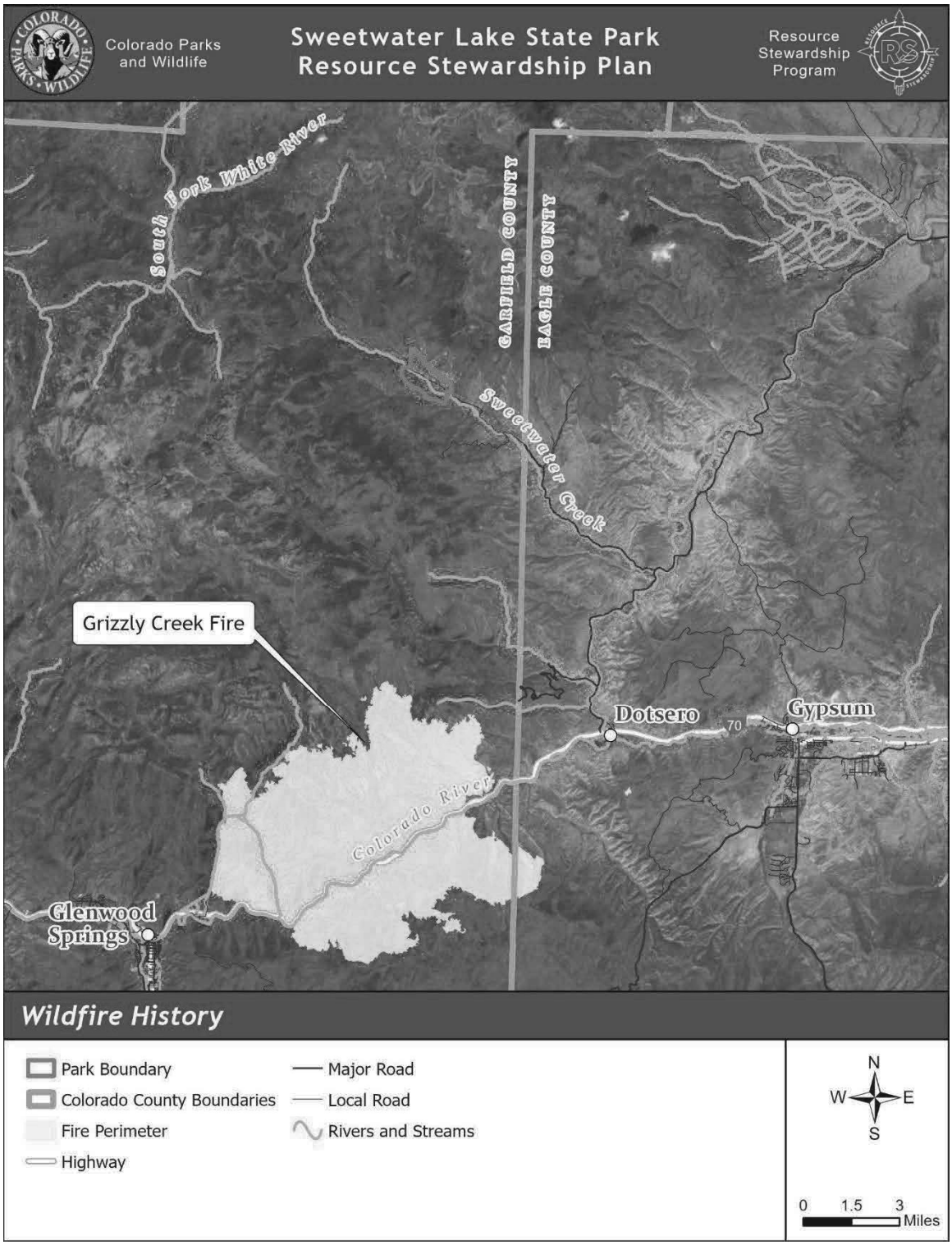
Wildfire Risk

The Wildfire Risk map for the Property shows the levels of risk of loss or harm from a wildfire in the Property. The risk levels coincide with the location of the values at risk in and around the Property. Wetland areas in the Property show low fire risk, while the uplands areas show moderate risk (CSFS 2022).

Burn Probability

Burn Probability (BP) is the annual probability of any location burning due to a wildfire. BP is calculated as the number of times that a 30-meter cell on the landscape is burned from millions of fire simulations. The Burn Probability map for the Property shows variability from east to west. All of the land within the Sweetwater Lake Property boundary has very low to moderate threat of an acre burning from a wildfire (CSFS 2022).

Figure 15. Fire History Map.



Human Impacts and Influences

Human influences at the Sweetwater Lake Property 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 Garfield County continues. This increase will likely stress the Property resources, and Property staff will have to determine at what level visitation and development endanger the goals and objectives for natural resource stewardship at the Property. Activities at the Property 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, Property staff will have to consider and determine an acceptable carrying capacity for the Property.

Regular scientific monitoring of wildlife, plants, geology, and soils at the Property may help to establish a solid number of visitors that the Property can accommodate before resource degradation occurs. Short of rigorous monitoring statistics, staff will need to rely on observations and general trends. The Property 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 Property and provide base-line information for the determination of a “carrying capacity”.

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.

Camping

Sweetwater Lake Campground, situated at the southern edge of Sweetwater Lake, comprises nine campsites that are partially shaded and equipped with picnic tables, food lockers, and fire rings. Out of the nine sites, six can accommodate vehicles that are up to 30 feet long. The campground features a single vault toilet, and the surrounding area is flanked by tall limestone cliffs on two sides. This campground may potentially be reconfigured as a day-use area in the future, but plans are still uncertain (Lehman & Thompson 2023). A campground is planned to be located on the north side of the lake and would accommodate 15-20 campsites, with a mix of water and electric hook-ups and some sites without any hookups. A dump station and vault

toilets will also be installed. Additionally, an equestrian campground with five sites that have horse pens and other

utilities is planned to be constructed in the Property. Vault toilets and one cabin with a horse pen may also be built in this area.

Photo 74. The existing campground at the Sweetwater Lake Property.

Source: Jeff Thompson

A photo of a road leading in to a campground with signage on either side, and green vegetation in the background.

