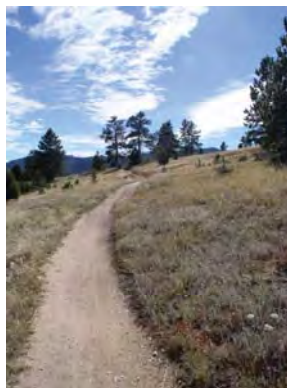
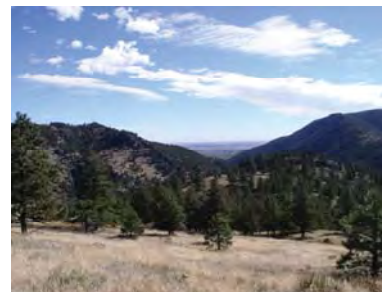


Betasso Preserve Management Plan

Including the Benjamin Property



Boulder County Parks & Open Space



June 2009

Boulder County Parks & Open Space

Vision Statement

Mountain vistas, golden plains, scenic trails, diverse habitats, rich heritage...a landscape that ensures an exceptional quality of life for all.

Mission Statement

To conserve natural, cultural and agricultural resources and provide public uses that reflect sound resource management and community values.

Goals of Parks and Open Space

- 1. To preserve rural land.*
- 2. To preserve and restore natural resources for the benefit of the environment and the public.*
- 3. To provide public outreach and volunteer opportunities to increase awareness and appreciation of Boulder County's open space.*
- 4. To protect, restore, and interpret cultural resources for the education and enjoyment of current and future generations.*
- 5. To provide quality recreational experiences while protecting open space resources.*
- 6. To promote and provide for sustainable agriculture in Boulder County for the natural, cultural, and economic values it provides.*
- 7. To develop human resources potential, employ sustainable and sound business practices, and pursue technological advancements.*

EXECUTIVE SUMMARY

The *Betasso Preserve Management Plan* sets forth the future management direction for Boulder County Parks & Open Space's (BCPOS) Betasso Preserve, which includes the original Betasso Preserve property, the Betasso Homestead property, the Benjamin property, and other adjacent BCPOS properties that have been acquired since 1977. It replaces the current management plan for Betasso Preserve, which was written in 1985 and amended in 1988, as well as the Benjamin property's interim management plan, which was approved in September 2007. The 1181-acre open space property, with its many unique and important natural, cultural, and recreational resources, presents a number of potential, yet somewhat divergent, management objectives. The following is an overview of BCPOS staff's recommendations for the future management of the property. These recommendations are based on the results of natural and cultural resource surveys, a trail feasibility study, public input throughout the planning process including that of the Betasso Preserve Stakeholders Group, the policies of the *Boulder County Comprehensive Plan*, and the mission and goals of the Parks & Open Space Department.

Betasso Preserve will be managed for its unique natural and cultural resources, significant habitat values, and exceptional recreational potential. A balanced approach that provides new and diverse visitor use opportunities, while setting aside the most significant land for plants and wildlife, will allow BCPOS to meet multiple management objectives. The more remote, steep, and undisturbed habitat will be preserved as the Arkansas Mountain Habitat Conservation Area, which will be closed to the public and managed for ecological preservation. A new trail system extending off of the existing Canyon Loop Trail will allow visitors to explore new territory and provide diverse experiences. The new trail system, which includes a potential future connection to Fourmile Canyon for mountain bikers and others, will double the available trail mileage by adding 4.6 miles of additional trails, thus creating a total of 9.3 miles of trails throughout Betasso Preserve, one of the highest densities of trails on any Boulder County open space property.

BCPOS will manage the habitats throughout Betasso Preserve to help maintain and perpetuate native plant and wildlife diversity. This will include the preservation of the 202-acre Arkansas Mountain Habitat Conservation Area. Where necessary and feasible, staff will actively manage the natural resources in accordance with the ecological processes that have shaped the area's landscapes and plant and wildlife species, as well as to achieve any desired future conditions for the site. BCPOS resource staff will utilize the best available science and an adaptive management approach to contribute to the longevity of the property's ecosystems and their long-term adaptation to environmental changes. Periodic natural resource surveys will occur to track changes over time.

To increase BCPOS's presence at Betasso Preserve, help manage user conflicts, increase enforcement of regulations, and help to build better partnerships, a new Betasso Preserve caretaker position will be created for the site pending budget approval and will be staffed by a ranger or deputy. This individual would live on-site and provide daily patrol and enforcement, as well as work with the diverse user groups and neighboring property owners in a collaborative approach to help preserve, protect, and manage Betasso Preserve more effectively.

The existing rules and regulations at Betasso Preserve will remain in place for the time being. The alternative day use regulation, which allows mountain bike use on the Canyon Loop Trail five days a week, but prohibits them on Wednesdays and Saturdays, will be continued and be applied to the new trail system for at least two years following the construction and opening of the new trail system. After two years, a Betasso Preserve user survey will be conducted to evaluate public opinion about the alternative day use regulation. If a majority of the public shows support for continuation of the alternative day use regulation, then the regulation will remain in effect. If not, then a public review process of the regulation will occur. In addition, the directional use (one-way) regulation for mountain bikers will continue for the Canyon Loop Trail, but will not initially be applied to the new trail system. However, BCPOS will have the option at any time to institute the directional use regulation on all or part (e.g. the west side of the loop only) of the new trail if the need arises.

Other future improvements at Betasso Preserve will include improvements to horse trailer parking, rehabilitation of all highly erosive social trails, including those within the Habitat Conservation Area, upgrades to the Canyon Link Trail where possible, an interpretive trail from the existing Canyon Loop Trail trailhead to the Betasso Homestead, and potential future expansion of the Canyon Loop trailhead parking lots if increases in visitor use numbers warrant it. In addition, if an opportunity arises, BCPOS will investigate the feasibility of a potential new trail in the southeast corner of Betasso Preserve that would provide a new link between Boulder Canyon and the Canyon Loop Trail. The goals of this new trail would be to eliminate the need to hike or bike on Boulder Canyon Drive to access Betasso Preserve from the Boulder Canyon Trail and to provide a more sustainable trail system compared to the existing Canyon Link Trail. A new trail at this location would provide a safer, easier, and potentially more environmentally sound connection between the City of Boulder and Betasso Preserve. If the opportunity arose for a new trail at this location, extensive resource surveys would be required to avoid and minimize impacts to natural resources, and the existing Canyon Link Trail would be closed and rehabilitated.

ACKNOWLEDGEMENT

Boulder County Parks & Open Space staff would like to thank the citizens of Boulder County for supporting the open space program and providing the vital funding necessary for the purchase and long-term management of properties like Betasso Preserve. This plan is dedicated to the memory of Ernie Betasso who provided the County with its first major open space purchase, which has provided the citizens of Boulder County with recreation, relaxation, and a connection to the natural world for over 30 years. Many thanks are also extended to Thomas and Karen Benjamin for selling their property to the County, thus protecting it for current and future generations. In addition, BCPOS staff thanks all Boulder County citizens, including members of the Betasso Preserve Stakeholder Group, who provided input throughout the management planning process and have helped set the future management direction for Betasso Preserve.

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PART ONE: INTRODUCTION

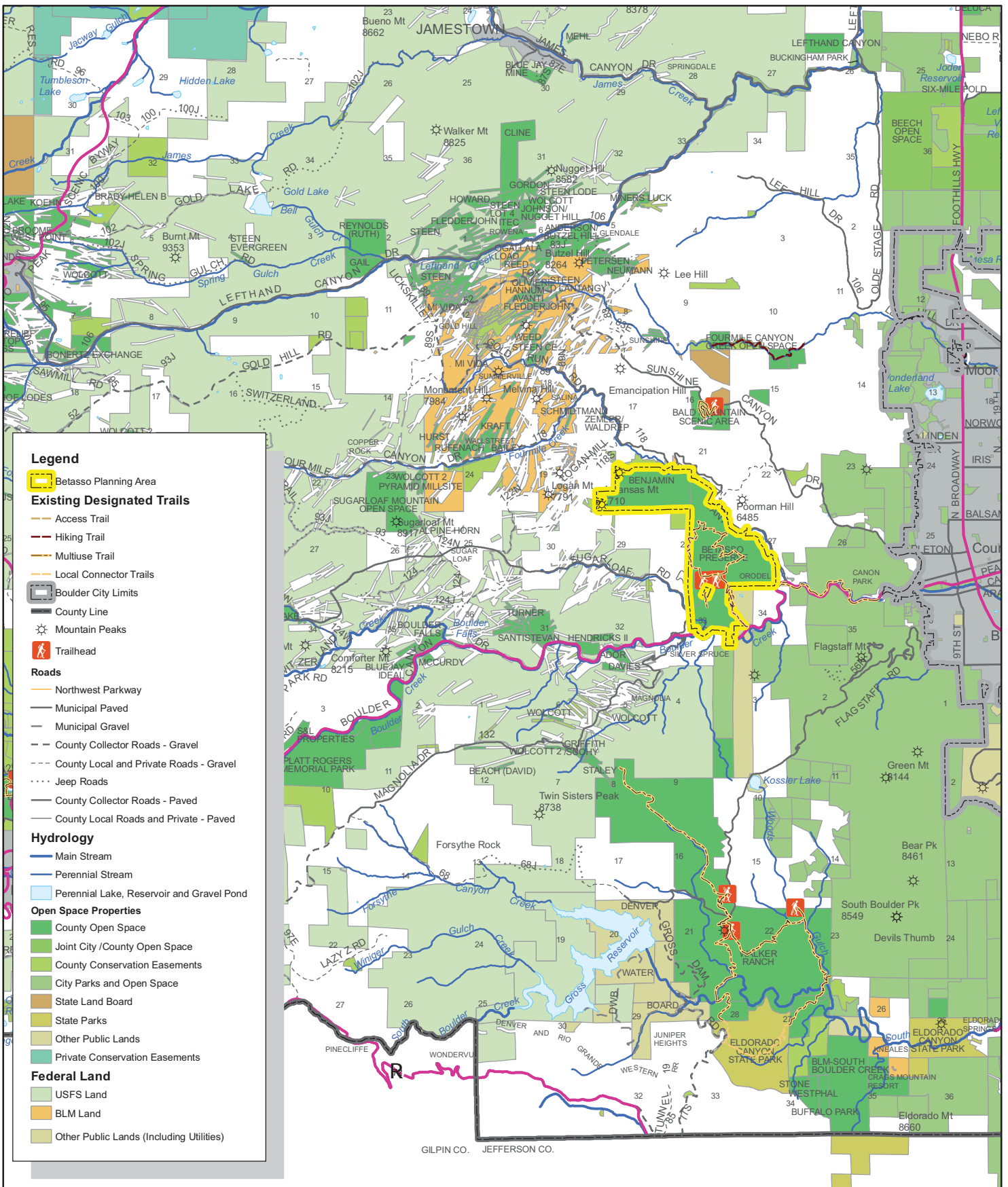
I. Introduction

Boulder County Parks and Open Space Department (BCPOS) has prepared a combined management plan for Betasso Preserve, including the Betasso, Betasso Homestead, Tinsley, Williams, Benjamin and Hannum properties (henceforth referred to collectively as “Betasso Preserve”). This combined management plan is an update to the 1985 *Betasso Preserve Management Plan* and sets forth the future management direction for the properties. The management actions and allowed uses outlined in this plan are based on in-depth analysis and evaluation of the existing natural and cultural resources, existing and potential future public use, the goals and policies of the *Boulder County Comprehensive Plan* and other relevant planning documents, public sentiment, including input from the Betasso Preserve Stakeholder Group, and additional opportunities and constraints that have come to light during the planning process.

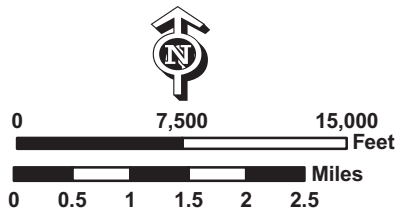
Betasso Preserve encompasses a total of 1,181 acres of lower montane habitat within the foothills of the Rocky Mountains and offers a variety of open space values. The property consists of a mosaic of native plant communities and important wildlife habitat and movement corridors. Mule deer, mountain lion, black bear, and Abert’s squirrel are just a small handful of the wildlife species that inhabit this landscape that is blanketed with ponderosa pine woodlands, mixed ponderosa pine and Douglas fir forests, open meadows, and riparian habitat. On-site drainages include sections of Arkansas Gulch, Fourmile Creek, Boulder Creek, and a number of other unnamed, intermittent and ephemeral streams. The diverse and rugged topography, abundant scenic vistas, and the relative peace and quiet have made Betasso Preserve a hub for recreational activities, especially for hikers, mountain bikers, trail runners, and local equestrians. With its mining and ranching roots, Betasso Preserve provides a reminder of Boulder County’s not so distant past. Combined, all of the distinct features of Betasso Preserve offer a unique and rewarding experience to the visitors of Betasso Preserve.

Betasso Preserve is located approximately two miles up Boulder Canyon, west of the City of Boulder and northwest of the junction of Boulder Canyon Drive and Fourmile Canyon Drive (Figures 1 and 2). Boulder Creek and Boulder Canyon are located south of Betasso Preserve, and Fourmile Creek and Fourmile Canyon are located to the east and north. The City of Boulder’s Betasso Water Treatment Plant borders the property on the southeast. The city also has a small inholding at the Bummer’s Rock Trailhead. An approximately nine-acre Bureau of Land Management (BLM) parcel is located near the northeast corner of the open space. Three properties with county-held conservation easements border the site. The remaining adjacent properties are all privately owned, the majority of which have homes and other buildings located on them.

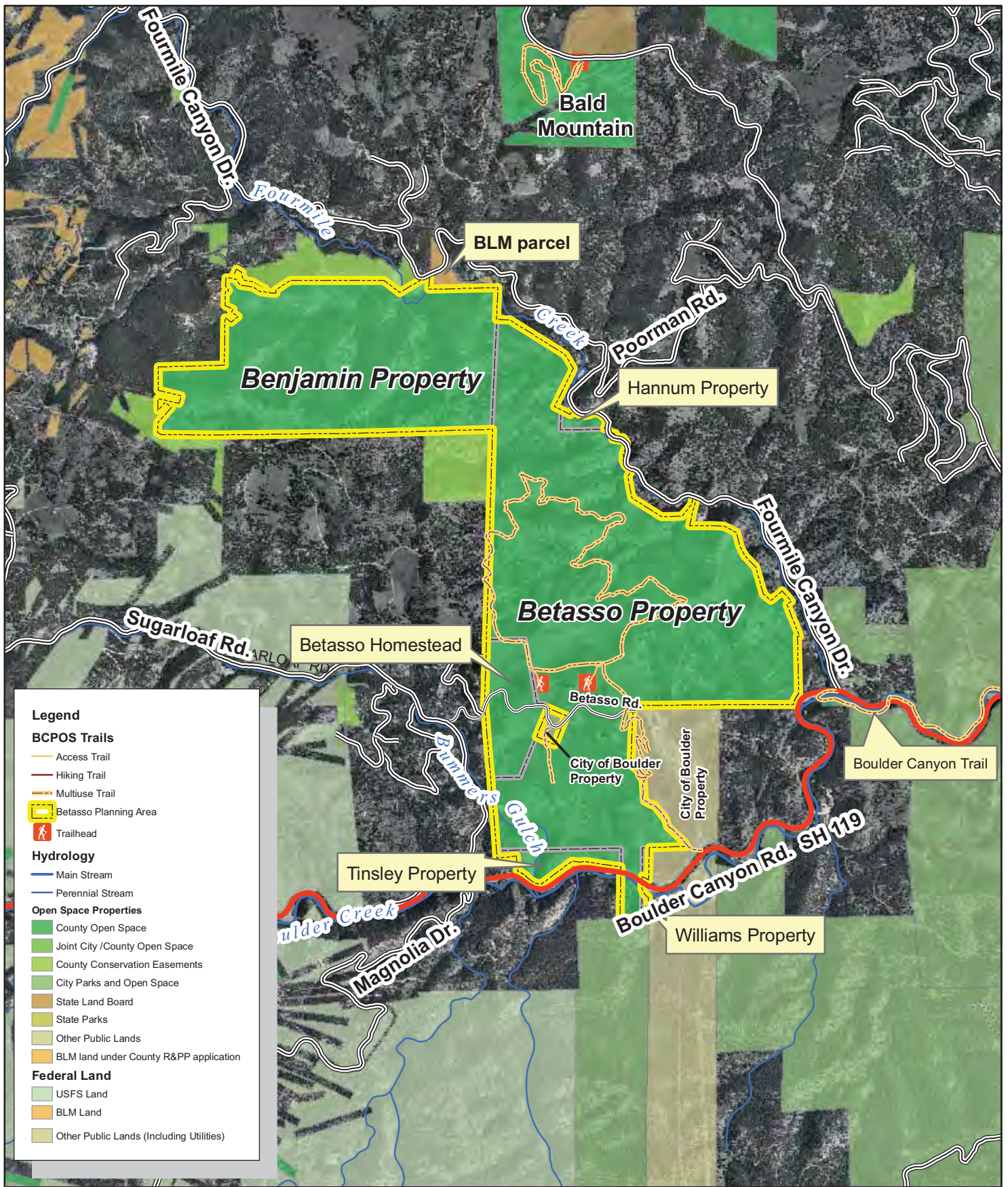
BCPOS has been managing Betasso Preserve since 1977, when it was purchased from the previous landowner, Mr. Ernest (Ernie) Betasso. Betasso Preserve was Boulder County’s first fee title purchase of open space land and was the second property to be included in the



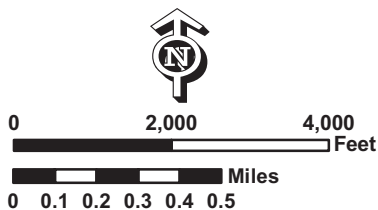
**Betasso Preserve Management Plan
Figure 1**



Site Vicinity Map - Regional Context



Betasso Preserve Management Plan
Figure 2



Site Vicinity Map - Site and Adjacent Properties

newly formed Parks and Open Space Department (Bald Mountain Scenic Area was the first county open space, but is leased from the State Land Board). Due to budgetary constraints at the time, the 713-acre property was divided into ten parcels and purchased by BCPOS through a 10-year schedule of lease-purchase options between 1977 and 1986.

Following Mr. Betasso's death in 1983, BCPOS purchased from his estate the remaining 50-acre homestead, which he had retained for himself during the 1976 sale. Two smaller parcels were added to the southern end of Betasso Preserve at later dates. In 1996, the 1.3-acre Williams parcel was purchased by BCPOS, and in 2004, the 19.5-acre Tinsley property was acquired (Figure 2).

The Benjamin property became part of BCPOS's portfolio of open spaces on May 30, 2007. The 391-acre property is adjacent to the northwest portion of Betasso Preserve and several BCPOS conservation easements (Figures 1 and 2). An additional 37.5 acres were accorded a conservation easement in the same transaction. The northeast portion of the property includes an approximately 0.25-mile section of Fourmile Creek. The southwest portion of the Benjamin property is adjacent to the top of 7710-foot elevation Arkansas Mountain. Arkansas Ridge, which is a part of Betasso Preserve, traverses to the east off of Arkansas Mountain, both of which are significant parts of the Boulder County mountain landscape.

Finally, the 5.8-acre Hannum property was acquired on October 29, 2008, along with the mining claim rights on the underlying 20.66-acre Little Ginny (a.k.a. Surprise Lode) unpatented claim. The Hannum property is located along the eastern border of Betasso Preserve and includes a portion of Fourmile Creek Figure 2.

This management plan sets forth the future direction for management of Betasso Preserve. To meet the multiple management objectives for the site and to balance visitor use and habitat preservation, BCPOS proposes to add 4.6 miles of new multiple use trails within the northeast portion of Betasso Preserve, including the eastern portion of the Benjamin property, and to set aside 202 acres of high value wildlife habitat on the Benjamin property within a Habitat Conservation Area (hereafter referred to as the Arkansas Mountain Habitat Conservation Area), which will be closed to all public use. Vegetation will be managed to promote native diversity, to the extent possible, and to provide high quality habitat for wildlife. In addition, this plan calls for the creation of an on-site caretaker position, continuation of the alternative day use and directional use regulations for mountain bikes for at least two years, rehabilitation of social trails, minor facility improvements, an interpretive loop trail to the Betasso Homestead, and a potential future new link trail between Boulder Canyon and the Canyon Loop Trail if an opportunity arises.

II. Property Description

Betasso Preserve is comprised of six separate properties acquired by Boulder County over a 30-year time span. Table 1 lists each property along with its total acreage, acquisition date, and purchase price.

Table 1. Name, Area, Year Purchased, and Purchase Price of Properties that Make Up Betasso Preserve.

Property Acquisition Name	Area (Acres)	Year Purchased	Purchase Price
Betasso	713.15	1977-1986	\$1,024,710
Betasso Homestead	50	1987	\$245,000
Williams (Russel and Lafaunn)	1.3	1996	Donated ¹
Tinsley	19.5	2004	\$150,090
Benjamin	391.18	2007	\$4,750,000
Hannum	5.8 ²	2008	\$185,000
Total	1180.93		

1. At the time of donation, the property was assessed at an actual value of \$40,800.00 by the Boulder County Assessor's Office for the 1995 tax year.
2. Plus 20.66 acre unpatented mining claim rights to the Little Ginny Lode (a.k.a. Surprise Lode)

A. Location

Betasso Preserve is located in Sections 20, 21, 28, 27, 33, and 34 of Township 1 North, Range 71 West of the 6th P.M. The southeast corner of Betasso Preserve is located less than two miles west of the City of Boulder near the historic townsite of Orodell at the intersection of Boulder Canyon Road and Fourmile Canyon Road. Fourmile Creek flows at or near the northeast and east boundary of the site. The Town of Crisman is in the vicinity of the northwest boundary. The Sugarloaf community is situated west of Betasso Preserve. Boulder Creek is located on the far south end of the property, and the City of Boulder's Betasso Water Treatment Plant is immediately southeast of the property. The entrance to Betasso Preserve is approximately ½ mile east of Sugarloaf Road along Betasso Road.

B. Access

Betasso Preserve is surrounded by a number of public and private roads (Figure 2). State Highway 119 (Boulder Canyon Drive) is situated on the south and is the main route to the site. Sugarloaf Road provides a connection between SH 119 and Betasso Road. Betasso Road crosses Betasso Preserve and provides access to the Canyon Loop and Bummer's Rock trailheads, as well as access to the City of Boulder's water treatment plant. Fourmile Canyon Drive wraps around the east and northeast portions of Betasso Preserve. Alaska Road is a publicly owned, but privately maintained, gravel road that touches the northwest corner of the site. It is the only other legal access point to Betasso Preserve, besides Betasso Road, and is characterized as "a narrow, mountain road...(that) provides very limited and unsafe parking opportunities...A proliferation of vehicles in this area could potentially complicate access to nearby residences and compromise emergency and fire access to those areas." (ERO Resources 2007, p. 19). All other roads adjacent to Betasso Preserve are private and do not provide legal access into Betasso Preserve.

C. Terms of Acquisition

1. Betasso. The 713.15-acre Betasso property was purchased from Ernie Betasso and subsequently his estate beginning in 1977. Boulder County general funds were used for the purchase along with funds granted through the Federal Land and Water Conservation Fund, administered through the State of Colorado. The property was initially divided into ten parcels (A – J) for acquisition (Appendix A). One parcel was scheduled for purchase per year, while the remaining land was leased from Mr. Betasso and his estate. BCPOS purchased the final parcel in 1986.

2. Betasso Homestead. Boulder County purchased the 50-acre Betasso Homestead on February 11, 1987 following the death of Ernie Betasso. Boulder County general funds were used for the purchase. This parcel contains two residences, a homestead cabin and associated log barn, corral and loading chute, a large animal barn, a blacksmith / work shop, a brick power station, and several other poultry and storage sheds. The residences are currently leased for private use.

3. Williams. The 1.32-acre Williams parcel was donated to Boulder County on October 30, 1996.

4. Tinsley. The 19.5-acre Tinsley property was purchased by Boulder County from Mansur Patrick Tinsley on November 18, 2004, with open space sales tax dollars. Under Boulder County open space sales tax resolutions, Boulder County can only use the property for passive recreational purposes, for agricultural purposes, or for environmental preservation purposes. The resolutions also provide restrictions on the sale, lease, trade, or other conveyance of the property.

5. Benjamin. Boulder County purchased the 391.175-acre Benjamin property from Thomas and Karen Benjamin on May 30, 2007. The property was purchased with money acquired from the Boulder County open space sales tax. Under Boulder County open space sales tax resolutions, Boulder County can only use the property for passive recreational purposes, for agricultural purposes, or for environmental preservation purposes. The resolutions also provide restrictions on the sale, lease, trade, or other conveyance of the property.

As part of the Benjamin property purchase agreement, Boulder County also acquired a conservation easement over and across 37.5 acres immediately north of the Benjamin property. The purchase agreement also allocated a fee simple interest in a one-acre parcel to the Benjamins, which is located north of and geographically separated from the rest of the Benjamin property. These properties and transactions, however, are not part of this management plan and have no bearing on the management of Betasso Preserve.

6. Hannum. The Hannum property was purchased on October 23, 2008, from the estate of Philip L. Hannum. Boulder County acquired 5.83 acres in fee simple and a right to prospect mining on an unpatented claim containing 20.66 acres. The property was purchased with money acquired from the Boulder County open space sales tax. Under

Boulder County open space sales tax resolutions, Boulder County can only use the property for passive recreational purposes, for agricultural purposes, or for environmental preservation purposes. The resolutions also provide restrictions on the sale, lease, trade, or other conveyance of the property.

D. Land Use Considerations

1. Adjacent Land Use. Betasso Preserve is surrounded primarily by private property on all sides. The majority of these properties are low-density, rural residential with some undeveloped lots. Three county-held conservation easements (CE) abut Betasso Preserve. These include the 23-acre Running Horse Foundation CE, the 39-acre Cofrin CE, and the 37.5-acre Benjamin CE. The Sugarloaf community is located west of Betasso Preserve. The Fourmile Canyon community is located along Fourmile Creek to the east and northeast of the property. Other public lands adjacent to Betasso Preserve are the City of Boulder's Betasso Water Treatment Plant and pipeline corridor along the southeast boundary, a five-acre city owned inholding at the Bummer's Rock Trailhead, a parcel of the City's open space and mountain parks that touches the southern end of Betasso Preserve, and a 9-acre BLM parcel on the northeast side.

2. Boulder County Comprehensive Plan. Betasso Preserve and adjacent roadways have the following *Boulder County Comprehensive Plan* designations:

- *Archaeologically Sensitive Area* throughout majority of site and *Travel Routes* along Boulder Creek ("Comprehensive Plan Map – Archeologically Sensitive Areas", adopted on November 30, 1983 by Boulder County Planning Commission (BCPC))
- *Open Corridor, Streamside* and *Open Corridor, Roadside* along Fourmile Creek and Boulder Creek ("Comprehensive Plan Map - Environmental Conservation Areas, Natural Landmarks & Natural Areas" adopted on March 22, 1995 by BCPC)
- *Stream Habitat Connectors* along Fourmile Creek, Boulder Creek, and Bummer's Gulch ("Comprehensive Plan Map - County Open Space Plan" adopted July 17, 1996 by BCPC)
- *Conceptual Trail Corridor* between Betasso Preserve and Bald Mountain Scenic Area ("Comprehensive Plan Map - County Trails Map", adopted on January 20, 1999 by BCPC)
- *Proposed (Trail) Shoulder – BOCO* along Fourmile Canyon Drive and *Proposed (Trail) Shoulder – CDOT* along Boulder Canyon Drive ("Comprehensive Plan Map - County On-Street Bikeway Plan", adopted on September 4, 2001 by BCPC)

3. Land Use Code. Betasso Preserve is zoned "Forestry", which is defined as "rural areas established for the purpose of efficiently using land to conserve forest resources, protect the natural environment, and preserve open areas" (Boulder County 2007).

4. Encumbrances and Easements. A number of easements and right-of-ways exist across Betasso Preserve, including right-of-ways for Fourmile Canyon Drive, Boulder Canyon Drive, powerlines, ditches, and pipelines, among others. Appendix B lists all easements and right-of-ways for Betasso Preserve including the Betasso, Betasso Homestead, Tinsley, Williams, Benjamin, and Hannum properties.

E. Property Context

A number of other Boulder County open space properties are within the vicinity of Betasso Preserve, but do not actually abut the site (Figure 1). Bald Mountain Scenic Area is approximately 0.5 miles north of Betasso Preserve, Sugarloaf Mountain is approximately 2.5 miles to the west, Platt Rogers is approximately 4 miles to the southwest, and Walker Ranch Open Space is approximately 2 miles south. Portions of the City of Boulder's Open Space and Mountain Parks are within 0.5 miles to the east of Betasso Preserve and also immediately adjacent to the southern tip on the south side of Boulder Canyon. U.S. Forest Service (USFS) and BLM parcels occur to the northwest, west, and southwest of Betasso Preserve. One BLM parcel (≈ 9 acres) borders Betasso Preserve on the northeast corner. In addition, Betasso Preserve is one of the County's closest open spaces to the City of Boulder and is at the terminus of the Boulder Canyon Trail. Thus, it is one of the most easily accessible open spaces by a large number of county residents.

III. Planning Overview

A. Purpose and Need of Management Plan

The purpose of this management plan is to establish the vision, short- and long-term goals and objectives, and implementation strategies for the management of Betasso Preserve. In particular, the plan provides management direction for the natural, cultural, and recreational resources that the property offers. The management direction set forth in this plan is based on public sentiment, BCPOS staff input, and the best available resource and scientific information and provides the foundation for long-term adaptive management of the property and its resources.

This management plan is an update of the plan prepared for Betasso Preserve in 1985 and amended in 1988 (BCPOS 1985, 1988). This update is needed to reassess, and where necessary, revise the management of the natural, cultural, and recreational resources at Betasso Preserve and to include adjacent properties acquired by BCPOS since 1988 in the management plan. As part of the management planning process for this plan, resource surveys were conducted and public sentiment regarding current and future management of the property was sought. This new information was considered and incorporated into this management plan.

The schedule for completion of the updated management plan for Betasso Preserve was moved from 2011 to 2008, per the 2007 *Benjamin Property – Interim Plan* (BCPOS 2007). Based on the level of public interest in the Benjamin property, as well as the rest

of Betasso Preserve, the Board of County Commissioners determined that this schedule change was necessary to resolve concerns regarding habitat protection, recreational access, and impacts to neighboring properties.

B. Intended Use of Management Plan

Boulder County open space management plans are prepared based on in-depth assessments and evaluations of the current conditions and projected future trends and management needs of a particular open space property. An interdisciplinary team of BCPOS staff carefully works through the details of the plan based on resource inventories and evaluations, sound science, and regular input from the public, stakeholder groups, and outside agencies and consultants. Open space management plans document existing conditions and present strategies for the protection and preservation of the natural and cultural resources and other community values. In addition, these plans provide for sustainable uses and seek to balance the diverse interests of the public.

This management plan documents the current resources and uses at Betasso Preserve and sets the future management direction and uses for the property. BCPOS staff and a number of outside consultants have spent many hours developing this plan and formulating the best management strategies based on the best available information and current public sentiment. This plan will guide the day-to-day and long-term management of Betasso Preserve, including management of the natural, cultural, and recreational resources, as well as public use of these resources.

C. Relationships to Other Planning Documents

The following Boulder County documents provide guidance for the future management of Betasso Preserve.

1. Boulder County Comprehensive Plan. The *Boulder County Comprehensive Plan* (BCCP) is an “advisory” document, which sets forth the goals and policies for land use in Boulder County (Boulder County 1999). Its intent is to provide guidance for land use decisions on public and private land. The “Open Space” element of the BCCP provides the goals and policies for open space acquisition (OS 1), resource management (OS 2), recreational use (OS 4), trails (OS 6), and public decision-making (OS 8), among others. Appendix C provides pertinent goals and policies from the BCCP that relate specifically to Betasso Preserve.

2. Betasso Preserve Management Plan. Although BCPOS began managing and constructing facilities at Betasso Preserve in 1977 following the purchase of the property, the first fully documented management plan for the property was not completed until 1985 (BCPOS 1985). This management plan was subsequently amended in 1988 following the addition of the Betasso homestead (BCPOS 1988). The 1985 management plan and its addendum have subsequently guided the management of Betasso Preserve and have provided the foundation upon which the current management plan rests.

The 1985 management plan set forth the following management objectives for Betasso Preserve.

Betasso Preserve is owned by Boulder County and is managed by the Boulder County Parks and Open Space Department as a low intensity recreation area. Specific objectives for the park include the following:

1. *Provide visitors with minimal development of trails and picnic facilities.*
2. *Provide on-site cultural and natural history educational opportunities for the public.*
3. *Preserve historical structures important to the cultural heritage of the property.*
4. *Manage the property as a wildlife sanctuary by maintaining or enhancing natural food, cover, and nesting areas.*
5. *Manage the property to encourage restoration of presettlement plant communities and to serve as an outdoor laboratory of a typical montane ecosystem.*
6. *Manage the forest resource of Betasso Preserve to minimize extreme fire hazards and perpetuate an ecologically sound forest environment. (BCPOS 1985, page 3)*

In addition to these objectives, the original 1985 management plan and the 1988 addendum listed the following goals and recommendations for the management of the property (BCPOS 1985, 1988).

Forest Management Goals

- To promote a healthy and vigorously growing forest through established silvicultural practices
- To maintain sufficient forest density and diversity to preserve wildlife habitat for birds and mammals
- To reduce fire hazards
- To improve and/or restore natural and scenic qualities

Grassland Management Goals

- To promote an ecologically sound grassland community as may have existed in presettlement times
- To maintain or improve wildlife habitat
- To reduce the risk of soil erosion in recently disturbed areas
- Recommended consideration of grazing program to restore plant community*

Wildlife Management Goals

- To enhance available wildlife cover and food
- To increase the wildlife database for Betasso Preserve
- To minimize adverse impacts to wildlife from land use and management of the property *

Visitor and Facilities Recommendations

- Reconstruct existing loop entrance road
- Improve Bummer's Rock trail
- Self-guided interpretive trail
- Group picnic shelter (50 people)
- Redesign and expand picnic facilities, parking areas, and restroom*

Cultural / Historic Facilities Recommendations

- Restore McDonald Cabin "to a state of arrested decay"
- Restore and furnish interior of Betasso Cabin with items donated by Betasso family. Potentially, utilize cabin as a mini-museum.
- Restore Homestead Complex "to a state of arrested decay"

Environmental Education Recommendations

- Provide natural history interpretation
- Focus on Boulder County history including cultural resources, buildings, and ranching
- Construct a self-guided interpretive trail
- Recruit and utilize volunteer naturalists and staff

(Note: Goals and recommendations from the 1988 addendum are marked with *)

3. Benjamin Property – Interim Plan. Following the purchase of the Benjamin property, a rapid resource assessment was completed for the property and the northernmost portion of Betasso Preserve (ERO Resources 2007). This document helped guide the *Benjamin Property Interim Plan*, which was adopted by the Board of County Commissioners on September 11, 2007 (BCPOS 2007). Per the interim plan, the Benjamin property was closed to the public until an update to the 1985 *Betasso Preserve Management Plan* is adopted. In addition, the interim plan elevated the priority of the updated plan, shifting the planning period from 2011 to 2008, and called for the inclusion of the Benjamin property as part of Betasso Preserve.

D. Planning Process

The planning for this project began in 2007 with the purchase of and the subsequent development of an interim management plan for the Benjamin property (BCPOS 2007). During this management planning process, many of the concerns of user groups and local citizens were heard and incorporated into the interim plan. Primary concerns expressed by the public included continued use of pre-existing social trails on the property and potential impacts of public use on wildlife habitat and adjacent public and private roads and private property. The interim management plan and its public process set the stage for this management plan, which covers all of Betasso Preserve including the Benjamin property.

Beginning in December 2007, BCPOS convened an interdisciplinary team of staff to work through the planning for this management plan. Team members included wildlife ecologists, plant ecologists, trail specialists, forestry and fire staff, cultural resource

specialists, GIS staff, landscape architects, resource protection staff, education and outreach staff, division managers (resource management, resource planning, and operations), the BCPOS director, and a resource planner (Appendix N). This team saw the management plan through to completion and was responsible for gathering and incorporating information from their respective disciplines, as well as helping formulate the final management recommendations found within this plan.

For this management plan, two initial public open house meetings and a public comment period were held in early 2008. The first open house meeting took place on February 26th at the Boulder County Clerk & Recorder's office and was attended by 25 people. The second meeting occurred on March 4th at the Sugar Loaf Fire Protection District, Station #2, and was attended by 28 people. The purpose of these meetings was to provide the public with background information on the existing natural and cultural resources and public uses at Betasso Preserve and to solicit comment on the draft vision, goals and objectives, and opportunities and constraints that BCPOS staff had prepared for the management plan. Information from the meetings was posted on the web throughout the management planning process. The public was also encouraged to send comments to BCPOS during the month following these meetings. A total of 277 comments were received. A summary of those comments can be found in Appendix D. An update of the management planning process and a summary of the public comments were presented to the Parks and Open Space Advisory Board (POSAC) on April 24, 2008.

To develop a better understanding of the property, resource surveys were conducted on-site before and during the planning process. Cultural and natural resource surveys occurred began in 2007 and were completed by September 2008. In addition, a trail feasibility study was completed during the summer of 2008.

Between October 2008 and January 2009, BCPOS convened a group of 23 stakeholders as part of the Betasso Preserve Stakeholder Group. The group was comprised of environmental organizations, users groups, and neighboring landowners. Although the group did not have equal representation amongst all groups, BCPOS tried to bring together a diversity of interests to work through complex management issues. The purpose of the stakeholder group was to assist BCPOS with the evaluation of future public use of Betasso Preserve. The desired outcome was to reach a consensus amongst all stakeholders on a potential new trail alignment, if any, whether to close or keep open to the public the remainder of the property, and any other ideas or concepts the group could generate. Three meetings were held on October 13 and December 4, 2008, and January 12, 2009, and two site visits were conducted on November 2 and 5, 2008. A memo summarizing the outcome of the stakeholders' activities and decision can be found in Appendix E. By the end of the third meeting, no consensus was reached amongst stakeholders on any draft trail concept or whether the remainder of the property should be open or closed to the public.