Campgrounds can provide visitors with an opportunity to appreciate and learn about the natural environment, which may foster a greater appreciation for the importance of conservation and protection of the surrounding vegetation communities. However, there are also negative impacts associated with campgrounds. These impacts can include vegetation loss and disturbance from the construction and maintenance of campgrounds and associated infrastructure, including roads, trails, and utility lines. The use of campfires and the introduction of non-native plant species by campers can also cause negative impacts on the vegetation communities. Additionally, the increased foot traffic from visitors can lead to soil compaction and erosion, which can be particularly damaging to sensitive vegetation communities.

Furthermore, the establishment of campgrounds can alter the natural water cycle, which may also have negative impacts on vegetation communities. Runoff from the campground may introduce pollutants or nutrients into nearby water sources, which can negatively impact aquatic vegetation communities. The creation of impervious surfaces like roads and parking lots can also increase runoff and reduce the amount of water that infiltrates into the ground, which can negatively impact the water availability to vegetation communities in the surrounding area.

Dogs and Domestic Pets

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

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 Property 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 Property 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

Sweetwater Lake is planned to have a family campground, an equestrian campground, an equestrian day use parking area, a day use and water access area, and a wetland interpretive area. Additionally, an interior trail system is planned for the Property that will allow hiking and some equestrian use. 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 Property are wildlife-proof but the dumpsters are not. Obtaining wildlife-proof dumpsters should be a goal for the future. Some black bear nuisance activity has been experienced in the Sweetwater community in the last few years. Measures should be implemented to reduce attractants within the State Property.

Photo 75. Black bear activity in the vicinity of the Property is high, and measures should be taken by the Property to reduce the likelihood of human-wildlife conflicts.

Source: Colorado Outdoors
A photo of a black bear opening a trash can.

Recommendations

- Install bear-resistant food storage containers at each campsite.
- Install bear-resistant trash receptacles throughout the Property.
- Only use bear-resistant dumpsters for trash collection and ensure that trash is removed frequently by trash hauler.

- Educate visitors on the importance of reducing attractants to deter bears from coming into contact with people.
- Pets must remain leashed on the property.

Picnic areas often increase the spread of noxious weeds by creating disturbed areas, can be a wildfire source, and attract wildlife by collecting trash. Picnic and camping areas may displace sections of habitat and be an unintended source of food for several species of wildlife including skunks and raccoons. Wildlife-proof trash facilities are present in the Property 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 Property 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, Property 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 Property facility; however, roads also impact Property 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 Property, Property 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.

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 Property staff should monitor the effects on these species over time.

Trail Use

Sweetwater Lake is planned to provide access to hundreds of miles of biking, hiking, equestrian, cross country skiing, and snowshoeing trails in the Flat Tops Wilderness. Trail use by visitors often provides the best means of experiencing the natural resources of the Property 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.

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.

It is likely that many non-designated "social trails" develop as a result of visitation to the Property. 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 lake 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 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 Property, it may be difficult to change this policy.

Table 28. Considerations regarding Property 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 erodible 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.

Visitation

Given that the Property's establishment took place in 2022, there are no visitation statistics available. Nevertheless, it is anticipated that the Property's inauguration, the allure of its natural beauty, coupled with its adjacency to the I-70 corridor, will result in a substantial volume of visitors. To effectively and sustainably administer the Property and its resources, it will be important to record visitation data during the first season as a benchmark and over subsequent years as a monitoring measure.

A timed entry day use reservation system is a method of managing visitor numbers and reducing parking congestion in the Property. This system allows visitors to make reservations for a specific time slot during the day, ensuring that the Property does not exceed its capacity for visitors at any given time.

To make this system effective, the Property may need to offer various reservation options, including same-day reservations, reservations made a day in advance, and reservations made for longer periods of time. Same-day reservations would cater to visitors who may not have planned their visit in advance, while reservations made a day in advance would cater to those who prefer to plan ahead. Longer time-out reservations would allow visitors to stay in the Property for extended periods, reducing the number of people coming in and out of the Property throughout the day.

To implement this system, the Property would need to establish a reservation system and make it easily accessible to visitors, such as through an online platform or phone service. The system should also provide clear guidelines on how to make a reservation and what to expect when visiting the Property, including any restrictions or regulations in place.

The Property would need to monitor the number of visitors allowed into the Property during each time slot and ensure that the number does not exceed the Property's capacity. Additionally, Property staff would need to be trained to manage the reservation system, including checking visitors in and out of the Property at their designated times, and ensuring that visitors comply with Property rules and regulations.

Grazing and Equestrian Use

Grazing is an important aspect of maintaining the natural balance in many parks, including the Sweetwater Lake Property. Currently, the Property is being used by one on-site horse outfitter, and there are plans to consider the construction of an equestrian campground in the future. A grazing plan for equestrians exists for the Property (Lehman & Thompson 2023). As a result, it is important to carefully manage grazing activities to ensure that the Property's ecosystem is not adversely affected. Horses can have a significant impact on the Property's delicate ecosystem. Horse impacts have been specifically noted in sensitive wetland habitats, causing erosion, sedimentation of waters, and vegetation trampling. These areas are essential to the health of amphibians, mammals, and bird species that use the Property, included several sensitive wildlife species. However, if grazing is managed effectively, it can help to control the growth of invasive plant species and promote the growth of native vegetation.

Photo 76. Horse tracks near a water feature in the Property.

Source: (Triece et al. 2022)
A photo of horse tracks in a muddy shore area with green vegetation scattered.

To ensure that grazing is properly managed, it is important to keep horses away from areas where rare plant species are located. This can be achieved by carefully monitoring the movement of horses within the Property and ensuring that they are not allowed to graze in areas where rare plants are present. It is also important to ensure that weed-free hay is provided.

Cattle ranching has caused some difficulties in the surrounding regions, particularly related to water usage and changes in water quality. Improper management of cattle grazing, particularly in riparian areas along creeks and lakes, can result in both immediate and downstream impacts. The use of herbicides, pesticides, and fertilizers in nearby agricultural operations has the potential to contaminate water resources, while soil tillage may increase sedimentation in the stream channel. Grazing on neighboring lands often leads to damage to riparian vegetation, soil erosion, and a decrease in water quality. Additionally, cattle may consume noxious weeds, which can spread their seeds to other areas and lead to further weed invasions.