The *Draft Betasso Preserve Management Plan* was completed in March 2009 and was available for public review between March 11 and April 8, 2009. In addition, BCPOS conducted a public meeting on March 24, 2009. The public was asked to submit

comments in writing, and a total of 155 comments were received. BCPOS staff reviewed these comments to determine if any changes to the draft management plan were warranted. The primary changes made based on the public comments included clarification about the intent of the visitor use surveys regarding the alternative day use regulation and changing the recommendation about the directional use regulation on the new trail system.

The draft management plan was presented to POSAC on April 23, 2009. POSAC voted 5-2 in favor of recommending the plan as presented to the Board of County Commissioners (BOCC). The final plan will be presented to the BOCC on June 2, 2009, for approval and adoption.

E. Community Values and Information

1. Community Values. Boulder County offers a unique mix of scenic beauty, a wealth of natural treasures, places for leisure and recreation, economic opportunity, and a place for many to call home. The rugged peaks of the Rocky Mountains to the west, the vast plains to the east, and the rolling foothills in-between provide a diverse landscape that has captured the attention of many for generations. Boulder County has a population of approximately 290,000 people, which has increased by about 65,000 people ($\approx 29\%$) since 1990 (US Census Bureau 2008). This population is distributed throughout a number of unique and diverse cities, towns, and unincorporated areas. Over 65% of the county's 741 square miles are publicly owned, which includes Rocky Mountain National Park, Arapaho and Roosevelt National Forests including the Indian Peaks Wilderness Area, Eldorado Canyon State Park, and multiple county and municipal open spaces. BCPOS has protected over 90,000 acres of open space through fee title ownership and conservation easements, while municipalities in Boulder County have protected over 50,000 acres.

Boulder County residents enjoy recreating and spending time in nature. With over 375 miles of trails (of which approximately 100 miles are managed by BCPOS), residents of all ages can be seen using the trail systems throughout Boulder County any day of the year. The county's geography, history, public lands, recreation, and tourism have combined to provide the county with a wonderful network of trails used by Boulder County citizens and visitors from all over the state and nation. These trails provide users with a vast array of experiences including hiking, mountain biking, horseback riding, trail running, snowshoeing, cross-country skiing, nature study, and places for solitude and scenic beauty. The County's varied trail experiences and the large amount of public land continue to bring recreationists to the area.

While the number of miles of trails is increasing throughout the county, the number of people recreating is also increasing, fueling the desire for more trails. Growth of communities throughout Boulder County and across the Front Range has added recreational pressure to Boulder County. At the same time, the citizens of Boulder County continue to value protection of the natural and cultural resources that make the county so unique. The public recognizes the necessity of balancing recreational use with

resource protection and understands the importance of managing resources for the long-term and creating sustainable trail systems that limit impacts to sensitive resources.

2. Adjacent Landowners. Private residential lots primarily surround Betasso Preserve. Two recent BCPOS surveys provide a picture of the local communities' attitudes and concerns regarding living next to County open space. These studies provide useful insight into the local community's stance on current and future management of the open space.

A 2005 survey of landowners who lived adjacent to BCPOS properties showed that, overall, adjacent residents are very satisfied with living next to County open space (Planning Alternatives 2005). Reasons for this satisfaction included the value of land protection, scenic views, rural landscape, and access for recreation that the adjacent open space provides. Some specific comments, not ranked in any order, from surrounding landowners of Betasso Preserve (prior to Benjamin purchase) included concerns regarding:

- Trespass
- Mountain biker conflict
- Illegal trails
- Trail erosion (due to mountain bikers)
- Fire risk
- Protection of wildlife
- Dwarf mistletoe
- Increased use
- More mountain lion sightings
- Illegal campers
- Trail connection between Fourmile Canyon and Betasso
- Continue access for horseback riding

In 2007, BCPOS conducted a survey by mail of individuals who live near or adjacent to forested County open spaces to better understand their opinions and preferences regarding resource management tools and techniques and the style of communication with BCPOS they prefer (BCPOS 2008a). Overall, a total of 2517 surveys were mailed to individuals adjacent to 23 different survey areas with a response rate of 53%. In this study, Betasso Preserve and the Benjamin property were divided into separate study areas. A total of 44 surveys were mailed to neighbors of Betasso Preserve with a response rate of 67%, and 14 surveys were mailed to neighbors of the Benjamin property with a 64% response rate.

Table 2 provides the results of the survey for neighbors adjacent to Betasso Preserve, the Benjamin property, and for all areas surveyed throughout Boulder County. At the time of the survey, neighbors of Betasso Preserve had the highest satisfaction with living near an open space (4.8 out of 5), while neighbors of the Benjamin property had the lowest satisfaction (2.4). Neighbors of these two properties felt relatively well informed about management on the open space (3.2 for Betasso Preserve and 3.9 for the Benjamin

property), compared to all neighbors surveyed throughout the county (2.6). Overall, neighbors of Betasso Preserve and the Benjamin property, as well as all neighbors surveyed throughout the county, are supportive of mechanical thinning and prescribed fire as management tools to both improve forest health and reduce the risk of wildfire. However, mechanical thinning had more support than prescribed fire for both management objectives. The neighbors of the Benjamin property were less supportive of spot application of herbicide to control exotic weeds (2.5) compared to the neighbors of Betasso Preserve (4).

Table 2. Results of Forest Management Survey of Individuals Living Near or Adjacent to Betasso Preserve, the Benjamin Property, and All Study Areas Combined.

Category	Average Score for Betasso Preserve (N=28)	Average Score for Benjamin Property (N=9)	Average Score for All Surveyed Areas (N=1269)
Satisfaction with living near open space ^A	4.8 ¹	2.4 ²	4.2
How informed do you feel about management of the nearby open space? ^A	3.2	3.9 ¹	2.6
Mechanical thinning to improve forest health ^B	4.8	4.5	4.4
Mechanical thinning to decrease wildfire risks ^B	4.7	4.4	4.4
Prescribed burning to improve forest health ^B	3.6	3.3	3.6
Prescribed burning to decrease wildfire risks ^B	3.6	3.3	3.6
Burning slash piles in winter ^B	4.5	3.7	4
Spot application of herbicides to control exotic weeds ^B	4	2.5	3.6
Use of insect "bio-controls" to control exotic weeds ^B	4.1	3.3	3.9

A On scale of 1 (Not At All) to 5 (Very Much)

B On scale of 1 (Do Not Use) to 5 (Legitimate Tool - Use Anywhere)

1 Received the highest ranked score for that question out of the 23 areas surveyed.

2 Received the lowest ranked score for that question out of the 23 areas surveyed.

F. Opportunities and Constraints

A list of opportunities and constraints was developed early in the management planning process by BCPOS staff and the public (BCPOS 2008b). The intent of the list is to outline all possible future management options to assess during the planning process (i.e. the *opportunities*) and to identify all possible limitations and restrictions to management (i.e. the *constraints*). The list of opportunities and constraints provided guidance and direction to the project planning team, as well as the public, in developing this management plan.

1. Opportunities

The following opportunities were considered during the management planning process:

Acquisitions

- The potential for additional acquisitions or easements within the vicinity of the property for trails, scenic vistas, and habitat connections and protection
- The potential to acquire the adjacent BLM parcel through ongoing land trade negotiations

Natural Resources

- The chance to conduct on-site vegetation mapping and wildlife surveys
- The potential to preserve a relatively large block of intact, undisturbed wildlife habitat
- The opportunity to manage and restore the structure, function, and native species composition where appropriate within disturbed or degraded sites including forests, grasslands and riparian areas
- The opportunity to manage habitat for specific wildlife species (e.g. western bluebird).
- The chance to protect wildlife movement corridors
- The chance to control existing and introduced State and County listed noxious weeds and other undesirable non-native species
- The opportunity to manage forests for health, vigor, and wildfire protection with mechanical thinning and prescribed fire, where appropriate
- The potential to reduce erosion from designated trails, non-designated social trails, and other developed facilities
- The opportunity to protect on-site water quality

Cultural Resources

- The chance to conduct on-site cultural resource surveys and interpretation
- The potential to protect and preserve significant cultural resources including the Betasso Homestead Complex

Recreation/Trails

- The chance to work with multiple user groups and stakeholders to develop a sustainable, equitable, and enjoyable trail system
- The possibility to extend the Canyon Loop Trail as either a loop, out-and-back, or through trail.
- The possibility to construct a new loop trail through the historic complex of cabins, corrals, and barns.
- The opportunity to improve areas of concern along the existing trail system
- The potential to redevelop the existing trailheads and parking areas if deemed necessary
- The chance to reassess existing trail regulations including the current one way restrictions and alternative day use for mountain bikers
- The potential to close and/or stabilize all unsustainable trails within Betasso Preserve
- The opportunity to potentially link Boulder Canyon Drive and Fourmile Canyon Drive via existing and potential new trails within Betasso Preserve.
- The opportunity to evaluate a future link from Betasso Preserve to roadways and regional trail systems
- The possibility to provide safer and more sustainable access to Betasso Preserve from the City of Boulder without driving

Education and Outreach

- The possibility to interpret the natural history of Betasso Preserve and the surrounding area including the area's native flora and fauna, geology, hydrology, and fire ecology
- The chance to interpret the cultural history of both properties and the surrounding area including Boulder County's ranching and mining history
- The potential to utilize volunteers to interpret and preserve the cultural and natural resources and help with the management of the trail system
- The opportunity to work cooperatively with the local fire protection districts and neighbors to reduce the risk of catastrophic wildfires
- The ability to work with neighbors, the public, and other agencies to improve the overall management of the property

Patrol

- The chance to combine patrols at both Betasso Preserve and the Benjamin property
- The opportunity to minimize trespassing from and to neighboring private properties through signage, trails management, and other appropriate measures
- The potential to increase patrol in response to new or hazardous use patterns

2. Constraints

The following constraints were considered during the management planning process:

Acquisitions

- Key parcels adjacent to Betasso Preserve for trails, scenic vistas, and habitat connections and protection may not be available for acquisition or easement from private landowners
- Access across the BLM parcel within the northeast corner of Betasso Preserve must fulfill requirements of the National Environmental Policy Act (NEPA)

Natural Resources

- Pre-existing data on vegetation and wildlife at Betasso Preserve was limited prior to planning efforts
- Additional impacts to natural resources due to trails and public use are unavoidable if any new trails are constructed
- Potential for threatened and endangered species is slight, but possible (e.g. Preble's Meadow Jumping Mouse)
- Expensive stream/drainage crossings will be unavoidable if new trail is constructed north of Canyon Loop Trail
- Introduction of non-native plant species is likely unavoidable
- Majority of slopes within north portion of Betasso Preserve, including the majority of Benjamin, are greater than 20 degrees (>35%) and have significant rock outcroppings
- Many of the more moderate slopes capable of supporting a sustainable trail including portions of the former Switzerland Trail grade are along riparian habitats
- Majority of soils have a "severe" erosion hazard rating for roads and trails per the Natural Resource Conservation Service (NRCS) soils map

Cultural Resources

- Some impacts to cultural resources due to trails and public use are unavoidable

Recreation/Trails

- New trail across the northern portion of Betasso Preserve, including much of the Benjamin property, may be difficult and costly to construct, especially a loop trail, due to the topography and amount of rocks and boulders across the site
- Limited ability to construct another trailhead based on ownership, topography, and road conditions
- Neighboring properties may be impacted by recreational uses, especially illegal trespass
- Limited access points onto trail system may lead to the creation of additional illegal, unsustainable, and unsafe social trails
- Due to the topography of the Benjamin property, establishing multi-use trails could be challenging.
- Public use of existing social trails and creation of new social trails may further impact the environment

- User conflict on existing and potential new trails may occur and may reach unacceptable levels
- Safety of trail users can not be guaranteed due to the nature of outdoor recreation

Education and Outreach

- Interpretation activities involving Benjamin will be limited using only the current Betasso trailheads, due to distance and terrain.

Patrol

- Limited access into the northern portion of Betasso Preserve, especially the Benjamin property, will make patrol and emergency response difficult
- Limited ability to control all trespass and social trail use

IV. Current Management

The Parks & Open Space Department began developing recreational facilities at Betasso Preserve in 1977 (BCPOS 1985). Since 1985, the *Betasso Preserve Management Plan* and its addendum have guided facilities development and management of the property (BCPOS 1985, 1988). Currently, Betasso Preserve is open to the public seven days a week, sunrise to sunset. Three multi-use trails exist including the 3.2-mile Canyon Loop Trail, the 0.25-mile Bummer's Rock Trail, and the 1.25-mile Canyon Link Trail. Hikers, mountain bikers, trail runners, and horseback riders, among other users, utilize these trails. The Canyon Loop Trail is presently closed to mountain bikes on Wednesdays and Saturdays to mitigate user conflict on the trail, and the Bummer's Rock trail is closed to mountain bikes at all times. The Canyon Link Trail is open to all users, including mountain bikers, seven days a week. The current regulations for Betasso Preserve allow visitors to go off trail, except for mountain bikes, which must stay on designated trails. Existing facilities at Betasso Preserve include four parking areas with 53 parking spaces, five picnic tables, one restroom, two informational kiosks, four benches, and a group shelter, which can accommodate approximately 40 people.

Past and current management activities by BCPOS have included noxious weed management, mechanical thinning of forests and prescribed fire to improve forest health and decrease wildfire risk, revegetation of disturbed areas including the closure of social trails, facilities and trail maintenance and improvements, wildlife monitoring, and renovations to the Betasso homestead. BCPOS resource protection staff regularly patrols the property to ensure compliance with the approved rules and regulations. In addition, a number of education and outreach programs are held at Betasso Preserve throughout the year.

Per the *Benjamin Property Interim Plan*, the Benjamin property is currently closed to the public pending the adoption of the combined management plan (BCPOS 2007). Presently, the property has no official BCPOS designated trails. However, a number of non-designated "social" trails exist on-site, which were created by various users accessing the property prior to the acquisition of the property by the County. These social trails are in poor to fair condition with many instances of erosion, downcutting, and braiding, especially on steeper slopes (ERO Resources 2007).

V. Management Plan Layout

This management plan has three primary sections, including *Introduction*, *Management Plan*, and *Appendices*. The *Management Plan* section is further divided into four sub-sections: *Physical Resources*, *Natural Resources*, *Cultural Resources*, and *Visitor Use and Services*. Within each of these sub-sections, an evaluation of the current condition is provided along with the future management direction for each topic.

PART TWO: MANAGEMENT PLAN

I. Introduction

Betasso Preserve includes 1,181 acres of lower montane habitat within the foothills of the Rocky Mountains. Its location between Boulder Canyon and Fourmile Canyon, approximately two miles west of the City of Boulder, makes it one of Boulder County's most easily accessible open spaces for many County residents. The mosaic of diverse plant communities, rugged topography, numerous ravines and ridge tops, and sources of water provide for a diversity of wildlife species. People from the surrounding communities, throughout the County, and beyond regularly use the site for hiking, mountain biking, trail running, picnicking, nature study, and horseback riding. The diverse and steep hillsides, abundant scenic vistas, and the relative peace and quiet have made Betasso Preserve a hub for recreational activities. The open space also provides a piece of Boulder County history with its mining and ranching roots, as well as a grand outdoor classroom.

With so many unique values and varied uses, Betasso Preserve has over the past 30 years provided a high level of visitor satisfaction and has helped preserve the rural landscape, cultural history, and natural state of Boulder County. With the addition of the Benjamin property, the open space will continue to be a unique and important piece of preserved land in the County, set aside for the preservation of natural and cultural resources, as well as public use and enjoyment.

In formulating this management plan, BCPOS staff has taken into consideration the desires and needs of all the citizens of Boulder County, including multiple user groups, conservation interests, and neighboring landowners. BCPOS also has relied heavily on in-depth natural and cultural resource surveys conducted on-site to better understand and properly manage the resources found on Betasso Preserve. A trail feasibility study has provided a number of potential trail alignments that were aligned based on construction feasibility (IMBA Trail Solutions and ERO Resources 2008). This study was conducted independent of other natural and cultural resource values, as well as the desirability of the trail options it provided.

In that context, BCPOS continues to strive to meet the multiple policy objectives for open space management as detailed in the Boulder County Comprehensive Plan (Boulder County 1999, Appendix C) and found in the language of the BCPOS mission statement and goals.

BCPOS Mission Statement

To conserve natural, cultural and agricultural resources and provide public uses that reflect sound resource management and community values.

BCPOS Goals

- 1. To preserve rural land.*
- 2. To preserve and restore natural resources for the benefit of the environment and the public.*

3. *To provide public outreach and volunteer opportunities to increase awareness and appreciation of Boulder County's open space.*
4. *To protect, restore, and interpret cultural resources for the education and enjoyment of current and future generations.*
5. *To provide quality recreational experiences while protecting open space resources.*
6. *To promote and provide for sustainable agriculture in Boulder County for the natural, cultural, and economic values it provides.*
7. *To develop human resources potential, employ sustainable and sound business practices, and pursue technological advancements.*

II. Vision Statement

The vision statement provides the desired future state for management of Betasso Preserve. It is what BCPOS hopes the management of Betasso Preserve will look like in the short to long-term future.

Boulder County Parks and Open Space's vision for Betasso Preserve is:

To protect, preserve, interpret, and restore the site's native ecosystems and significant cultural resources, while providing passive, sustainable, and satisfying recreational opportunities.

As part of this vision, BCPOS foresees core habitat areas provided at Betasso Preserve that are of sufficient size to help maintain and perpetuate native plant and wildlife populations, wildlife movement across the property and beyond, and the ecological processes that have shaped the area's landscapes and the species that inhabit them. It is BCPOS's intent to manage the site based on the best available science and with an adaptive management approach. Management activities will be selected to help perpetuate and restore healthy native ecosystems.

Integrated with resource protection, BCPOS envisions high quality, passive recreational experiences that meet the needs of multiple user groups. The open space will continue to provide public access, picnic areas, and other developed facilities at the Canyon Loop and Bummer's Rock trailheads that are accessible for a wide diversity of individuals, families, and groups. As part of BCPOS's vision, any potential new designated recreational trails will be designed and constructed to be safe and sustainable and to minimize environmental impacts, as well as limit impacts to neighboring properties. All trails will be managed and maintained regularly to ensure their longevity and sustainability, as well as a high level of visitor satisfaction by multiple user groups.

The public will take pride and ownership in Betasso Preserve through BCPOS's outreach and education efforts. BCPOS will continue to provide educational programs that highlight the area's native flora and fauna, geology, hydrology, fire ecology, and Boulder County's ranching and mining history. Historic buildings and structures will continue to be preserved and interpreted. Volunteers will play an important role at Betasso Preserve by helping

BCPOS staff to interpret and preserve the cultural and natural heritage of the site and with the construction and maintenance of the trail system.

III. Physical Resources

A. Physical Resources Evaluation

1. Climate. Betasso Preserve has a continental, semi-arid climate that is greatly influenced by the Front Range of the Rocky Mountains. Because of changes in topography and elevation across the site (elevation ranges from approximately 5900' to 7700'), data from two weather stations were accessed (WRCC 2008). Based on weather data from the Boulder (≈5400') and the Gross Reservoir (≈7950') weather stations, average annual maximum temperatures vary from 58.1°F (Gross Reservoir) to 65.2°F (Boulder), and average annual minimum temperatures range from 31.3°F (Gross Reservoir) to 38.4°F (Boulder) (Table 3). On average, July has the highest monthly temperature (80.7°F at Gross Reservoir and 87.6°F at Boulder), while the coldest average monthly temperatures occur in January (20.5°F (Boulder)) and February (16.8°F (Gross Reservoir)). Average annual precipitation ranges between approximately 19 inches (Boulder) and 21 inches (Gross Reservoir). Average annual snowfall ranges from 83.2 inches (Boulder) to 110.1 inches (Gross Reservoir). The highest monthly average precipitation occurs in May, and the lowest monthly average precipitation occurs in January.

Table 3. Weather Data from the Boulder and the Gross Reservoir Weather Stations (WRCC 2008)

Weather Station Data	City of Boulder	Gross Reservoir
Approximate Elevation of Weather Station	5400'	7950'
Years of Data Collection	1948 - 2007	1978 - 2007
Average Annual Maximum Temperature (°F)	65.2	58.1
Average Annual Minimum Temperature (°F)	38.4	31.3
Highest Monthly Average Temperature (°F)	July (87.6)	July (80.7)
Lowest Monthly Average Temperature (°F)	January (20.5)	February (16.8)
Average Annual Total Precipitation (in.)	19.11	21.2
Average Annual Total Snowfall (in.)	83.2	110.1
Highest Monthly Average Precipitation (in.)	May (2.98)	May (3.05)
Lowest Monthly Average Precipitation (in.)	January (0.70)	January (0.71)

2. Geology. Betasso Preserve is near the eastern margin of the Front Range of north-central Colorado, and consists primarily of igneous rocks of Precambrian age (Bridge 2004). Generally, the area is dominated by 1.7 billion year old granitic rocks formed during an ancient episode of mountain building. Specifically, the site is underlain by a rock formation known as the Boulder Creek Granodiorite, which solidified from molten material. This molten material, known as magma, had its origin deep beneath the earth's

surface. Sedimentary and metamorphic rocks were also formed in the area during this time period.

The Ancestral Rocky Mountains formed along what is now the Front Range during the Pennsylvanian Period (318-299 million years ago). These mountains were eroded, followed by a number of geologic processes that spanned millions of years. Over this time, the climate underwent many changes, ranging from tropical to desert-like. An ocean covered the area for millions of years, depositing thousands of feet of sediment.

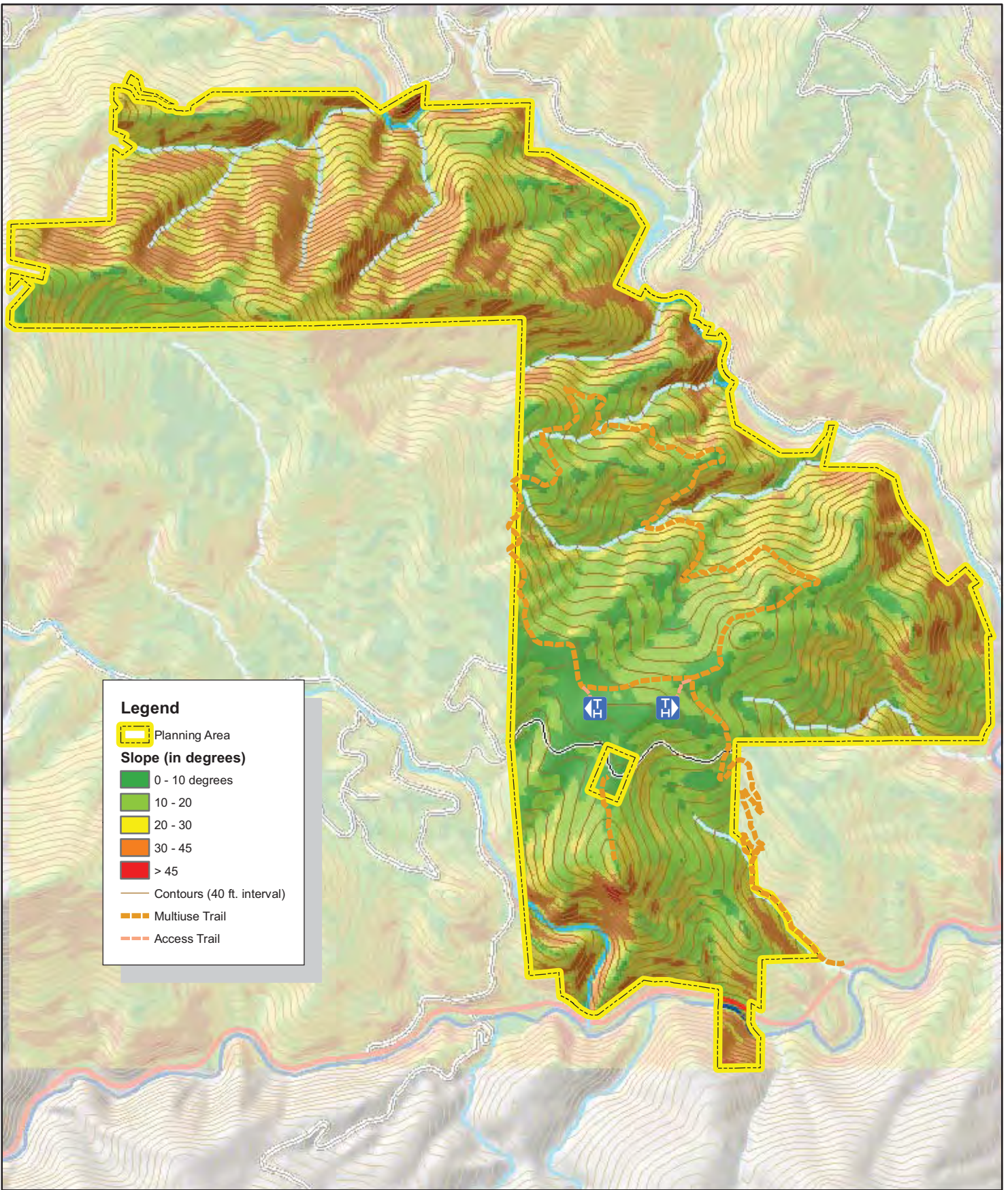
The sea gradually withdrew, and the present day Rocky Mountains began to uplift in what is referred to as the Laramide orogeny (i.e. the process of mountain building). The Laramide orogeny began during the late Cretaceous Period, 65 to 55 million years ago, and continued into the Eocene, 55 to 33 million years ago. During this great mountain building episode, mineral rich solutions were injected into cracks of the older granite. These solidified to form the mineral veins, which have been mined in the Colorado Mineral Belt. The mining activity that characterizes some of the early history of the Boulder Canyon and Sugarloaf area is due to the exploitation of gold and other mineral deposits within the Colorado Mineral Belt.

Erosion has been the predominant process shaping the area since the uplift, stripping off between 15,000 to 20,000 feet of rock layers to expose the harder Boulder Creek Granodiorite. The granite is well exposed in the rugged southern portion of the property and in the rock outcrops throughout the Benjamin property. A prominent series of rock outcrops follows the upper ridgeline of the Benjamin property, running from Arkansas Mountain down to Fourmile Creek. In addition, runoff has formed and sculpted the various gullies and drainages seen at Betasso Preserve. The gently sloping meadow area in the northeast part of the property was formed by soil eroded down into this area from the surrounding mountains.

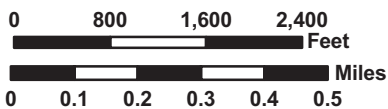
3. Topography. Betasso Preserve's topography varies from gentle (0-10%) to very steep (greater than 30%) slopes (Figure 3). The steepest slopes occur primarily on the Benjamin property along the northeast slopes of Arkansas Mountain, and include several rocky outcrops. Elevation ranges from approximately 5900 feet at Boulder Creek to approximately 7700 feet near the top of Arkansas Mountain (Figure 4). In general, the Benjamin property has a predominantly northerly aspect, while the remainder of Betasso Preserve has a predominantly easterly aspect with north and south facing slopes along drainages.

Prominent topographic features include (Figure 4):

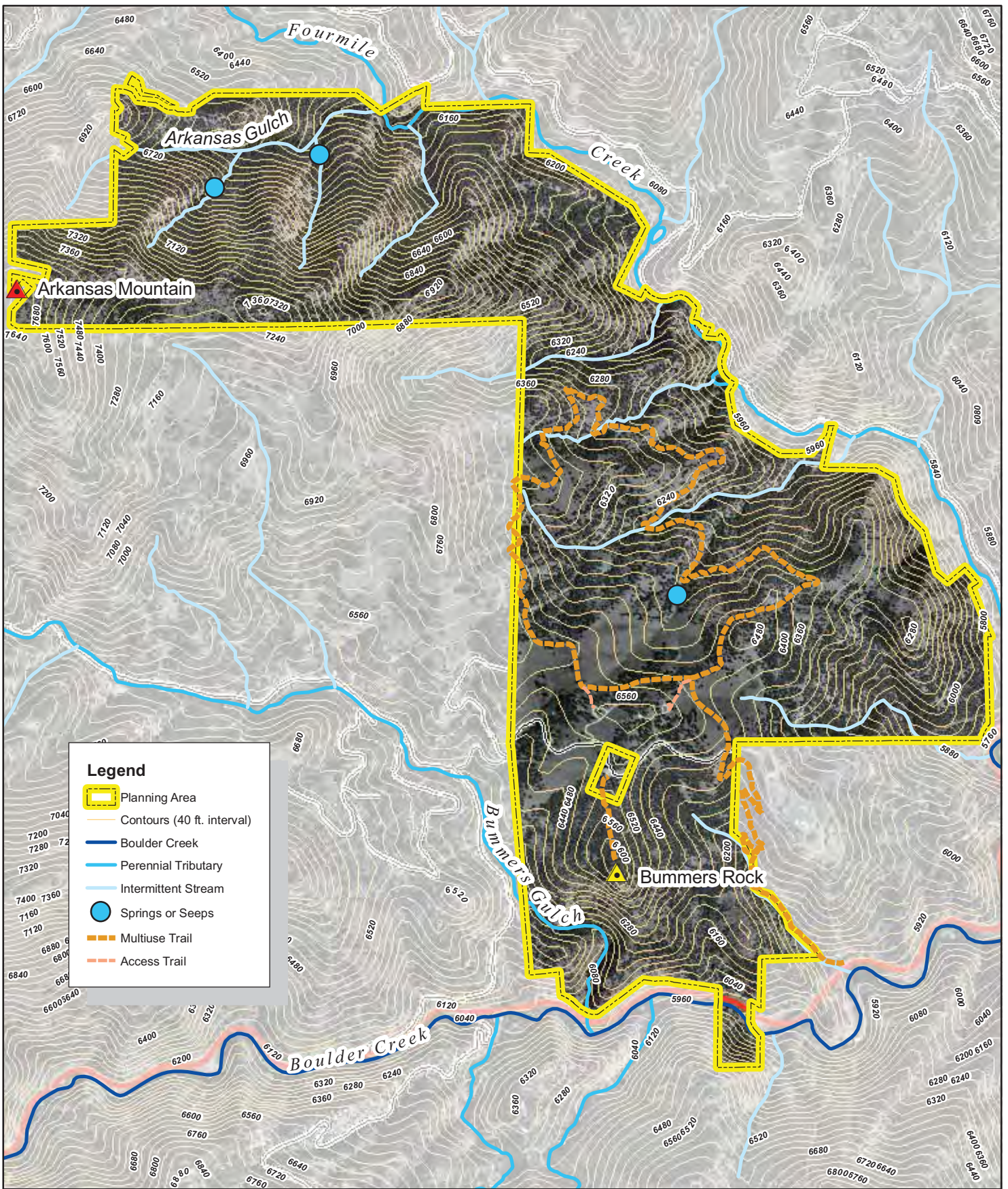
- Fourmile Creek and Canyon to the east and northeast;
- Boulder Creek and Canyon to the south;
- Arkansas Mountain adjacent to the Benjamin property's southwest corner;
- The ridge extending east-west from Arkansas Mountain down to Fourmile Creek;
- Arkansas Gulch traversing east-west within the northern portion of the property;
- Bummer's Rock on the south end of the property; and



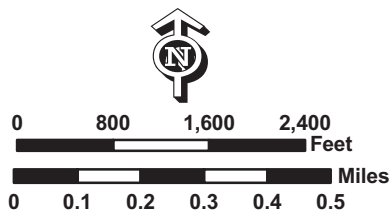
Betasso Preserve Management Plan
Figure 3



Slope Analysis Map



**Betasso Preserve Management Plan
Figure 4**



Hydrologic / Topographic Map

- A number of other unnamed ephemeral and intermittent drainages surrounded by steep hillsides.

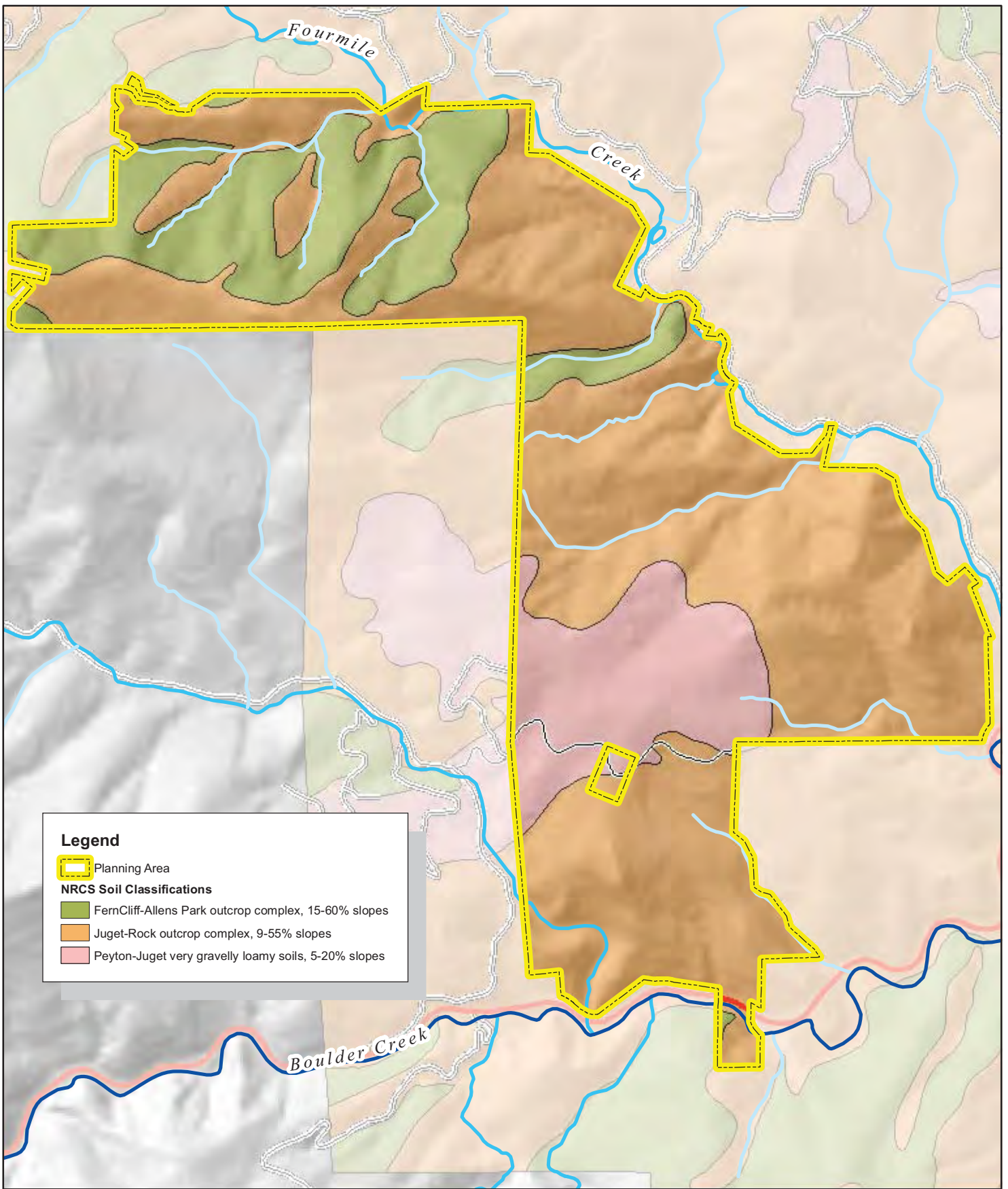
4. Soils. The Natural Resources Conservation Service (NRCS) has mapped three soil types within Betasso Preserve (Figure 5). The following are detailed descriptions of each soil type based on the NRCS soil survey (NRCS 1975, 2007).

Juget-Rock Outcrop Complex (JrF). (9 to 55% slopes) This complex is made up of about 50% Juget very gravelly sandy loam and 30% rock outcrop with the remaining 20% made up of Peyton soils and Allens Park soils. The Juget series is made up of shallow, somewhat excessively drained soils. The soils formed on mountain slopes and ridges in sandy residuum weathered from granite. Native vegetation is mainly ponderosa pine with an understory of grass with Englemann spruce and Douglas fir at higher elevations. Runoff is rapid, and the erosion hazard is high. This soil type is considered to have moderate to severe limitations for paths and trails due to slope.

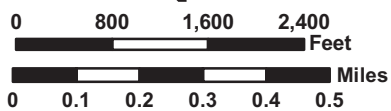
Fern Cliff – Allens Park - Rock Outcrop Complex (FcF). (15 to 60% slopes) This complex is made up of about 30% Fern Cliff stony sandy loam, about 30% Allens Park gravelly sandy loam, and about 20% Rock outcrop. The Fern Cliff series is made up of deep, well-drained soils. The soils formed in loamy mixed alluvium on short fans and mountain valley side slopes. Native vegetation is mainly ponderosa pine and Douglas fir forests with a sparse understory of grass. Runoff is medium to rapid, and the erosion hazard is high. This soil type is considered to have moderate to severe limitations for paths and trails due to slope.

Peyton-Juget (PgE). (5 to 20% slopes) This complex is made up of about 65% Peyton very gravelly loamy sand and 20% Juget very gravelly loamy sand with small areas of rock outcrop and Allens Park soils present. The Peyton series is made up of deep, well-drained soils. These soils formed on upland hills and valley side slopes in weathered loamy and sandy material that has been locally transported. The vegetation primarily consists of tall grasses with scattered ponderosa pine. Runoff is slow to medium, and the erosion hazard is moderate to high. This soil type is considered to have moderate limitations for paths and trails due to very gravelly soil.

5. Hydrology. Based on topographic information from the USGS 7.5-minute quadrangle map, surface water on and in the vicinity of Betasso Preserve flows to one of three perennial streams, Boulder Creek, Fourmile Creek, or Bummers Gulch (USGS Boulder, CO Quadrangle 1966; photorevised 1979). Fourmile Creek and Bummers Gulch are tributaries to Boulder Creek. In the northern portions of Betasso Preserve, including the majority of the Benjamin property, surface water runs in a northeasterly direction toward Fourmile Creek (Figure 4). Three small, high gradient intermittent drainages flow from the steep north slope of the Benjamin property into Arkansas Gulch. Arkansas Gulch, which also is intermittent, traverses the northern portion of the Benjamin property and drains into Fourmile Creek to the northeast. Three other prominent intermittent drainages flow to the east directly into Fourmile Creek, while two intermittent drainages in the southern portion of Betasso Preserve flow to the southeast directly into Boulder Creek.