Water Sports (Non-Motorized Boats)

Sweetwater Lake is a suitable location for fishing, but due to the topography of the region, shoreline access is restricted. Non-motorized watercraft are permitted on the lake, with a 5-horsepower electric motor limit. Canoes and rowboats are frequently rented at the site. Use of gasoline-powered motors is prohibited on the lake (Lehman & Thompson 2023).

Photo 77. Boating and fishing in Sweetwater Lake is a main attraction of the Property.

Source: Jeff Thompson
A photo of a metal boat docked on a gravel road next to Sweetwater Lake with coniferous forests and rocky outcroppings in the background.

Winter Sports

Snowmobiling is no longer allowed at the Property, although it was allowed prior to CPW acquiring the Property. Ice fishing is allowed at the Lake during the winter (Lehman & Thompson 2023).

Resource Summary

Resource Condition Summary

The summary table, below provides a summary of resource conditions discussed in Chapter 3 of this report. Overall, resources are in good condition in the Sweetwater Lake Property. The largest threats to the condition of resources at the Property include noxious weeds, increased visitation, grazing and climate change.

Table 29. Summary of Resource Condition Status, Trend, and Confidence Ratings.

Priority Resource or Value	Condition Status / Trend	Rationale
Vegetation Communities		• Vegetation condition in good condition overall. Wetlands and sagebrush shrublands are impacted by noxious weeds and grazing. Cliff communities and coniferous forests seem to be in good condition. • A high number and diversity of vegetative communities were documented in the Property recently during surveys. • Effective management of noxious weeds is necessary to control their abundance in the wetlands and grasslands. Increased weed control with CPW management of the land will improve vegetative resources.
Rare Plant Species and Sensitive Vegetation Communities		• The Property has one rare plant species and nine sensitive communities confirmed. • All of the sensitive vegetation communities were found to be in good condition. • Noxious weeds, grazing, and increased visitation threaten the continued existence of rare plant populations. Active management of these threats however will improve this resource in the future. • Implementing protection buffers and keeping development away from rare plant populations will be critical in their conservation and management.
Forestry Resources		• The forest ecosystems within the Property are primarily coniferous Douglas-fir forests and deciduous Gambel oak woodlands. • The Property has not completed a forestry management plan, so the conditions of forest resources is uncertain.

Priority Resource or Value	Condition Status / Trend	Rationale
Noxious Weeds		• Noxious weeds are present in the Property, especially in grasslands, wetlands, and riparian communities. • The Noxious Weed Management Plan provides actions to implement in order to treat noxious weeds in the Property. • Visitation is expected to increase in the upcoming years, which may worsen the spread of this resource. Continued management of noxious weeds annually will be important. • CPW management of the land will improve noxious weed control in future years compared to historic management.
General Wildlife		• Ample forest, shrublands, montane meadows, and wetland and riparian habitats along creeks provide for a wide variety of wildlife species. • A high number of bird species were documented in the Property recently, including nesting raptor species. Sensitive habitats are present for large ungulates. • The Property contributes to a greater connected landscape that allows for wildlife movement and migration. The goals of the Property include limit development and prioritize conservation, which will benefit wildlife.
Sensitive Wildlife		• The Property was documented in 2021 to have incredible bird diversity and abundance and several sensitive mammals species (bats and dwarf shrew). • Intensive surveys for wildlife in the Property have increased the knowledge about rare species present. • The goals of the Property include limit development and prioritize conservation, which will benefit sensitive wildlife.
Wetlands		• The periphery of the lake and numerous creeks and ponds that support wetland vegetation can be found in the Property, and provide important habitat for a variety of plants and wildlife species. • Cottonwood, birch, and alder riparian forests and dense willow shrublands are present along major creeks located in the Property. • Noxious weeds and sedimentation of waters could increase with increased visitation and continued grazing. Noxious weeds are more likely to spread and infest wetland areas. Active management of these threats however will improve this resource in the future.

Priority Resource or Value	Condition Status / Trend	Rationale
Water Quality		• No impaired waters are classified in the Property, confirming that water quality is currently in good condition. • Water quality is threatened by visitation and grazing activities in the Property. Active management of these threats however will improve this resource in the future. • CPW cannot improve water quality condition without assistance from outside agencies or controlling activities outside of the Property.
Water Flow/Function		• Climate change and drought is a major threat to the Property and may affect the availability of water in the future. • No Aquatic Nuisance Species have been detected.
Geology		• The Property contains unique rock outcrops that provide beautiful views and scenery for visitors. • Geologic features in the Property are naturally erosive and degrading with time. No prevention measures can be implemented to stop the degradation of this resource.
Soils		• Soil health conditions are threatened by visitation, erosion, soil compaction and trampling of vegetation. Active management of these threats however will improve this resource in the future. • Highly erosive soil types are present in the Property and should be avoided when possible and proper mitigation should be included when building trails or infrastructure. • This resource should be monitored as a part of the development process in the Property.
Paleontology		• The overall condition of paleontological resources in the Park has remained constant and is considered good. • Several paleo resources have been located in the Park and identified for protection. • Visitation, trail use, and other activities have not been found to impact potentially sensitive areas of the Park.
Cultural Resources		• The Property contains several unique cultural sites, and a significant cultural history, which provides visitors with an opportunity to learn more about the people that once inhabited the area. • Historic buildings may be removed due to safety concerns.

Priority Resource or Value	Condition Status / Trend	Rationale
		• The Ute Cave is a unique feature of the Property, but has been vandalized in the past. Proper management and protection of this resource will maintain its current conditions and prevent future degradation.

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 Property. 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 30** outlines attributes that should be considered in the delineation of ecological sensitivity zones, and the necessary scrutiny associated with each attribute.

Table 30. Attributes to be Considered when Delineating Property 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 Property mapped by US Fish and Wildlife Service or CPW as important habitat? • Does the Property 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?

Resource	Summary	Questions
		• How does snow load and melt exist in the Property?
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 Property? • What is the condition and land use of the ecosystem surrounding the Property?

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.).