Betasso Preserve Management Plan
Figure 5



Soils Map

7. Visual Resources. Betasso Preserve provides views of the Continental Divide to the west, the Great Plains to the east, and the surrounding hills and mountains of the Front Range, including Bald Mountain and Sugarloaf Mountain. Along the eastern portions of the site, visitors can look over the City of Boulder at the mouth of Boulder Canyon.

B. Physical Resources Management

The primary management goals and objectives for physical resources are the prevention of excessive soil erosion and protection of water quality. Because the physical and natural resources are entwined, the goals and objectives for physical resources are grouped with Natural Resources below.

IV. Natural Resources

A. Natural Resources Evaluation

1. General Ecology. Betasso Preserve is situated within the foothills of the Front Range, along the eastern edge of the Southern Rocky Mountains physiographic province. A distinct and unique flora provides the backdrop for these ecosystems. Because of its location, the foothills are a transition zone between the ecosystems of the Great Plains to the east and those of the higher elevation mountains to the west. Relict plant species that existed under past climatic conditions and rare species can also be found where micro-climatic conditions and soil types favor such species.

Both environmental and anthropogenic factors have shaped the structure, function, and species composition of these ecosystems. Within the Front Range, the principal environmental influences on vegetation are slope, aspect, elevation, soils, water, and climate, as well as a variety of natural disturbances such as drought, flooding, fire, herbivory, and insect and disease outbreaks. Subsequently, the structure and composition of the plant communities, as well as the location of water sources, predator-prey relationships, and the availability of adequate shelter and travel corridors, influence the type and distribution of wildlife within the area. Natural ecosystems are not stable, however, but change over time. The range of natural variability is an ecological concept that recognizes that ecosystems shift within a range of various states dependant upon such dynamic factors as climate, environmental conditions, disturbances (e.g. flooding and fire), species composition, birth and death rates, and other natural processes.

Human use and impacts, whether intentional or not, have had a long history and have greatly influenced the existing conditions at Betasso Preserve and the surrounding landscape. Past and current land uses and management practices, such as livestock grazing, timber harvest, arson, wildfire, prescribed fire, fire suppression, mining, roads, and residential and recreational development, have altered the plant and wildlife communities to varying degrees. Over time, changes have included extirpation of species, alterations of plant and wildlife population sizes, introduction and spread of non-native species, changes in fire regime and other natural disturbances, soil deposition and

erosion, and hydrological modifications. In the near future, climate change may also have a dramatic effect on the structure, function, and composition of these ecosystems.

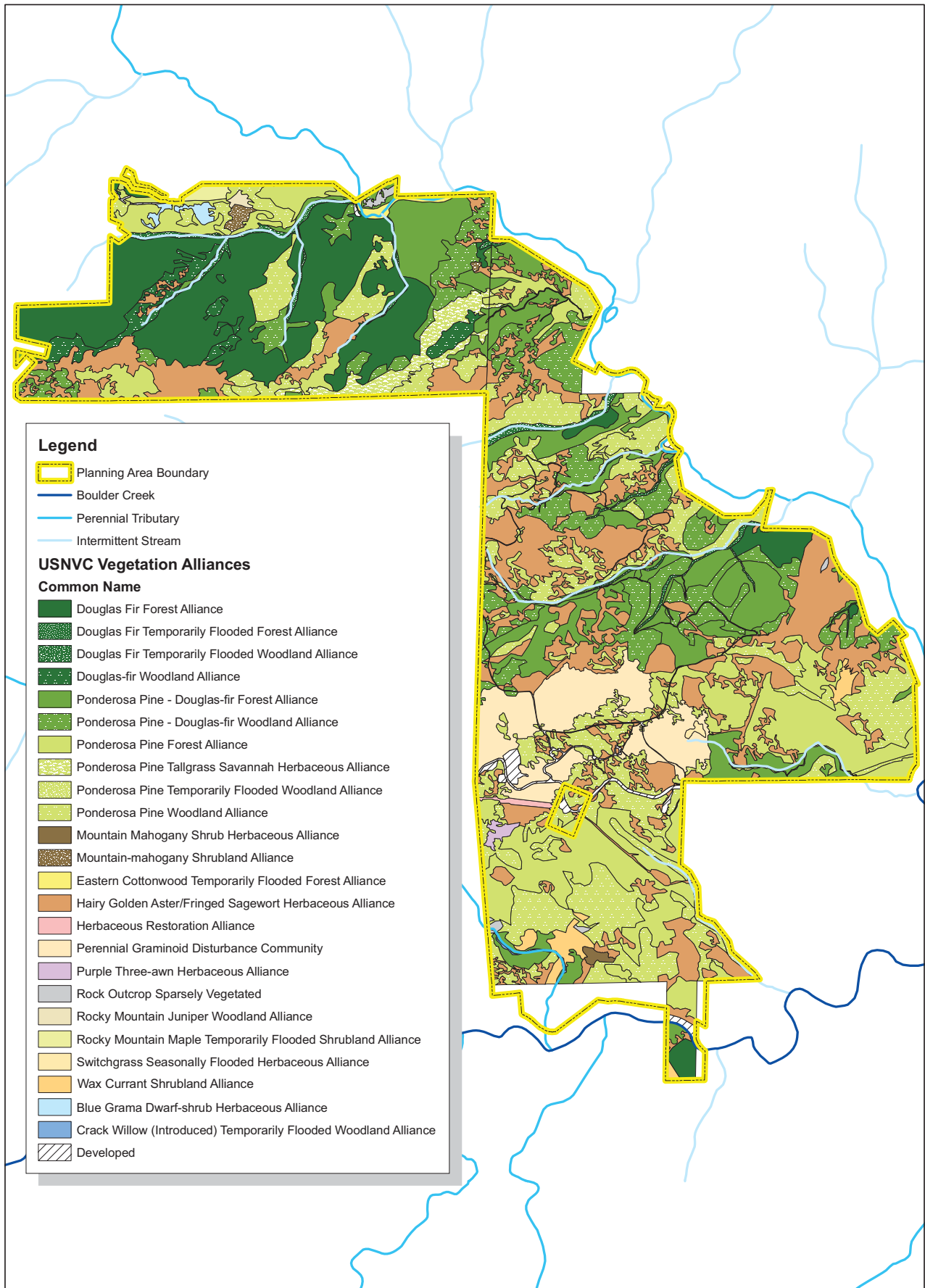
2. Vegetation. BCPOS currently has four full time staff within its plant ecology group. They are responsible for inventorying and monitoring plant communities and rare species, protecting significant and unique native plant species and communities, maintaining native plant communities, and restoring degraded and disturbed plant communities on open space properties. The plant ecology staff utilizes a variety of management tools and techniques to protect, restore, and manage sites including seeding and planting native species, prescribed burning, and weed control where necessary.

a. Surveys. In summer 2008, a private consultant (Patrick Murphy, Ecotone Corp., Boulder) mapped vegetation alliances at Betasso Preserve using the U.S. National Vegetation Classification System (Grossman, et al. 1998, Anderson, et al. 1998, NatureServe 2008). The purpose of the vegetation mapping was:

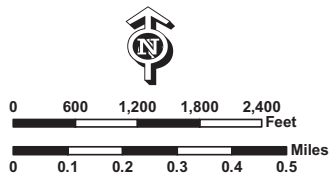
1. to assist with resource and trail planning and management,
2. to provide a baseline vegetation inventory of the property,
3. to identify weed species, if any,
4. to guide long-term management of the property, and
5. to track long-term changes in the vegetation.

The on-site baseline inventory of vegetation was conducted to delineate the boundaries of dominant plant species groupings, called alliances, across Betasso Preserve based on geologic and hydrologic characteristics, plant species composition, and the percent aerial cover of each vegetative structural component present at the site. The alliances were assigned a name based on the dominant species of the site (e.g. ponderosa pine woodland alliance). Each alliance was then spatially mapped into a GIS program with all the field data saved into a relational Access database; and a species list of the different plants present within each alliance was collected. The mapping of vegetation alliances does not take into consideration the quality of the plant communities present and is not a species-specific inventory, such as a rare plant inventory. However, the information gathered in the vegetation mapping could be used to direct further investigation of habitat quality and rarity surveys.

The results of this vegetation mapping can be found in Figure 6 with explanations of the U.S. National Vegetation Classification System in Appendix F. A complete species list from the 2008 mapping effort, including scientific names, can be found in Appendix G. Table 4 lists the vegetation alliances found at Betasso Preserve along with the total area and percent of total area.



Betasso Preserve Management Plan
Figure 6



Plant Alliance Map

Table 4. Vegetation Alliances at Betasso Preserve

Vegetation Alliances	Total Area (Acres)	Percent of Total Area
Blue Grama Dwarf-shrub Herbaceous	2.65	0.23%
Crack Willow (Introduced) Temporarily Flooded Woodland	0.6	0.05%
Developed	12.89	1.14%
Douglas Fir Forest	152.6	13.45%
Douglas Fir Temporarily Flooded Forest	7.79	0.69%
Douglas Fir Temporarily Flooded Woodland	8.51	0.75%
Douglas-fir Woodland	18.53	1.63%
Eastern Cottonwood Temporarily Flooded Forest	4.38	0.39%
Hairy Golden Aster/Fringed Sagewort Herbaceous	210.93	18.59%
Herbaceous Restoration Alliance	1.6	0.14%
Mountain Mahogany Shrub Herbaceous	1.32	0.12%
Mountain-mahogany Shrubland	2.19	0.19%
Perennial Graminoid Disturbance Community	58.83	5.19%
Ponderosa Pine - Douglas-fir Forest	132.41	11.67%
Ponderosa Pine - Douglas-fir Woodland	110.69	9.76%
Ponderosa Pine Forest	144.42	12.73%
Ponderosa Pine Tallgrass Savannah Herbaceous	16.62	1.47%
Ponderosa Pine Temporarily Flooded Woodland	4.4	0.39%
Ponderosa Pine Woodland	224.96	19.83%
Purple Three-awn Herbaceous	1.79	0.16%
Rock Outcrop Sparsely Vegetated	2.37	0.21%
Rocky Mountain Juniper Woodland	1.0	0.09%
Rocky Mountain Maple Temporarily Flooded Shrubland	2.64	0.23%
Switchgrass Seasonally Flooded Herbaceous	0.67	0.06%
Wax Currant Shrubland	9.62	0.85%

In addition to the vegetation alliance survey, the Colorado Natural Heritage Program (CNHP) also surveyed portions of Betasso Preserve as part of a larger countywide inventory of rare and imperiled species and habitats between 2007 and 2008. Although official survey results were not published at the time of this management plan, preliminary results suggest that Betasso Preserve, including the Benjamin property, has a “high biodiversity significance” and identified in the drainages of Betasso Preserve beaked hazelnut, wild sarsaparilla, and black snakeroot, which are each very uncommon in Colorado (CNHP 2008). In addition, CNHP called out a good occurrence of the “globally vulnerable” Douglas fir / waxflower lower montane forest and a good- to fair-occurrence of the “globally vulnerable” ponderosa pine / spike fescue foothills ponderosa pine savannah at Betasso Preserve (CNHP 2008).

b. Discussion. Currently, Betasso Preserve retains much of a typical Front Range foothill ecosystem with its distinct plant communities. Very steep to gentle, forested slopes interspersed with grassy meadows, rock outcrops, and intermittent drainages characterize the site. The 2008 vegetation survey identified a total of 209 native plant species throughout Betasso Preserve (Appendix G). The upland habitat of Betasso Preserve can be characterized as ponderosa pine and mixed conifer woodlands and forests with openings composed of native and non-native grass and forb species. Douglas fir is primarily found on the north and west facing slopes and wetter drainages, while ponderosa pine is typically found on the more xeric (dry) south- and east-facing slopes. The majority of the ponderosa pine-dominated communities within Betasso Preserve are currently outside of their historic range of variability, meaning the density of trees is much higher than historic densities due to fire suppression and past grazing. The Douglas fir-dominated systems, however, historically had higher densities, as is seen today.

The condition of the grassland and forest understory vegetation in the eastern portion of Betasso Preserve is moderately disturbed due to past agricultural production (grazing and hay production), mining, and recreational uses. Native grass and grass-like species, including blue grama, sideoats grama, Ross's sedge, needle-and-thread grass, Junegrass, spike fescue, mountain muhly, western wheatgrass, switchgrass, big bluestem, and little bluestem, dominate some areas. Other areas have a high incidence of non-native pasture grasses (e.g. Kentucky bluegrass, crested wheatgrass, smooth brome, timothy) and invasive weedy grasses and forbs within the understory (e.g. cheatgrass, Japanese brome). In contrast, the understory shrubs, grasses and forbs on the Benjamin property to the west are mostly native species with a lower occurrence of non-native and invasive species. Overall, the understory vegetation in the mixed conifer forests of the Benjamin property is in relatively good condition with relatively high diversity of plant species. The steepness of the site has presumably limited human activity, especially livestock grazing, within the area, thus limiting the introduction of many non-native species. Native shrubs interspersed throughout the site include such species as mountain mahogany, kinnikinnick, wax currant, white sage, and Oregon grape. A total of 135 species of native forbs were identified at Betasso Preserve in 2008 and included yarrow, sulphur flower, yellow stonecup, gayfeather, big flower cinquefoil, wallflower, and Britton's skullcap, among many others.

The Fourmile Creek riparian corridor is a diverse mix of native deciduous trees and shrubs (e.g. plains cottonwood, lanceleaf cottonwood, bluestem willow, sandbar willow, skunkbush, chokecherry, plum, boxelder, western snowberry, wax currant, alder, Rocky Mountain maple, and river birch), but has a number of non-native herbaceous species (e.g. smooth brome, orchard grass, common plantain, and Canada thistle). Arkansas Gulch and other intermittent drainages are composed of a mix of Douglas fir and deciduous shrubs. Significant tree and shrub species in these drainages include three members of the Birch Family, including river birch, alder, and beaked hazelnut. Beaked hazelnut is uncommon in Colorado and may be a relict species from when the Front Range received more precipitation. It currently occurs in more moist conditions, such as the drainages of Betasso Preserve. Also of significance is the occurrence of other relict

plant species, snakeroot and wild sarsaparilla, which are more typical of eastern U.S. woodlands. These species are a component of the deciduous tree and shrub plant associations found in the moist gulches and riparian areas.

Non-native invasive species are found in various sections of Betasso Preserve. These include Canada thistle, whitetop, bull thistle, bindweed, St. Johnswort, peppergrass, fieldcress, myrtle spurge, leafy spurge, cheatgrass, and Japanese brome. Many of these species are mapped and controlled annually by BCPOS's weed management program. An integrated pest management approach is utilized to manage State and County listed and other invasive species.

3. Wildlife. BCPOS currently has three full time wildlife biologists. The staff conducts wildlife surveys and habitat improvement projects, monitors wildlife populations, and provides input for management decisions regarding wildlife on open space properties.

a. Surveys. BCPOS wildlife staff conducted wildlife surveys throughout the northern portions of Betasso Preserve between winter and fall 2008, focusing solely on areas north of the current Canyon Loop Trail. Two primary wildlife survey techniques were utilized, remote cameras and bird point count surveys. The purpose of these wildlife surveys was:

1. to document the diversity of species on-site,
2. to provide information about wildlife on Betasso Preserve to assist with resource and trail planning and management, and
3. to gain insight on the ecology of the area in order to guide long-term management of the property.

Wildlife staff systematically placed four, baited remote cameras in areas of interest based on landscape features such as rocky outcrops, drainages, travel corridors and the permanent spring. The camera surveys were conducted in the winter, spring, and summer of 2008 to obtain seasonal variation. Species detected via the remote camera survey included American marten, gray fox, red fox, black bear, pine squirrel, Abert's squirrel, Steller's jay, common raven, American crow, black-billed magpie, mule deer, and domestic dog. Based on the habitat types present and general knowledge of the life histories of each species, all species detected were expected to be present on the property with the exception of the American marten and gray fox, which are uncommon to rare at the edge of their elevational ranges. The marten detection occurred at the lower end of the typical elevation range of the species, and gray fox is limited in general (see Appendix H for more details and discussion regarding surveys and results).

In addition to the camera surveys, six point-count stations for bird species were established during the 2008 avian breeding season with the intent to spatially sample the entire Benjamin property. Ten stations already exist in the sampling regime from past efforts on Betasso Preserve. Survey stations were systematically placed to coincide with variable habitat elements including habitat edges, closed canopies, riparian areas, and meadows. Wildlife staff utilized the Rocky Mountain Bird Observatory point transect protocol (Leukering et al. 2006). In addition, wildlife staff recorded all bird species

detected during general field trips to the property, which allowed for a general census during the time period outside of the protocol season. In total, 37 bird species were recorded, which indicates high avian diversity. This high diversity is attributable to the variable and highly diverse habitat components on the Benjamin property.

Other signs of wildlife use (e.g. tracks, scat, nests, and markings) were also documented during periodic site visits by wildlife staff. These included American marten tracks in snow adjacent to the remote camera station where it was captured on film, and bear, lion, deer, squirrel, raptor, and elk sign throughout the property. Appendix I provides a complete wildlife species list for Betasso Preserve.

Wildlife surveys completed in 2008 focused primarily on the Benjamin acquisition and the northern portion of “original” Betasso Preserve and provided baseline conditions. Baseline surveys were also conducted on the original Betasso acquisition. In 1983, bird surveys (point counts and incidental sightings) were conducted on the “original” Betasso Preserve, and a total of 44 avian species were documented (BCPOS 1985). Portions of this transect were again surveyed in 1985, 1986 and 1987 in various seasons and with varying effort. No more than 11 species were detected during these survey attempts. However, additional surveys conducted along the transect in 2004, 2005, and 2006 detected 34, 30 and 40 avian species, respectively. This transect will be surveyed again in 2011.

In addition to the avian point count surveys, a general mammal survey was conducted on the “original” Betasso property in 1985 for inclusion into the 1985 management plan (BCPOS 1985). In total, 10 mammal species were documented on Betasso Preserve, but no attempt to quantify numbers of individuals was made. All of these species are currently still present on the property, with the exception of porcupine. Porcupines have significantly decreased in Colorado in the lower montane, and the reason for this is unknown.

In addition to BCPOS’s wildlife surveys, the Colorado Division of Wildlife (CDOW) is currently conducting a multi-year study to better understand the behavior of mountain lions (cougars) in the vicinity of urban areas along the Front Range, including the interactions between mountain lions and humans (Alldredge and Freddy 2008). Begun in 2007, the study area extends from the Boulder-Larimer county line to Interstate 70 along the Front Range. Many of BCPOS’s properties are included in this study as trapping, releasing, and tracking sites, including Betasso Preserve.

Although delineation of home ranges was not a stated objective of the study, the CDOW investigation has found that a portion of the home ranges of four different adult mountain lions are in the vicinity of Betasso Preserve, as well as extending far beyond its borders (pers. com. Matt Alldredge, CDOW, 2008, documented between June 2007 and August 2008). Three of these individuals are adult females, which in some years may have offspring. The presence of these females in the area corroborates local knowledge of mountain lions with kittens. The CDOW monitoring has not, however, pinpointed any special areas or den sites within Betasso Preserve to date. As the CDOW study is a long-

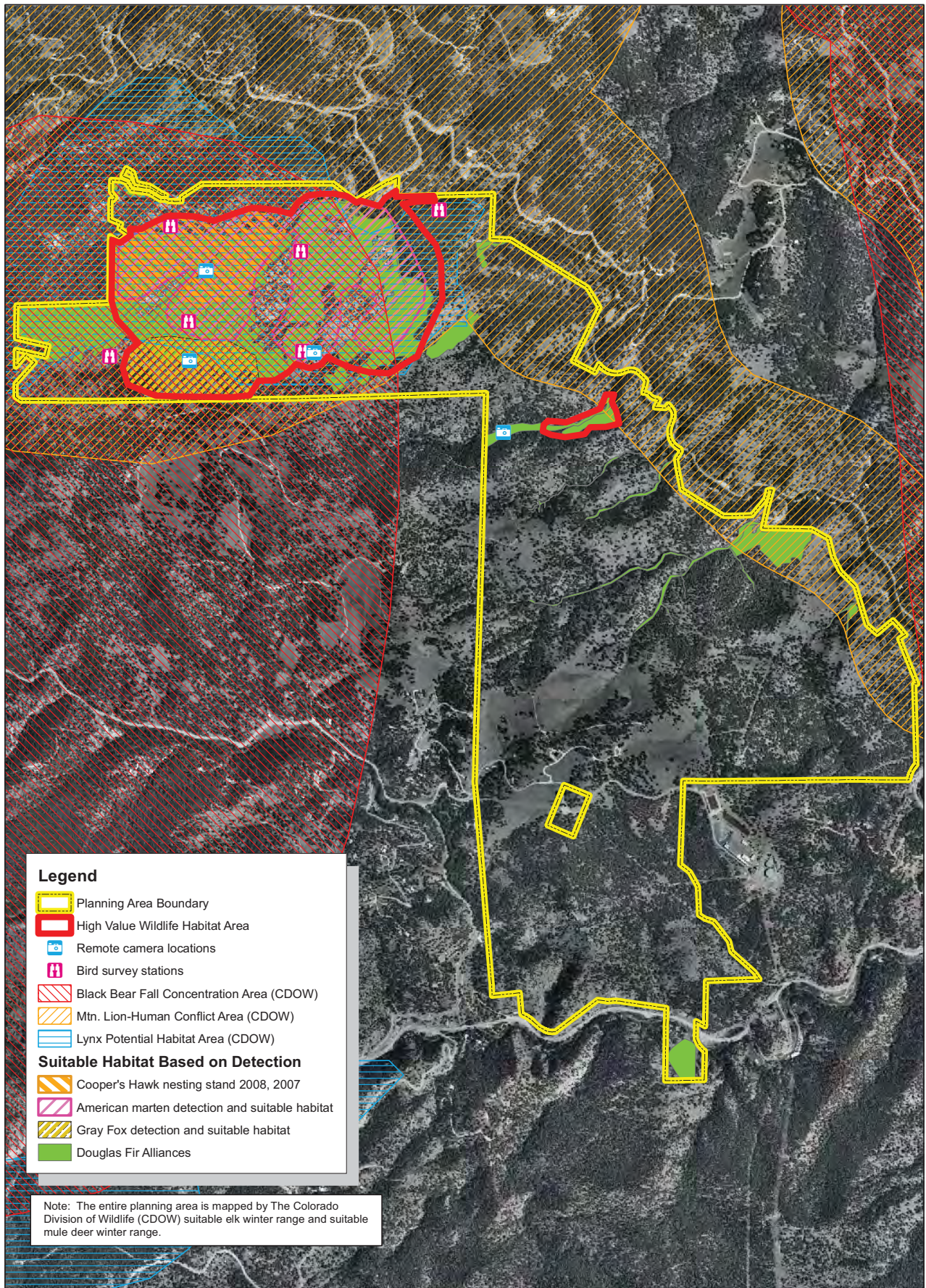
term effort, important information about mountain lions throughout the region will undoubtedly be revealed and may help with the management of Boulder County open spaces, including Betasso Preserve.

Finally, an independent study of butterflies within the Benjamin property was conducted during the spring and summer 2008 (Sportiello and Chu 2008). This study, which was sponsored by BCPOS's small grants program, found forty-seven butterfly species within the Benjamin property. These included several species of special interest, including California tortoiseshells, hedgerow hairstreaks, and a Behr's hairstreak. No rare or imperiled species were observed, but the potential habitat for these species occurs on the property. Three primary butterfly habitats within Benjamin were identified. These included the ridgetop near Alaska Road, the high meadow along the ridge to the east of Arkansas Mountain, and a meadow located near the confluence of Arkansas Gulch and Fourmile Creek.

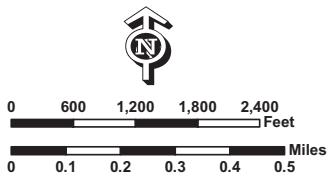
b. Discussion. Based on the results of the wildlife surveys and an understanding of wildlife ecology and life history requirements, BCPOS wildlife staff delineated an area of "high value wildlife habitat" (Figure 7, Appendix H). This designation was made due to the species found in the area, especially American marten, gray fox, and Cooper's hawk, among others, as well as a variety of important and essential habitat features that make the site suitable for a variety of wildlife species. These important features include riparian areas and densely vegetated drainages, water sources (i.e. natural springs), mines (i.e. potential den sites or hibernacula), rare or unique plant associations, densely timbered north-facing slopes, wildlife travel corridors, a skyline ridge, raptor nests, and rocky outcrops. Additionally, the high value wildlife habitat area is also important for its relatively large, undisturbed, and insular nature. These conditions exist in only a few locations within Boulder County below 8000 feet in elevation and are important for numerous wildlife species. This collection of habitat conditions does not exist within the boundaries of the remainder of Betasso Preserve, which is composed of forest structure typical of the lower montane.

In addition to the BCPOS's surveys, a number of CDOW's wildlife designations occur over the Benjamin property as well. These include mountain lion human conflict area, elk winter range and severe winter range, black bear fall concentration area and human conflict area, mule deer winter range, and Canada lynx potential habitat. Also, ERO Resources, a private consulting firm that conducted the rapid resource assessment for the Benjamin property and northern Betasso Preserve in 2007, called out the Benjamin property as being important for wildlife (ERO Resources Corp. 2007, Appendix L). This report stated:

From a regional perspective, this study area is one of the largest patches of contiguous habitat in the Boulder foothills. Two of the existing (social) trails and other disturbances are on the periphery of the study area, leaving a piece of central core habitat area that is unfragmented by roads and trails and sees little, if any, human disturbance. This area is known to support habitat for black bear and mountain lion, in addition to many other wildlife species. While the long-term conservation of the Benjamin Property will protect habitat values from



Betasso Preserve Management Plan
Figure 7



Wildlife Map

development, the management of habitat, trails, and public use should seek to maintain the integrity and continuity of the core habitat area. (ERO Resources Corp. 2007, p. 21)

The CDOW designations and Rapid Resource Assessment provide additional support for designation of the high value wildlife habitat area.

As stated above, the habitat types and conditions that exist in Betasso Preserve south of and including the Canyon Loop Trail are well represented within the County Open Space system and throughout the Front Range. This area is mainly characterized by east-facing, open stands of ponderosa pine interspersed with meadows typical of lower montane forests below 8000 feet along the Front Range. It contains a few of the cool, moist drainages similar to those found in the Benjamin survey area, but not in the same forest/aspect context. Another difference between the two areas is the presence of the three large meadow areas in the vicinity of the trailheads. These meadows are adjacent to infrastructure, roads, and trails, and have been altered (or created) by crops, grazing, planting, and/or haying. A further difference in habitat quality exists between the two areas, in the long-term, persistent presence of people and their infrastructure on the “old” Betasso Preserve. So, while excellent wildlife habitat exists within the remainder of Betasso Preserve, it is not in the unique context representative of the “high value wildlife habitat” area found within the Benjamin property (Figure 7).

4. Forestry and Fire. BCPOS currently has six full time staff within its forestry and fire group. The forestry and fire staff inventories and surveys forest stands to assess the overall forest condition, implements management prescriptions based on the results of these inventories and surveys to improve the health and vigor of trees and reduce fire danger, works with wildlife staff to improve or maintain wildlife habitat, and maintain and preserve the aesthetic and ecological values of forests on open space properties. In 2008, the forestry and fire team surveyed Betasso Preserve.

a. Discussion. The majority of forested ecosystems across Betasso Preserve are within the lower montane zone. The historic forest type in this area was probably an uneven-aged mix of ponderosa pine and Douglas fir, which was present across the lower montane landscape for many centuries prior to European settlement, which occurred around 1860. Historical photos, settlers notes, fire ecology studies with fire scars and tree rings, and the dry climate preserving old logging evidence, all suggest a low density uneven-aged forest historically that consisted of about 10-60 trees per acre with a basal area range of 20-60 square feet per acre. These trees grew in clumps that varied in size and shape, and there were many small, medium and large size openings in between these clumps. These forested ecosystems below 8000 feet were subject to frequent, low-severity disturbances such as grazing and surface fire. Fire intervals historically ranged from 10-30 years. These low-severity frequent surface fires consumed surface fuels and consumed high percentages of seedlings and saplings that had established between fire events. Southern aspects at low elevation were even drier and had tree densities as low as 5-10 trees per acre. North facing aspects in the lower canyons historically had a higher tree density, and Douglas fir was also a component. These slopes did not burn as frequently as the south,

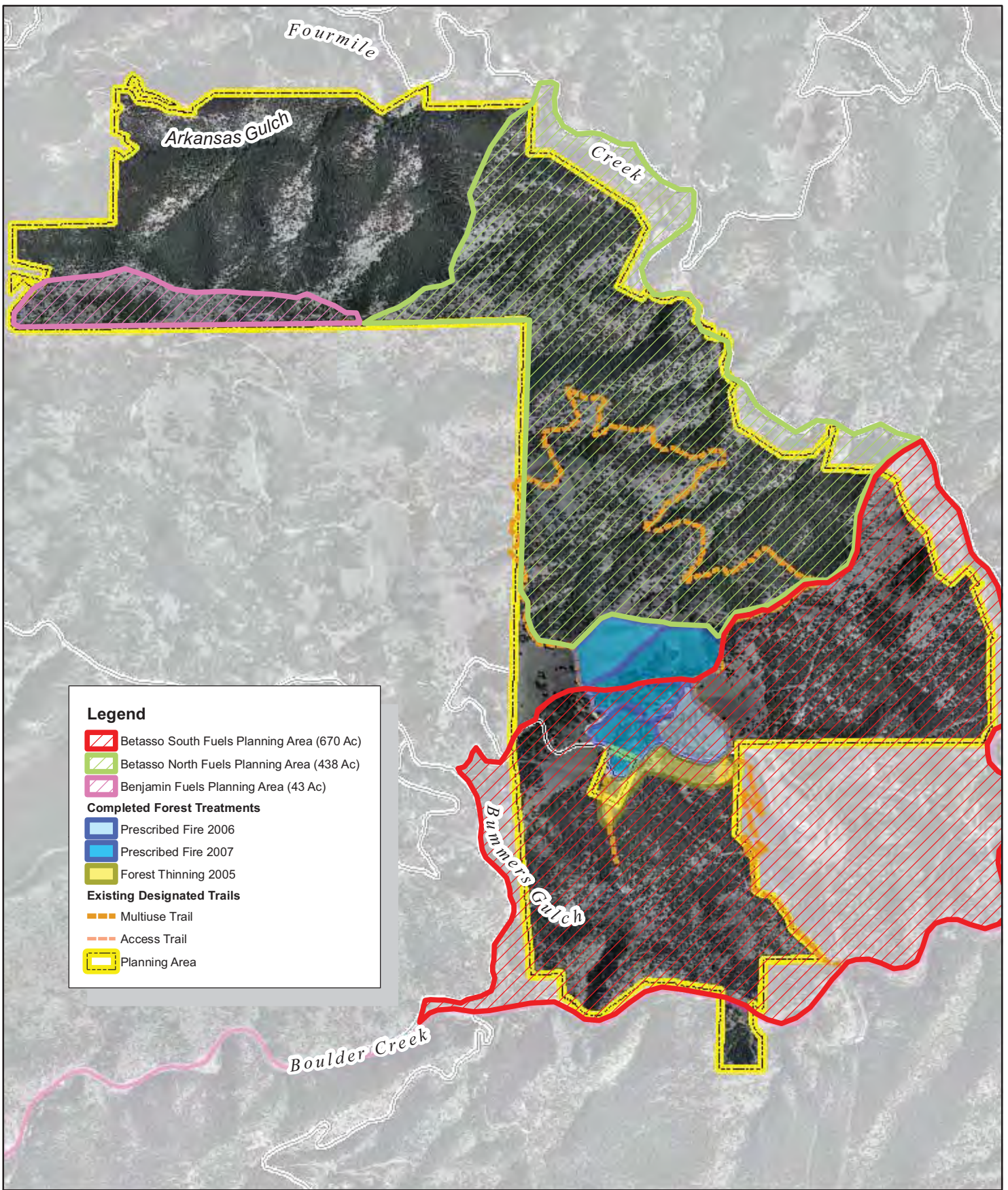
west and east aspects, and the fire severity on north facing slopes was more mixed with some stand-replacing events. Bark beetles were probably also agents of change at the stand level, rather than the landscape level, due to low tree densities in the historical lower montane forests. That was not the case for the higher elevation forests to the west.

Betasso Preserve currently is outside of its historic range of variability for low-elevation ponderosa pine-dominated ecosystems. A high percentage of the area consists of south and east aspects. Juniper is present on the low elevation, south and east aspects, which acts as a ladder fuel to increase the chance of fire getting into the canopy. Due to past overgrazing and fire suppression, the current densities are ranging from 60-2000+ trees per acre with basal area ranging from 60-200+ square feet per acre. Disturbances now occur infrequently and are more moderate-to-severe when they do occur. Bark-beetle activity will have a greater chance of higher mortality due to the density and lack of age diversity. Snags are also lacking on the property. The area is within the wildland urban interface of the City of Boulder, including its water treatment plant, which is located in the southeast corner of Betasso Preserve. Homes are also present around the entire property.

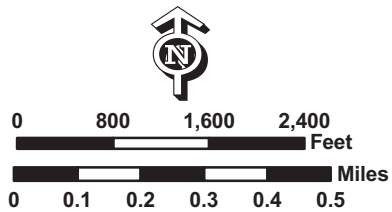
The Benjamin property is located near the upper end of the lower montane life zone. A high percentage of this property consists of north aspects. Qualitative observations show more evidence of mixed-severity fire on this property. Overall, the historical interval between fire events increased with increasing elevation. With longer periods between fire events and greater accumulations of fuel, these fires had components of moderate- and high-severity stand replacing events. Currently, there are small east-facing aspects near the intermittent drainages that are outside of their range for historical tree densities. While the rest of the property has increased in tree density, the higher elevation north-facing slopes on the Benjamin property had higher tree densities historically. This remains to be the case currently, and there is an old-growth component to some of the higher elevation Douglas fir dominated stands

Between 2006 and 2008, BCPOS has burned with prescribed fire fifty-five acres near the Canyon Loop trailhead and near the water treatment plant. An approximately 20-acre shaded fuel break was completed in 2005 on the south side of the water treatment plant between the Bumpers Rock trailhead and the water treatment plant. Future forest management should emphasize forest restoration that will allow restoration of ecosystem processes such as fire.

Figure 8 shows the high priority forestry management units that have been identified by forestry staff for future management. The forestry and fire staff recommends that an uneven-aged ponderosa pine forest be maintained on the south, east and west aspects with a basal area range of 10-80 square feet per acre. An uneven-aged ponderosa pine and Douglas fir forest on north aspects and in riparian zones should also be maintained. The basal area range in these areas should range between 40 and 150+ square feet per acre. The highest priority for forest management is in the southern portion of Betasso Preserve due to the infrastructure associated with the Betasso Water Treatment Plant, the Canyon Loop trailhead, and adjacent homes (Figure 8).



Betasso Preserve Management Plan
Figure 8



Forestry Map

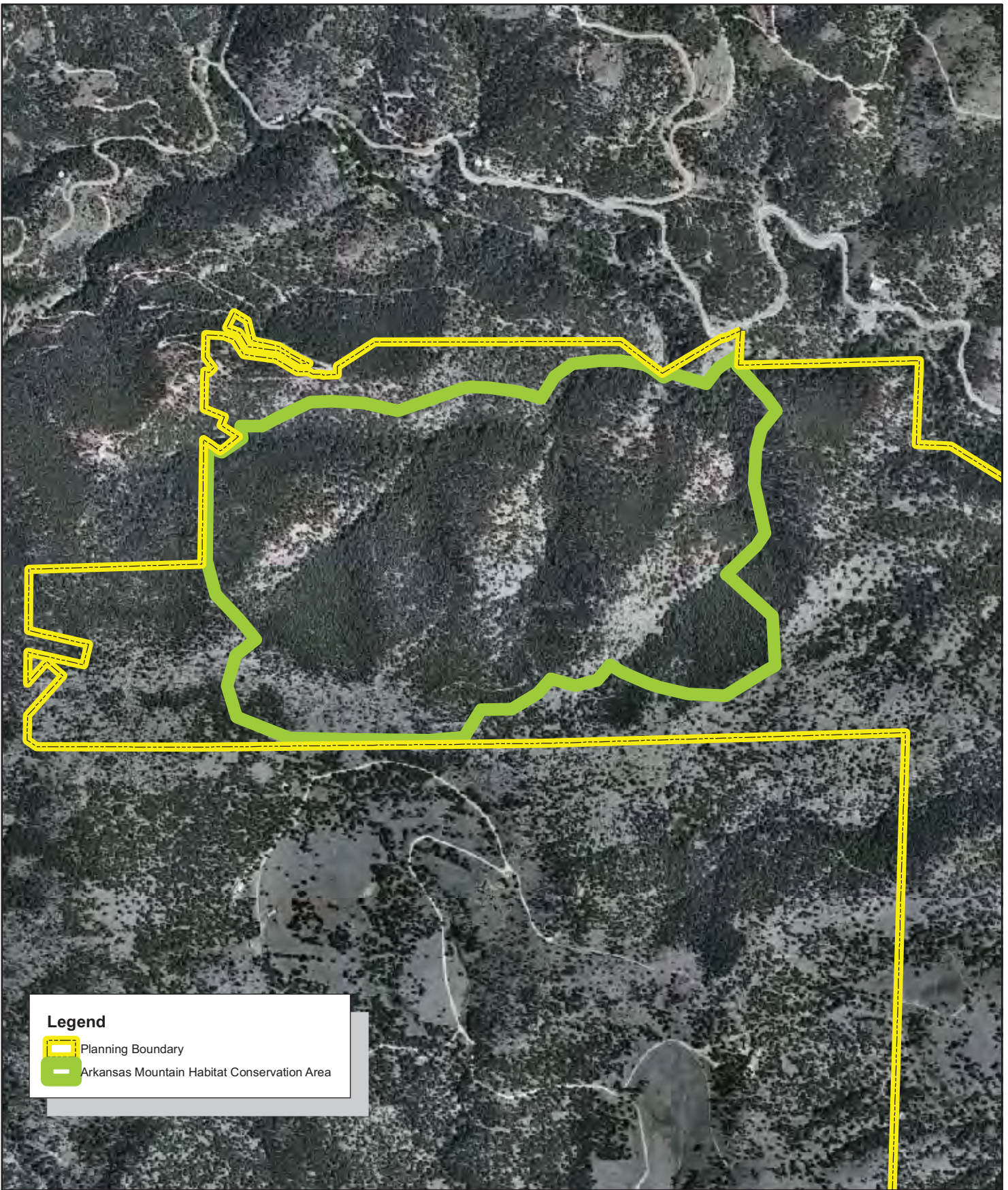
Due to lack of access and very steep terrain within the Benjamin property, forestry management options are limited. Fourmile Fire Protection District has recently completed a shaded fuel break along Alaska Road for emergency access to homes on that road. BCPOS recommends that a higher density mixed and uneven-aged ponderosa pine and Douglas fir forest be maintained in this area for wildlife species dependent on higher density forests.