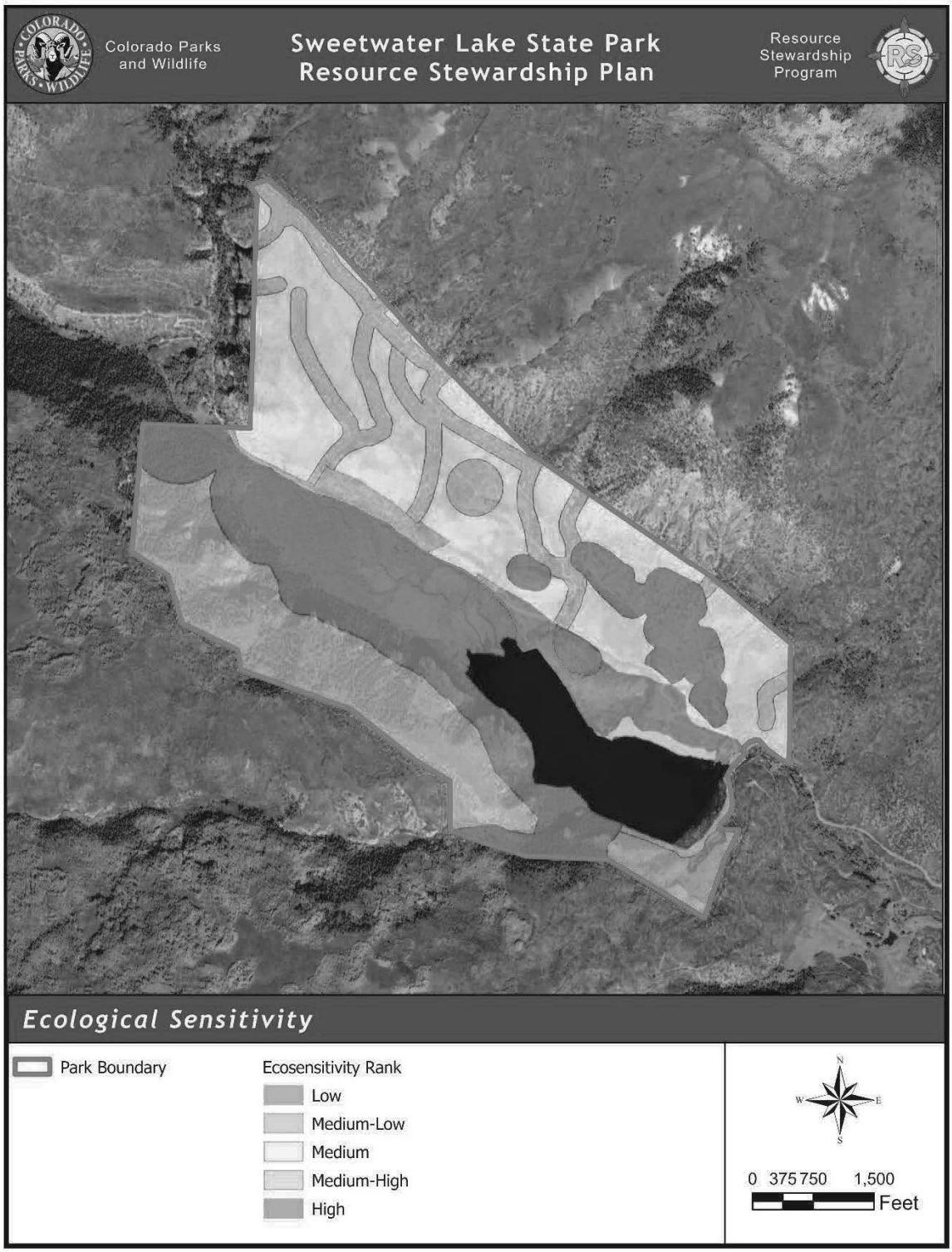
Datasets used were in vector format and unioned together into one dataset. Then attributes were filled out with sensitivity rating scores by selecting features in the unioned dataset that overlapped with individual layers based on location. Once all scores were entered, the total score by polygon was summed by adding the sensitivity ratings (**Table 31**). This sensitivity rating total was then used to categorize the high, medium, and low overall sensitivity rating. To simplify and remove small polygons, the Eliminate Polygon tool was used to remove polygons less than one acre. The result was a vector dataset that represent a cumulative score of all the variables analyzed and represent the ecological sensitivity of an area.

Table 31. Variables and Rankings Used to Develop Ecosensitivity Zones.

Type	Dataset	Source	Date	Sensitivity Rating (1-5)
Wildlife	CPW Raptor nest buffers	CPW Resource Stewardship	2022	5
	Bald eagle winter range	CPW SAM	2022	2
	Cliff habitat for nesting raptors	Digitized	2024	4
	Elk Severe Winter Range	CPW SAM	2022	3
	Moose Winter Range	CPW SAM	2022	2
	Ungulate Calving Area	Digitized	2024	4
	Cave location plus a 350-foot buffer*	Digitized	2024	3
	Positive detection locations for dwarf shrew plus a 350-foot buffer	Digitized	2024	3
Vegetation	Native Wetlands and Riparian Communities	CNHP Vegetation Mapping	2022	4
	Non-native Wetlands and Riparian Communities	CNHP Vegetation Mapping	2022	2
	West side high quality wetlands and wildlife habitat	Digitized	2024	5
	Good and excellent condition vegetation polygons	CNHP Vegetation Mapping	2022	2
	Harrington's beardtongue population polygons plus a 200-foot buffer	CNHP	2022 & 2011	5
	Sensitive vegetation communities	CNHP Vegetation Mapping	2022	2
Water	Streams, creeks, ponds, lakes plus a 50-foot buffer (with wetlands from veg mapping subtracted)	NHD, NWI	-	2
Other	Soils with severe erosion hazards	NRCS	-	2

**Cave will also be considered in Cultural Resource Zoning.*

Figure 16. Ecosensitivity Zone Map.