B. Natural Resources Management



1. Staff Recommendation. To protect and preserve the most significant wildlife habitat and unique and rare plant species, BCPOS staff recommends the creation of the Arkansas Mountain Habitat Conservation Area (HCA) within a 202-acre section of the Benjamin property (Figure 9). The HCA will protect a portion of the high value wildlife habitat area that was identified by wildlife and vegetation surveys. The area has numerous values that, when combined, make it highly significant and unique, thus supporting the creation of the HCA. These include:

- A diverse landscape mosaic comprised of drainages, ridgelines, rock outcrops, rugged topography, perennial and intermittent springs, and distinct open east-facing slopes and densely-covered west-facing slopes that provides for diversity of plant and wildlife species
- Relatively large, isolated, intact habitat which is scarce in the surrounding area
- North-facing slopes that support dense Douglas fir forest cover at an elevation below 8000 feet that is important for wildlife and unique to BCPOS's properties
- Movement corridor, food sources, potential den sites, and protected resting areas for large mammal species including black bear, mountain lion, and mule deer
- Perennial springs which are vital for wildlife species
- Relatively high diversity of bird species (37 species identified in 2008)
- Uncommon-to-rare species including gray fox and American marten
- Rare and unique plant species including beaked hazelnut, wild sarsaparilla, and black snakeroot
- The cumulative significance of the natural resource values within the HCA

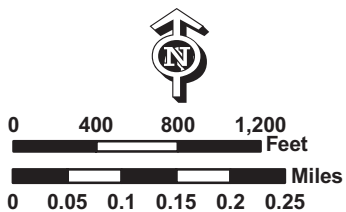
In addition, throughout all of Betasso Preserve including the HCA, BCPOS will help maintain and perpetuate native plant and wildlife diversity through a variety of potential management tools, including integrated pest management, mechanical thinning of forests, prescribed fire, native plant restoration, soil stabilization, and installation of necessary wildlife structures such as blue bird boxes. Where necessary and feasible, staff will actively manage the natural resources in accordance with the ecological processes that have shaped the area's landscapes and the species that inhabit them and the desired future conditions for the site. BCPOS resource staff will utilize the best available science and an adaptive management approach to ensure the longevity of the property's ecosystems and their long-term adaptation to environmental changes. Periodic natural resource surveys and research projects will be undertaken to track changes over time and guide management actions.



Legend

-  Planning Boundary
-  Arkansas Mountain Habitat Conservation Area

Betasso Preserve Management Plan
Figure 9



***Arkansas Mountain Habitat
Conservation Area***

2. Natural Resource Goals, Objectives, and Management Strategies

NR Goal 1. Protect, preserve, maintain, and restore the ecological integrity of Betasso Preserve's native ecosystems and the natural ecological processes that sustain them.

Objectives and Strategies

A. Natural resource management decisions and assessment of impacts to the resources from management activities and public use will be based on the best available science and accepted standards and practices.

1. Stay informed of current natural resource management issues through professional journals, conferences, and consultation with outside experts (e.g. CDOW, USFWS, CNHP, etc.) when necessary and apply to management decisions and assessments

B. Viable populations of existing native plant and wildlife species will be maintained throughout the site to the extent possible by using appropriate management tools.

1. Utilize integrated pest management, mechanical thinning of forests, prescribed fire, native plant restoration, soil stabilization, and installation of necessary wildlife structures such as blue bird boxes, where appropriate and necessary
2. Protect and preserve high quality habitat through the designation of the Arkansas Mountain Habitat Conservation Area, where there will be no public use, closure of social trails, and appropriate management
3. The exact boundary of the HCA will be delineated in the field by BCPOS staff and be defined with signs. Slight alterations to the east boundary of the HCA may occur to allow sufficient room for the construction of the adjacent trail, if necessary.
4. Protect and preserve habitat within other undeveloped areas of Betasso Preserve with closure of social trails, limited future trail development, and appropriate management
5. Prior to any land management activity, the effects of the activity on existing native plant and wildlife species will be taken into consideration to ensure that potential negative impacts are mitigated.

C. Sensitive resource areas, including any known or discovered nest sites for sensitive bird/raptor species, den sites for large mammals, or rare plant communities, will be protected from impacts from recreational use, trails, and other infrastructure.

1. Inventory any new trail corridor for sensitive resources before construction with potential for realignment based on findings.
2. Survey all trail corridors periodically during use for presence of sensitive resources
3. Institute temporary or seasonal trail closures where necessary and appropriate due to presence of sensitive resources
4. Use appropriate and necessary management tools within sensitive resource areas
5. Revegetate disturbed soils with native species where necessary and appropriate

D. An adaptive management approach will be utilized to ensure the most effective management of natural resources.

1. Develop plan of action based on current management goals and objectives and predicted outcomes based on current information and understanding
2. Implement plan of action
3. Monitor the resource prior to, during, and following the management action
4. Revise plans based on monitoring results and new information and understanding, and begin adaptive management process again

E. Biological data will be collected and analyzed on a regular basis to document existing plant and wildlife species, track trends in species composition and numbers, and assess the effects of management decisions.

1. Periodically monitor indicator wildlife species including raptors (goshawk), large carnivores, ungulates, bats, breeding birds, Abert's squirrel, and mesopredators (e.g. marten)
2. Reassess the need for remapping the vegetation within 10 years and re-map if necessary
3. Periodically re-assess forest condition

F. A matrix of habitat types and movement corridors will be provided for wildlife species.

1. High quality habitat and movement corridors will be protected and preserved with the designation of the Arkansas Mountain Habitat Conservation Area which will have no public use, closure of social trails, and appropriate management
2. Habitat and movement corridors within the remainder of Betasso Preserve will be protected through closure of social trails, limited future trail development, and appropriate management

G. Maintenance of native plant communities will be dependent on natural ecological processes, or prescriptions based on these processes, to the extent possible to allow ecological systems to function within their natural range of variability, thus encouraging healthy native plant communities.

1. To the extent possible, a hands-off approach to management of natural resource will be taken, allowing natural processes to occur. However, if necessary, appropriate, and desirable, active management (e.g. prescribed fire) will be undertaken.

H. Plant communities that have been significantly disturbed or degraded by past or current land uses will be revegetated and restored with appropriate native species where feasible and desirable.

1. Use local, native genotypic seed and plant stock whenever possible.
2. Prioritize and close existing social trails beginning in fall 2009.
3. Revegetate all disturbed soils adjacent to new trails or facilities or areas of excessive disturbance due to weed or forest management

4. Where necessary, appropriate, and desired, restore other disturbed plant communities within Betasso Preserve
5. Consult with cultural resource, operations, and other resource management staff when necessary to avoid potential impacts to other natural, cultural, and recreational resources due to restoration projects

I. Excessive soil erosion along trails, facilities, and elsewhere will be kept in check via appropriate erosion control measures to minimize impacts to habitats and water quality.

1. Implement best management practices for soil erosion during new trail construction and around any new or renovated facilities
2. Periodically monitor entire site to track changes in erosion and implement best management practices where necessary and appropriate

NR Goal 2. Manage forested ecosystems within Betasso Preserve within their natural range of variability, while first and foremost ensuring public safety.

Objectives and Strategies

A. The density of woody vegetation within forested systems will be managed based on historic density levels and desired future conditions.

1. Plan, develop, and implement forest management plan for Betasso Preserve based on best available science and accepted standards and practices.
2. Consult with cultural resource, operations, and other resource management staff when necessary to avoid potential impacts to other natural, cultural, and recreational resources due to forestry projects
3. Utilize mechanical thinning, which may include the use of temporary roads and landings and forest extraction equipment, and prescribed fire treatments, which may include construction of fire containment lines and temporary roads and fire equipment, where necessary and appropriate and with proper approvals
4. Monitoring of forestry projects will be completed to track and mitigate any potential erosion.

B. Mitigation measures will be pursued on-site to reduce the risk of catastrophic wildfire spreading to and from the site, while maintaining the site's ecological integrity.

1. Work with local fire protection districts, adjacent landowners, and other agencies on cross-boundary wildfire mitigation measures.

NR Goal 3. Control and suppress non-native invasive species.

Objectives and Strategies

A. Manage State and County listed noxious weeds and other undesirable non-native species throughout Betasso Preserve.

1. Survey and map State and County listed and other undesirable non-native species regularly
2. Utilize county weed management plan to identify State list A and B weed species, which require targeted control.

3. Utilize County-approved integrated pest management plan to control and suppress non-native species
4. Consult with cultural resource, operations, and other resource management staff when necessary to avoid potential impacts to other natural, cultural, and recreational resources due to weed management projects

NR Goal 4. Conduct natural resource research at Betasso Preserve

Objectives and Strategies

A. Natural resource research at Betasso Preserve will be conducted whenever possible to help formulate a better understanding of the resources present on-site and their response to various management scenarios.

1. Encourage and utilize BCPOS staff, outside researchers (e.g. university staff and students), BCPOS Small Grants recipients, and others to conduct research at Betasso Preserve whenever possible
2. Incorporate research finding in management planning where appropriate

V. Cultural Resources

A. Cultural Resources Evaluation

1. Prehistoric Use and Resources. Betasso Preserve lies within areas that have been designated as archaeologically sensitive in the *Boulder County Comprehensive Plan* (Boulder County 1999). Although there have been no reported archaeological finds at Betasso Preserve, the Platte River Valley, including the Front Range, was extensively utilized by early people. The first evidence of humans in Colorado dates back 11,000 to 12,000 years before present (BP), during the Paleoindian stage. The earliest documented cultures included the Clovis Period (12,000-11,000 BP), followed by the Folsom Period (11,000-10,000 BP) and finally the Plano Period (10,000-7500 BP). These early peoples had a nomadic lifestyle hunting mammoth elephants, giant bison, and other species of prey. The animals provided food, sinew for hafting weapons, hides for clothing and shelter, and bone for tools. Early hunters escaped the hot, dry periods on the plains by climbing a few thousand feet into the mountains where large game could be taken in summer months. Varied chipped stone tools are the primary artifacts that indicate the presence of these people in the area and are also used to distinguish between the three periods.

By approximately 7500 years ago, mammoths had become extinct, and attention shifted to previously unexploited resources as well as new technologies. The people of the Archaic Stage responded to the extinction of the large Ice Age animals by turning to plant resources as food sources. This is noted by the increase in frequency of ground stone implements. Hunters primarily sought deer, rabbit, and bison, where available. Due to hotter and drier conditions, it is believed that many people migrated to the high country. Vegetation zones and big game populations also shifted in response to climatic conditions. As the climate returned to cooler and wetter conditions, people moved back out onto the Plains, and bison hunting increased as their populations increased.

Around 150 A.D., the peoples of the Late Prehistoric stage adopted ceramic technology, a trait common to the Plains Woodland cultures, and increased use of horticultural practices including cultivating corn. Evidence has been found that these people utilized natural shelters and open campsites. Later, certain Mississippian attributes filtered into the territory just east of the Continental Divide. This combination of hunting, gathering, and horticulture continued for several hundred more years. Other cultural changes during this period included unique burial practices and the use of smaller projectile points and bow and arrows.

The Protohistoric/Historic stage (1540 - 1860 A.D.) is noted by the occupation and influence of Euroamericans. The historically recognized tribes within the region included the Arapaho, Cheyenne, Ute, Comanche, Apache, and Sioux. These people lived by hunting and gathering and planting crops in stream valleys. Bison was the primary source of food, shelter, and clothing. The introduction of the horse, metal and glass implements, and disease, as well as competition for resources and the systematic reduction of bison herds, greatly influenced the native peoples of this period. Displacement of native peoples from the area and the subsequent forced movement to reservations ended the native peoples' occupation of the region. By 1881, the last tribe, the Ute, was removed from the area.

2. Historic Use and Resources. Although Colorado achieved statehood in 1876, settlement of the state began in earnest in the 1850s following the discovery of gold near modern day Denver. Miners scoured the area trying to strike it rich. In 1859, rich placer deposits were discovered in an area just northwest of Betasso Preserve, subsequently referred to as Gold Hill. With mining as the backbone during the 19th century, commercial and agricultural development also sprung up along with the railroad and water diversion systems during the 1860s and 1870s.

By the 1870s, sawmills and mining operations got underway along Boulder and Fourmile Canyons. The town of Orodell was established at the junction of those two canyons, immediately adjacent to Betasso Preserve. A general store, post office, and school served the visitors and residents of Orodell. Five stages passed through Orodell daily, en route from Boulder to Nederland. In 1883, most of Orodell was destroyed by a fire, and in 1894, the sawmill and gold mill were destroyed in a flood.

In the early 1860s, the United States government financed the building of a military road up to Sunshine Canyon. The road, originally intended to cross Arapahoe Pass, was called the Gordon-McHenry Road after its two chief engineers. The road went to the top of Sunshine Hill, turned down Ritchie Gulch to Fourmile Creek near Orodell. At Orodell, the road turned to the northwest, crossing what is now Betasso Preserve. The road continued to Sugarloaf, and then on to Caribou. The road was never completed past Caribou. The portion of the road crossing the boundary of Sections 27 and 28 was not mentioned in the original land survey of 1875 (Kellogg 1875), and it may be assumed that the road did not extend to Betasso Preserve at this date. However, by 1902, the road was completed past Sugarloaf, as indicated by the first U.S. Geologic Survey map of the

area. The route was used as late as the 1950s as a major route to Sugarloaf (Ernie Betasso, oral history interview, 1977). Remnants of the Gordon-McHenry Road can be seen in Section 27, and in portions of Section 28, the road still exists in its original grade (see *Designated Landmarks and Cultural Resource Surveys* below).

It was eighteen years after the flood that destroyed Orodell before the land above it, now Betasso Preserve, was homesteaded. In 1912, the Blanchard family homesteaded the 160 acres of the SE ¼ of Section 28. In 1915, Steve Betasso, a hard rock miner from Crisman (Fourmile Canyon) purchased this small ranch. In 1920, Arthur Crews homesteaded most of the portions of Betasso Preserve in Section 27. In 1922, Ronald McDonald homesteaded the NE ¼ of Section 28 and the SE ¼ of Section 21. The Lindemuth family homesteaded the NE ¼ of Section 33 in 1922 (Appendix J).

Although none of the land that is presently Betasso Preserve was legally in private ownership before 1912, several cabins and/or other structures were present on the site as early as 1902. None of these structures, however, were described in the original land survey notes of 1875, and all should have been obvious from the survey line. One structure existed in the SW ¼ of Section 27 (Crews) and two in the SE ¼ of Section 28 (Blanchard). Few remnants are present from these structures.

When Steve Betasso moved to the land he purchased from the Blanchards, he lived in a small cabin with his family for three years, while building a larger home. This cabin, which must have been built between 1902 and 1915, was on government land that was not claimed until 1922. Ernie Betasso reported that the Blanchards might have built this cabin around 1912. The log cabin is in good condition and still stands in its original location.

A larger, brick home was built in part by Nick Fanti, a Boulder bricklayer. Steve and Mary Betasso, with their four boys and a girl, moved into this house in 1918. One of the boys, Julius, died this same year of influenza. Another son (Ray) left soon after to work in the mines near Caribou. In 1933, Ernie, the youngest son, married Mae Toots, a miner's daughter who grew up in Blackhawk. They met at a dance hall in Sugarloaf, the social center for the mountain men, miners, and ranchers in the area.

Ernie and his brother, Dick, expanded the ranch from its original 160 acres to over 2000 acres from their mining profits. By 1940, the Betassos owned approximately 373 acres of the Betasso Preserve, and by 1953, they owned 574 acres. Ernie and Dick operated the ranch on the side and worked in the mines until 1945. Ernie worked in mines on Poorman Hill, Salina, Gold Hill, Boulder Falls, Nederland, and Sugarloaf. He held a variety of jobs, from mucker to running hoist. From 1945 to 1959, Ernie worked at a Boulder sand plant.

Dick, two years older than Ernie, started the cattle ranching operation with thirteen head of cattle. Their ranching operation peaked at 125 head of cattle. They wintered their cattle on the ranch, the forage partially consisting of alfalfa hayed from the meadow north of the present Canyon Loop trailhead. Cattle were driven up Magnolia Hill to Tolland to

Mammoth Basin for summer range on U.S. Forest Service land. In 1964, when Dick passed away, Ernie sold the upper ranches, which are now Mountain Meadows – Mountain Pines and Pride of the West Subdivisions. In 1976, after Mae Betasso’s death, Ernie sold most of the cattle and all but 50 acres of his ranch.

Boulder County Parks and Open Space acquired 713.15 acres of the ranch from Ernie Betasso in 1977. Because of budgetary constraints, the property was divided into ten parcels and acquired by BCPOS under a lease and purchase agreement. BCPOS purchased the first parcel in 1977, and the final parcel in 1987. Following Mr. Betasso’s death in 1983, Boulder County entered into a purchase agreement with the Betasso Estate to purchase the remaining 50-acre homestead. Since 1977, BCPOS has built and maintained the trails, trailheads, and associated facilities at Betasso Preserve and has protected and managed the natural and cultural resources.

The 391-acre Benjamin property was purchased from Thomas and Karen Benjamin on May 30, 2007. The property has historically been vacant with no evidence of any permanent structures. It is made up of nine separate, but contiguous, parcels that the Benjamins purchased over the past 30 years. Not much is known about the historic ownership of the site. A 1953 Marden Map showed H. Copeland owning 340 acres of the southern portion of the site, and the remainder consisting of government lots (CTL Thompson 2007). The primary historic use on the site was mining, which occurred as early 1892 (CTL Thompson 2007). Portions of the Lottery King (date surveyed: July 16, 1892), Jupiter (July 16, 1892), Amzy (October 29, 1932), and Dixie Queen (April 10, 1916) lodes are located within the Benjamin property and are part of the Sugarloaf Mining District. Mine features include shafts, adits/tunnels, exploratory glory holes/pits, and mining roads or trails. A series of social trails were created over time across the property, which were used by mountain bikers, equestrians, and hikers for a number of years prior to Boulder County’s acquisition of the property (ERO Resources 2007). The historic Switzerland Trail also crosses the northeast portion of the property. This rail line was historically used as a railway for mining and later for tours into the mountains, and more recently was incorporated into the network of on-site social trails. Other potential past uses of the Benjamin property include grazing by livestock and timber harvest.