Stewardship Goals and Objectives

Based on the current natural resource assessment of the Sweetwater Lake Property, 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 Property by general and sensitive wildlife species. Maintain and protect habitat for sensitive species documented, such as little brown myotis, peregrine falcon, and bald eagle. Restore and improve habitat for sensitive wildlife species that could occur on the Property.
- Initiate a raptor monitoring program at the Property. Recruit volunteers and potentially utilize Stewardship Team technicians. Raptor monitoring efforts are an important stewardship effort, allows for adaptive management, and an understanding of raptor populations helps to better understand the overall ecosystem health of the Property.
- Protect and encourage the nesting of the wide-variety of raptor species within the Property, including peregrine falcons, bald eagles, red-tailed hawks, sharp-shinned hawks, and Cooper's hawks, which successfully nested in 2022 during the avian survey. Maintain populations of all existing bird species that use the Property as habitat. Continue to survey bird species at least every five years in the Property, if possible. Implement appropriate trail route closures to protect nesting bird species.
- Protect and conserve the cave in the Property that provides habitat for sensitive bat species identified. Implement procedures that prevent the spread of WNS.
- Document wildlife species and taxa that have not been inventoried or inventories that are outdated. Regular monitoring should continue for raptors and additional survey efforts for amphibians should occur, if resources are available. In addition, monitoring efforts should be communicated to the Property Manager to share information regarding wildlife management and sightings.
- Control and reduce the spread of noxious weed species to maintain and improve wildlife habitat quality. Continue to implement the Noxious Weed Management Plan, including following recommended treatments methods and priorities (Appendix).
- Protect sensitive wintering and calving habitat for mule deer and elk located on the north side of the Property. Implement no disturbance time periods so that the species are protected during these critical life periods.
- Limit access to the extensive wetlands located on the west side of the Property to protect habitat for moose, waterfowl, amphibians, and raptor foraging.
- Potentially restore beaver populations to the Property. This species is native to Colorado and could greatly improve water quality and wetland and riparian habitats in the Property.

Vegetation

- Maintain existing biodiversity and improve upon the condition of native plant communities by encouraging a high diversity of native species, natural vegetative structure, and minimizing disease and noxious weed infestations.
- Monitor the existing populations of the sensitive communities and rare plants, such as Harrington's beardtongue, that were documented on Property to ensure continued health and survival. Create a volunteer rare plant monitoring program to track the health of identified populations in the Property.
- Preserve and protect the rare plant populations and sensitive plant communities identified in the Property. Avoid planning new trails in sensitive communities or near rare plants and continue to revegetate social trails that form as a result of existing trails in these communities.
- Survey for rare plant species prior to construction in potential habitat zones to prevent disturbance to populations from development.
- Enhance habitat for rare plant species and communities by reducing non-native species cover.
- Design Property development activities (new buildings, trails, parking lots, roads, etc.) out of high-quality/excellent condition native plant communities, riparian zones, and wetlands to the extent possible.
- Contain, suppress or eradicate occurrences of noxious weeds, following the guidance of the Noxious Weed Management Plan (Appendix). Prevent the establishment of noxious weed species that are not already present in the Property. Treat noxious weed populations immediately before and after construction activities occur.

Water and Wetland Resources

- Protect sensitive wetland resources in the Property, including the extensive wetlands areas identified in the western side of the Property and the wetlands and riparian areas surrounding the Lake. Protect the water resources in the Property and prioritize their use for wildlife that need them. Limit grazing activities near these sensitive resources.
- Maintain the good condition of water quality in the Property by preventing the introduction of pollutants and sediment. Continue to manage boats and grazing in a way that limits impacts to water quality.
- Limit visitors using the western wetland and riparian areas in any condition.
- Revegetate areas that are eroded and devoid of vegetation near waterways and the lake with native plant species. Revegetate social trails that develop around water resources.
- Establish formalized access to water resources in the Property in a way that conserves wetland areas and shoreline habitat. Establish natural vegetation or other physical barriers to sensitive area access.
- Reduce the spread of noxious weeds in wetlands and riparian areas by continuing to implement the Noxious Weed Management Plan (Appendix).

Geology, Soils, and Paleontology

- Monitor, protect, and preserve the unique geological and paleo features of the Property for human impacts. Provide access to visitors in a strategic way that allows users to enjoy the resource but maintain its integrity and the resources dependent upon it.
- Maintain hydric soils (and associated wetlands and riparian areas) in their current undeveloped condition, with new development located out of wetlands and riparian areas to the greatest extent possible.
- Maintain a sufficient cover of living plants and plant litter on upland areas to minimize soil erosion.
- Limit sediment-laden runoff from Property roads, paved sidewalks, and parking lots. This will decrease sedimentation into the waterways and reduce damage to road surfaces and embankments.
- Construct and maintain trails to prevent erosion. Ensure that soil types and slope and aspect of terrain are carefully considered during construction of trails and facilities, and erosive soils are avoided for development. Build trails with limited impact to geology, wildlife, and vegetation that require limited maintenance over the lifespan of the trail.
- Adhere to Best Management Practices for trail construction to avoid impacts to geology and soils.
- Avoid disturbance to paleontological sites, as they are a non-renewable resource that cannot be replaced once damaged. Plan trails to avoid known sites.

Cultural Resources

- Limit public access to cultural sites within Property to preserve cultural artifacts, including the cave, to be good stewards of cultural resources, to promote the health and safety of visitors, and to comply with cultural resources laws and regulations.
- Educate Property visitors about cultural resources through signage and interpretative materials. Distribute signs around the Property 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 Property.
- Maintain and preserve cultural resource sites and mitigate already present natural- and human-caused deterioration. Photo monitor all significant cultural sites for human and natural impacts.
- Adhere to Best Management Practices for cultural resource preservation provided in the Appendix.

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 Property 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 Property. They are resource issues that should be addressed in the near future, but do not require monitoring or surveys.

Photo 78. the Sweetwater Lake Property at night. Pursuing an International Dark Sky Place Certification is a recommended Resource Management Action for the Property.

Source: Jordan Neumeyer

A photo of a pink, orange and purple night sky with glowing stars above a snowy landscape.

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 2022 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
Temporarily close trails and lake access to protect raptors during breeding season	• Protect existing raptor nests and those newly discovered through adaptive management techniques, such as the application of raptor monitoring data to seasonally close raptor breeding areas in consultation with CPW raptor management experts. Also, follow management recommendations in the CPW Recommended Buffer Zones and seasonal Restrictions for Colorado Raptors 2020 document (Appendix). • Implement a visitor access management action that would seasonally restrict lake surface access to the western portion of the lake that is adjacent to the wildlife breeding habitat for raptors when raptor nests are active. At the time of the drafting of this document, bald eagles and peregrine falcons were actively nesting in this area. A seasonal management action for these species would occur between December 1st and July 31st or when nesting attempts were observed as completed. • Seasonally close the South Overlook Trail and South Shore Trail # 1855 during raptor breeding seasons, as these trails fall within raptor nest buffers (December 1st and July 31st). • Seasonally close the North Overlook Trail and North Shoreline Trail (proposed trails - currently not formal system trails) during wildlife breeding seasons for raptors (December 1st and July 31st), as these trails fall within raptor nest buffers and are in the line-of-sight of raptor nests.	High

Resource	Description of Action Item	Priority
	• The wetland area would remain closed to human entry year-round as it is currently managed by the USFS. This is to protect this sensitive ecosystem and foraging opportunities for wildlife, including nesting eagles and falcons. • Review the CPW raptor nest buffer guidelines provided in Chapter 6 and the Appendix.	

Install wildlife-safe fencing around sensitive areas to prevent degradation from Property use activities	• To reduce vegetation trampling that causes erosion and sedimentation of waters, consider installing new fencing in areas impacted by activities.
	• Use exclusion fencing to protect the following resources:
	  ○ Rare plants
	  ○ Wetlands
	  ○ Access management to calving area
	• Use BMPs for fence installation.
		High

Limit activity near cave to protect bat species and cultural resources	• Restrict actions within 350 feet of cave bat roosts to those that will not negatively alter the vegetative and structural characteristics of roosts or impede the movement of bats. • Conduct tribal consultation regarding cave access and cultural resource preservation. • Consider a metal gate or other access methods to manage access to the cave.	High
Temporarily/seasonally close public access to sensitive elk and mule deer habitat	• The south-facing slope that predominates the landscape on the north side of County Road 150 is ideal for wintering ungulates, including mule deer and elk. This area has been mapped by CPW as a mix of elk winter, severe winter, and winter concentration area. This same area is valuable spring fawning and calving area for mule deer and elk. • Development in this area is still uncertain. If facilities and trails are located nearby, initiate and enforce a closure of these areas from December 1 – June 15 or in consultation with the District Wildlife Manager.	High

Resource	Description of Action Item	Priority

Provide education and signage about wildlife presence in the area and safety measures	• Moose, black bear, and mountain lion have all been reported to be present in the area. Post warning signs in potential habitat areas and conflict zones (campgrounds, picnic areas) to heighten awareness of visitors.
	• Enforce dog leash regulations in the Property. Provide signage that reminds visitors to keep dogs leashed at all times.
	• Install and educate visitors about proper waste disposal to prevent conflicts with black bears.
	  ○ Install bear-resistant food storage containers at each campsite.
	  ○ Install bear-resistant trash receptacles throughout the Property.
	  ○ Only use bear-resistant dumpsters for trash collection and ensure that trash is removed frequently by trash hauler.
	• Add interpretative materials for sensitive wildlife, vegetation communities and plant species that occur in the Property.
	• Install wildlife road crossing signs in high-traffic areas of the Property.
		High

Develop cultural resource outreach materials	• Develop and add interpretative materials following the guidelines provided in the cultural resources Interpretative Opportunities section.	High
Maintain vault toilet covers in all restroom facilities	• To prevent wildlife from falling into vault toilets, install screens in all restroom facilities. • Ensure that existing restroom facilities include vent covers for wildlife conservation.	High
Add fishing line recycling tubes	• Add PVC tubes for fishing line recycling efforts around the lake, in popular fishing spots.	Medium

Resource	Description of Action Item	Priority
Pursue International Dark Sky Place (IDSP) certification for the Property	• Consult regularly with International Dark Sky Association mentor to assist in achieving the certification. • Train staff on dark skies data collection.	Medium
Reclaim and revegetate inappropriate social trails and bare ground as they appear in developed areas	Restore and improve social trail areas and bare ground: • Remove noxious weeds in these areas according to the Noxious Weed Management Plan (Appendix). • Use native seed mixes provided in the Appendix. • Use BMPs and Management Prescriptions for trail restoration and trail closures.	Medium
Manage the west end of the lake for waterfowl and shorebird species	• Manage access by visitors to protect resources, potentially restore habitat, and control noxious weeds in the area.	Medium
Install wildlife habitat enhancement infrastructure throughout the Property	• Create raptor perching poles and nesting platforms. It has been recommended to install a platform on the west side of the Property in the wetland area. Create a raptor perch and platform plan and move towards implementation. • In order to provide more roosting locations for the bat species in the Property, purchase or make bat houses and erect them in locations in accordance with recommendations provided in the Appendix. • To provide nesting substrates for waterfowl, American kestrels, and owls, add nesting boxes throughout the Property in accordance with recommendations provided in the Appendix.	Medium
Remove unnecessary fencing within the Property	• Remove fencing that is relict grazing fence, which no longer is used and is not wildlife-safe. Follow guidelines provided in Hanopy 2009.	Low

Resource	Description of Action Item	Priority
Evaluate the potential encroachment of pinyon-juniper trees in sagebrush areas	• Removal of encroaching pinyon-juniper woodlands could enhance habitat for Brewer's sparrow, a sensitive bird species, and other sagebrush-dependent wildlife species. • Consult with CPW Resource Stewardship Team about target areas and methods.	Low
Evaluate the potential for beaver reintroduction	• Potentially reintroduce beaver populations to the Property to help with water quality, streambank erosion, and wetland and riparian vegetation improvements: • Review the Management Prescription for beaver management (Appendix). • Review resources and methods used for beaver reintroduction, including Scamardo & Wohl 2019. • Communicate with the Resource Stewardship Team about the project and potentially hire a contractor to assist in the effort. • Work with local land management agencies that must relocate beavers away from housing developments and urban areas.	Low
Create "Stay the Trail" signage	• Implement and enforce the Property's regulation to "Stay the Trail" and disperse signage throughout the Property informing visitors about Property regulations.	Low
Install boot brush / cleaning stations	• Install boot-cleaning stations near sensitive areas such as wetlands and riparian areas and in areas with high visitation, such as trailheads and parking lots. • Apply for funding for the boot brush kiosks through Colorado Department of Agriculture.	Low
Apply for Leave No Trace Certification	Apply for Leave No Trace Certification: • Review the Leave No Trace Certification Toolkit. • Review the Start-up Workbook. • Follow the implementation guide. • Complete the Leave No Trace Assessment.	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 Resource Management and Conservation Actions, 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 Property and address an issue identified in this Stewardship Plan.

Photo 79. View of Sweetwater Lake from the existing campground.

Source: Jeff Thompson

A photo of a bright blue sky with large white clouds on a sunny day above Sweetwater Lake, surrounded by green vegetation and rock outcroppings.

Table 33. Resource Plan and Report Actions Priority List.

Plan / Report	Description of Action Item	Suggested Contact
Grazing Monitoring Plan	A grazing plan for equestrians exists (Lehman & Thompson 2023). As a result, it is important to carefully monitor grazing activities to ensure that the Property's ecosystem is not adversely affected. Horses can have a significant impact on grazing patterns, and if not properly managed, can cause damage to the Property's delicate ecosystem.	Resource Stewardship Team / Property Manager
Raptor Perch and Pole Plan	Create a plan that maps potential locations appropriate for nesting platforms in the Property.	Resource Stewardship Team
Equestrian Management Plan	Equestrian use of the Property is expected by the outfitter and visitors. Some Property trails will permit equestrian use, and an equestrian campground is included in Property plans. An equestrian management plan would help to identify permitted use areas in the Property.	Resource Stewardship Team / Property Manager
Trail Revegetation Plan	Identify informal trails that should be revegetated. Create a plan that provides methods for revegetation, maps of trails to be restored, and appropriate seed mixes to use.	Resource Stewardship Team / Property Manager
Forest Management Plan	Conduct a field assessment of forest resource health and create a management plan that outlines forestry issues and potential management projects. Update every 10 years if possible.	Resource Stewardship Team
Noxious Weed Management Plan	Map noxious weeds in Property and revise the existing management plan that addresses treatment methods and priorities. Update every 5 years if possible.	Resource Stewardship Team

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 Property 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.

Photo 80. Monitoring of cultural resources in the Property is recommended, including the rock art found in the Ute Cave pictured below.

Source: Dan Neubaum

A photo of drawings of animals on a rock wall.

Table 34. Resource Surveys and Monitoring Effort Priority List.

Effort	Effort Type	Description	Priority	Suggested Contact	Desired Completion Year / Completion Year
Vegetation					
Rare Plant Monitoring	Monitoring	Dedicated rare plant monitoring of existing populations of Harrington's beardtongue should be conducted to ensure existing populations are not being disturbed by visitors or grazing activities.	High	Resource Stewardship	Annually or when resources available
Noxious Weeds	Monitoring	Surveys were completed 2022, and should be repeated every five years to assess new populations and the treatment of previously identified populations.	High	Resource Stewardship	2027
Sensitive Vegetation Communities Monitoring	Monitoring	Monitor rare and sensitive vegetation communities for native species cover and non-native species spread.	Medium	Resource Stewardship	Annually or when resources available
Wildlife					
Raptor Monitoring Program	Monitoring	Begin annual raptor monitoring in the Property. Potentially use Property staff, volunteers, and seasonal Resource Stewardship technicians.	High	Resource Stewardship	2024 and annually thereafter
Amphibian Surveys and Acoustic Monitoring	Surveys and Monitoring	Surveys were conducted in 2022, but additional efforts could uncover more cryptic species and help to better manage this taxon. Seasonal acoustic monitoring is recommended to start in April. Monitor important habitats used by amphibians species in the Property, specifically the vast wetlands on the west side of the Property.	Medium	Resource Stewardship	Annually or when resources available

Effort	Effort Type	Description	Priority	Suggested Contact	Desired Completion Year / Completion Year
Bat Studies	Surveys and Monitoring	Conduct additional acoustic surveys and monitor any known hibernacula for WNS. Evaluate existing structures for bat use. Deploy acoustic bat monitors near buildings prior to their removal, to document bat species use.	Medium	Resource Stewardship NW Regional Biologist	Annually or when resources available
Invertebrate Monitoring	Monitoring	Begin working with Butterfly Pavilion to monitor butterflies. Consider monitoring the response of butterflies to changes in native plant community caused by recreation and grazing and the introduction of non-native plants.	Medium	Resource Stewardship	Annually or when resources available
Breeding and Migratory Bird Surveys	Surveys	Contact Stewardship Team to conduct breeding and migratory bird surveys at established points. This survey should be conducted 5 years, if possible and the last survey was conducted in 2022.	Medium	Resource Stewardship	2027 or when resources available
Wetlands and Water Resources					
Wetland and Water Resources Monitoring	Monitoring	Monitor the health and function of wetland and water features in the Property.	Medium	Resource Stewardship	Annually or when resources available
Cultural Resources					
Cultural Resource Monitoring	Monitoring	Visit cultural resource sites as available to ensure natural- and human-caused influences are not affecting the condition of resources. Contact the Stewardship Team for more details and review the Cultural Resource Survey and Inventory Section for more information.	High	Matt Schulz	2024 and annually thereafter

Figure 17. 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 Property. 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, Property 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. Property 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 Sweetwater Lake.

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 Property 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 been eroded before it leaves the project.	• Review Property 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.	• 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).

		• Limit the velocity of water flow in disturbed areas. • Remove sediment from waters before water leaves project area.	
Vegetation Removal and Revegetation			
Reseeding Vegetation	Revegetation is often required following any soil disturbing activities that occur in the Property, 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.	• Fishers Peak State Property 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).
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.	• Construction, Ground Disturbance, and Tree/Vegetation Removal Projects Standard Operating Procedure (Appendix). • Wildlife Habitat Standard Operating Procedure (Appendix).

		• 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.	
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.	• 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, wildlife, other organisms, and human enjoyment.	• Avoid construction or disturbance near aquatic areas to the extent possible. • Reseed disturbed aquatic and nearby areas with native seed mixes provided in the Appendix. • Remove or treat aggressive noxious weeds that infest aquatic areas.	• Aquatic herbicide Management Prescription (Appendix).
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	• Hold a training for Property staff on weed identification.	• Colorado Weed Management Association Booklet (CWMA 2020).

	exacerbated by construction activities and increased visitation.	• Report any new or particularly aggressive populations of noxious weeds to the Stewardship Team. • Review the Noxious Weed Management Plan (Appendix).	• Colorado Department of Agriculture (CDA 2020). • Colorado Noxious Weed App. • Noxious Weed Management Plan (Appendix)
Weed-free Construction Practices	Construction at the Property will create a prime opportunity for new weeds to become established and existing populations to spread. However, diligence and foresight on the Property of the Property manager can significantly reduce the threat of these unwanted pests.	• Inspect construction vehicles for weed and soil contamination prior to the commencement of work on-site and wash if necessary. • 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 Property.	• Weed Prevention BMP (Appendix). • Weed Management Techniques and Prevention BMP (Appendix). • Off-Road Vehicle Usage in Property 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 Property 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 streams. Aquatic nuisance species wreak havoc on ecosystems, outdoor recreation, hydroelectric power equipment, and the economy.	• Operate an ANS check station at the Property to inspect all watercraft entering the Property. • 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 Property 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.	• Aquatic Invasive Species of Concern and Methods of Control (USFS 2010). • 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 Property 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 Property. • 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 Property may use.	• Create a burn plan for any prescribed fire. • 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.	• Prescribed Fire Preparation and Planning Standard Operating Procedure (Appendix). • Colorado Division of Fire Prevention and Control (CDFPC 2018).
Hazardous Tree Removal	Hazardous trees pose a threat to Property visitors and staff. Proactive management of hazardous trees will reduce the likelihood of accidents in the Property.	• 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 temporarily 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. • 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).

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 Properties 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).
Recreation and Visitation			
Stay on the Trail	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 Property. • 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 Property staff to enforce rules regarding staying on the trail.	• Stay the Trail Colorado

Dog Management	Dogs off leash can harass wildlife present in the Property. 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 Property 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 Property (CPW 2020e)
Visitor Education	Providing educational resources for visitors on the importance of natural and cultural resources will encourage visitors to appreciate and respect resources. This will help to curb undesirable behaviors such as dogs off leash, resource destruction, and walking off trail.	• Create educational and interpretative material in the Property describing plant and wildlife resources at the Property. Explain the importance of native species, keeping dogs on leash, and how social trails fragment habitat and subsequently affect wildlife. • Provide educational programs to the public about the Property and its natural and cultural resources.	• National Environmental Education Program • North American Association for Environmental Education
Property Infrastructure and Development			
Property Development	Keeping the Property's footprint small will help in an effort to keep remaining tracts of contiguous habitat as unfragmented as possible.	• Concentrate Property development, buildings, and visitor activities near existing Property 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.	• Fencing with Wildlife in Mind (Hanopy 2009)
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	• If raptors are present and nesting in the Property near a trail, recreation area, or proposed construction project, consider temporarily 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).

	Eagle Protection Act, 16 U.S.C. 668 (BGEPA).		
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. 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).	• 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. • 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).	• 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) • 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	• 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)

	may provide nesting sites, attract insects that are essential food sources, act as perches for wildlife.		
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).
Prairie Dogs	Prairie dogs are an important, keystone species in Colorado. Concern about prairie dog populations stem from apparent declines in distribution caused by multiple factors, but most notably plague which is a non-native disease spread by fleas.	• Conserve prairie dog colonies by establishing conservation area in the Property. • Avoid establishing a prairie dog conservation area near neighboring landowners and park boundaries. • Obtain the proper permits to relocate any colonies if relocation is absolutely necessary. Follow relocation recommendations in the Prairie Dogs Management Prescription (Appendix).	• Prairie Dogs Management Prescription (Appendix).
Whirling Disease	Whirling disease is a parasitic condition that affects fish and is present in many Colorado waters.	• Do not move fish from one body of water to another. • Do not dispose of fish entrails or other by-products into any body of water. • Do not transport aquatic plants.	• Whirling Disease Fact Sheet and BMPs (Appendix). • Whirling Disease Information and Status (Appendix). • Whirling Disease and Colorado's Trout (CPW 2020g). • Aquatic Invasive Species of Concern and Methods of Control (USFS 2010).

Cultural and Paleontological Resources	Cultural and paleontological resources are important components of any Property and their preservation is of utmost importance.	• Use education and enforcement to ensure people do not remove artifacts from the Property. • 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 Property.	• Climate Change Response Network Adaptation Strategies (NIACS 2021a). • Adaptation Strategies and Approaches for Recreation (NIACS 2021b).

Management Prescriptions

The Stewardship Team has developed Management Prescriptions as an integral part of the stewardship process to assist Property 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 Property resources:

- Aquatic Herbicide Management – This prescription provides information on the legal use of herbicides in aquatic and wetland habitats.
- 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.
- 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.
- 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.
- Shoreline Erosion Monitoring Prescription – This prescription outlines an effective, easily followed, and consistent method for long-term shoreline erosion monitoring.
- 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 Property 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 Property 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

Internal Property Volunteer Programs

the Sweetwater Lake Property plans to create new volunteer- and staff-based monitoring programs in the Property. These programs have been successful at documenting numerous important natural resources in other Properties and would be beneficial to the documentation of resources at the Sweetwater Lake Property. These programs and additional programs the Property may add are listed below.

- Raptor Monitoring – Starting a raptor monitoring program with volunteers or with the help of seasonal Resource Stewardship Staff is recommended. Efforts should follow the Raptor Monitoring guidelines provided in the Appendix.
- Rare Plant and Sensitive Vegetation Community Monitoring –Monitoring populations of documented rare plants and sensitive vegetation communities should occur regularly throughout the active period for the plant. Contact the Resource Stewardship Team to develop this program.
- Invertebrate Monitoring – Potentially partner with the Butterfly Pavilion or invertebrate specialists in the area of the Property to monitor the presence of butterflies and other invertebrates in the Property.
- 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 Team to develop this program.

External Property 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 Property resources are declining or responding favorably to management activities.

7.0 CONCLUSION

Protecting and preserving the natural resources within the Sweetwater Lake Property will be beneficial in providing visitors with a fulfilling outdoor experience, sustaining Property 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 Property appears to be in good to excellent condition, though the impacts to these resources continue to intensify. These impacts to the ecological health of the Property include the following: grazing, noxious weeds, and visitation. 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 Property's natural resources will require a cooperative effort between Property managers, state and federal agencies, scientists, Property 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 Property management with a useful tool to assist in protecting, maintaining, and enhancing the natural assets of their Property.

Thank you,

The Resource Stewardship Team

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9.0 APPENDICES