3. Designated Landmarks and Cultural Resource Surveys. On June 10, 1999, the Betasso Ranch Complex and Site (763 acres of the original Betasso Preserve including 713-acre Betasso property and 50-acre Betasso Homestead) was designated as a Historic Landmark under Article 15 of the Boulder County Land Use Code. This designation was granted for the site’s agricultural, ranching, mining, and Italian ethnic heritage significance (Appendix K). The Historic Landmark designation places certain restrictions on alterations to the site’s historic structures.

In 2007 and 2008, cultural resource surveys were conducted at Betasso Preserve with the purpose of providing an inventory of cultural resources to guide management decisions. The surveys included locating and recording visible archeological or historical resources and to evaluate these resources for eligibility to the National Register of Historic Places (NRHP), State Register of Historic Properties (SRHP), or local landmarking.

A cultural resource survey for the 391-acre Benjamin property was completed between August and October 2007 (Native Cultural Services 2008). Six historic sites were documented including:

- A segment of the Switzerland Trail of America (also referred to as the Denver, Boulder, & Western Railroad) and associated features, including some milled planks, a circular platform, rock-lined gully crossing, and leveled areas which may have been used for tent foundations during construction or for storage. Constructed around 1897 or 1898 for mining purposes and later used to take tourist to the mountains and to haul freight for the construction of Barker Reservoir in Nederland.
- Five separate mine or mine complex sites all from the early 20th century. Likely gold or tungsten mines that were not extensive in scope.

The remainder of Betasso Preserve was surveyed for cultural resources in May 2008 (RMC Consultants, Inc. 2008). Twelve historic sites and thirty-two historic isolated finds were documented including:

Historic Sites

- Four sections of Gordon-McHenry Wagon Road, which was constructed in the early 1860's from the City of Boulder to the top of Sunshine Hill, then down Ritchie Gulch to Fourmile Creek near Orodell, then northwest across Betasso Preserve to Sugarloaf, and then on to Caribou. Heavily utilized by locals until 1874 when Boulder Canyon Drive was constructed. Road used sporadically until 1950s. A 2740-foot section of road currently used as portion of Canyon Loop Trail. Determined not eligible for NRHP in 2001.
- Access road for Betasso Homestead, 4121 feet long, within central portion of Betasso Preserve and likely associated with historic ranching operations. A portion of road is currently part of Canyon Loop Trail
- Portions of historic metal pipeline, 2294 feet long, possibly related to historic Lakewood Pipeline built in 1907 and portions reconstructed in mid-1950s.
- A building foundation consisting of 60 stones of unknown date or purpose, along with widely scattered metal artifacts including indeterminate metal fragments, four bundles of baling wire, and a metal pipe. On flat ridge near west parking lot.
- Two collapsed structures. One is located in an open meadow on northwest-facing slope and was potentially a barn or other enclosure. Includes associated access road and some metal artifacts. The other structure is located on a small bench on an east-facing slope in a meadow and was potentially used as an enclosure for winter-feed storage. Metal artifacts including food cans, square cut nails, and wire nails also present.
- A trash dump with two small enclosures around natural springs. Enclosures consist of a small, notched log structure and a small concrete water trough with associated metal pipe. Dump consists of over 50 bundles of smooth wire, corrugated sheet metal, barbed wire, and a metal bucket. Remnants of wagon also present.

- A collapsed mine adit with associated waste rock pile and road or footpath. Located on a northeast-facing slope in vicinity of Bummer Rock
- The Ronald McDonald cabin with a probable coal bin on exterior of east wall and an outhouse, fenced enclosure, and road remnant within vicinity. Constructed in 1919 by Ronald McDonald and purchased by the Betassos in 1924.
- A habitation site consisting of building foundation, a pit of unknown function, four hearth features, possible remains of privy pit, and scattered artifacts including glass fragments, ceramic fragments, and sanitary cans. Located on ridge above townsite of Orodell adjacent to Gordon-McHenry Wagon Road.
- Two stone circles of unknown origin, age, or affiliation. One located on an east-facing ridge slope near east boundary, potentially a 1970's "New Age" stone circle. The other located on a northeast-facing ridge slope, at treeline, adjacent to a meadow within central portion of Betasso Preserve.

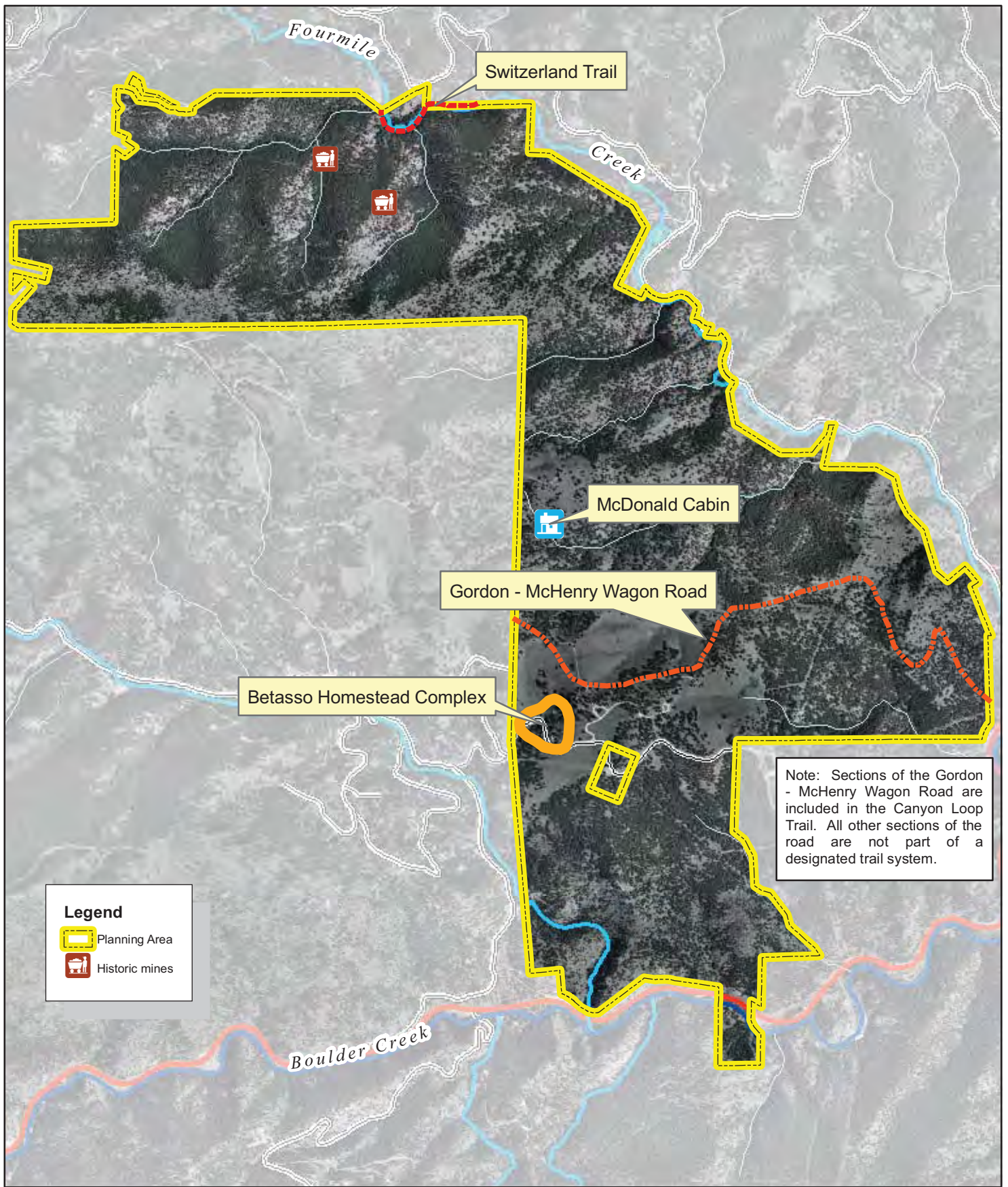
Historic Isolated Finds

- Scattered metal artifacts
- Farm machinery
- Prospect pits

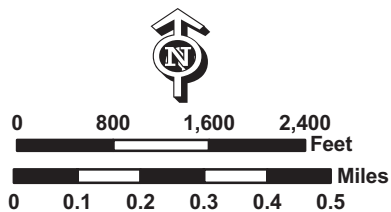
In addition to the documented on-site cultural resources, a number of other historic sites occur within the vicinity of Betasso Preserve (Native Cultural Service 2008). These include historic mines, historic roads, the Crisman townsite, the Orodell townsite, and the Iron Soda Spring. The summit of Arkansas Mountain, which is privately owned by the not-for-profit Running Horse Foundation, is considered a sacred site by a number of people, including some Native American groups (Gleichman 1993).

B. Cultural Resources Management

1. Staff Recommendations. Figure 10 shows the locations of many of the cultural resources on-site. Staff continues to recommend the protection and preservation of all significant historic buildings, structures, and other features within Betasso Preserve including the buildings of the Betasso homestead, McDonald cabin, and associated structures and features. With the exception of any residential building or buildings used by the public, all historic buildings, structures, and features will be left in place and managed in a state of arrested decay. A future interpretive trail extending from the Canyon Loop Trailhead to the Betasso Homestead is recommended, as well as allowing future cultural resource interpretive signs to be installed near the trailhead and along the trails in appropriate locations. In addition, if possible and desirable, the genetic stock of the plum trees within the orchard adjacent to the McDonald cabin will be preserved, and the new trees planted in the orchard's current location to preserve the historic landscape of the area.



**Betasso Preserve Management Plan
Figure 10**



Cultural Resources Map

2. Cultural Resource Goals, Objectives, and Management Strategies

CR Goal 1. Preserve and protect the historic buildings, structures, and features within Betasso Preserve important to the cultural heritage of the property and Boulder County.

Objectives and Strategies

A. Prevent excessive deterioration of historic buildings and structures.

1. Inspect and evaluate historical buildings and structures periodically for necessary repairs
2. Consult with operations and resource management staff when necessary to avoid potential impacts to natural and recreational resources due to improvement projects
3. Implement improvement projects as necessary and as available funds allow.

B. Protect historic buildings and structures from vandalism and looting.

1. Regularly patrol historic sites for vandalism and looting

C. Preserve the historic landscape around the McDonald cabin

1. If possible and desirable, preserve the genetic stock of the plum trees within the orchard adjacent to the McDonald cabin

VI. Visitor Use and Services

A. Visitor Use and Services Evaluation

Since 1977, Betasso Preserve has offered the citizens of Boulder County a place to relax, rejuvenate, reconnect, and recreate and to learn about Boulder County's unique natural and cultural history. Overall, Betasso Preserve receives one of the highest ratings for open space experience from users who cite the natural beauty, trail maintenance, good biking, cleanliness, and scenic views for this high rating (BCPOS 2006). In the most recent five-year survey, Betasso Preserve received an average rating of 8.8 on a scale of 1-10 (1 being "poor" and 10 being "excellent"), compared to 8.4 for all BCPOS properties surveyed.

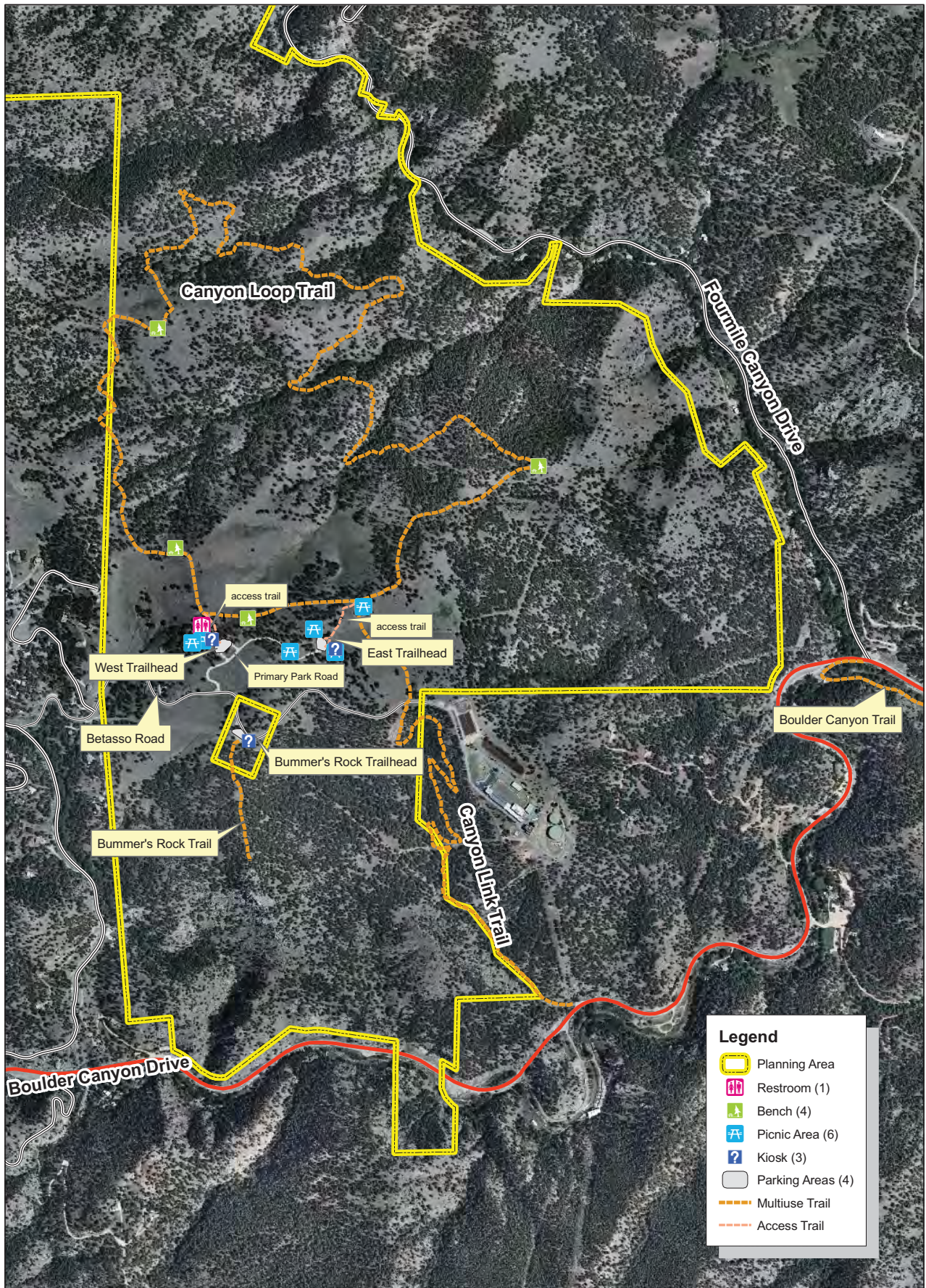
1. Current Facilities. Betasso Preserve contains three trailheads and one exclusive picnic area (Figure 11). The west trailhead, picnic area, and east trailhead are all accessed from the primary park road off of Betasso Road while the Bummer's Rock trailhead is adjacent to the paved Betasso Road, approximately 375 feet southeast of the beginning of the primary park road.

a. Primary Park Road. The primary park road begins at Betasso Road and terminates at the east trailhead and is the main vehicular entrance into the site. At the beginning of the road is a double leaf pipe gate, which allows for restricting vehicular access into the site. The primary park road is approximately 1500 feet long with an average width of sixteen (16) feet. The surface of the road is compacted road base.

b. West Trailhead and Associated Facilities. The west trailhead is located approximately 500 feet past the entry gate on the primary park road. This trailhead contains a parking lot, an informational kiosk, one isolated picnic table, a group picnic shelter with a grill, and a restroom. This trailhead directly accesses the southwest corner of the Canyon Loop Trail.

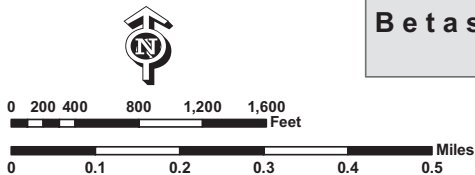
The west trailhead's parking lot provides eighteen (18) standard parking spaces, two (2) handicap parking spaces, and one parking space for a bus or vehicle with a horse trailer. Circulation through the parking area is one-way in a counterclockwise direction with the parking spaces generally oriented 30 degrees from perpendicular to the driveway. Parking spaces are delineated by timber curbing and recycled plastic wheel stops. The surface of the parking lot is compacted road base. There is one corrugated plastic drainage culvert on the south side of the parking lot, which diverts storm water run-off from crossing several parking spaces. There is no inlet or outfall structure associated with this culvert.

The informational kiosk at the west trailhead is the standard BCPOS full size mountain-style kiosk. The kiosk features an area map of Betasso Preserve, park rules and regulations, brochures, and other information and is located approximately 100 feet northwest of the parking lot and is accessed via a crusher fines trail.



**Betasso Preserve Management Plan
Figure 11**

Current Facilities



The group shelter is BCPOS's standard mountain-style shelter and features a concrete floor, four (4) picnic tables, and a grill. The shelter can accommodate approximately 40 people. The shelter is located approximately 300 feet to the west of the kiosk and is accessed via a crusher fines trail.

The restroom is BCPOS's standard mountain-style restroom. The restroom features two units, one designated for women's use and the other for men. The restroom is located approximately 450 feet north of the kiosk and is accessed by a crusher fines trail. There is also a crusher fines trail connecting the restroom to the shelter.

One wooden picnic table is located approximately 150 feet west of the shelter. There is no formal trail to the picnic table and it is situated on native soil. The picnic table can accommodate approximately 8-10 people.

In addition, the west trailhead contains one 'Bear-Saver' combination trash and recycling receptacle. The unit is located adjacent to the trail between the kiosk and the shelter. Additionally this trailhead contains old pieces of farm equipment located approximately halfway between the kiosk and restroom and situated in a grassy area approximately 20 feet west of the trail.

c. Picnic Area. The primary picnic area is located approximately 1000 feet past the entry gate on the primary park road. This area features a small parking lot and a couple of picnic tables. Located on the south side of the park road, the parking lot provides five standard parking spaces oriented perpendicular to the road. The parking spaces are delineated with timber curbing and recycled plastic wheel stops. The parking lot is surfaced with compacted road base. There are no drainage structures in this parking area.

Two picnic tables (one wood, one plastic coated metal) are located on the north side of park road, directly across from the parking lot. There are no formal trails in this area and the tables are situated on native soil. The picnic area can accommodate approximately 20 people. A social trail originates at the picnic area and extends to the east trailhead. There is one trash receptacle in the picnic area. The trash receptacle is a fifty-gallon metal container designed to prevent wildlife from getting into the trash. The trash receptacle is located approximately 50 feet west of the picnic tables.

d. East Trailhead and Associated Facilities. The east trailhead is located approximately 1300 feet past the entry gate on the primary park road. This trailhead contains a parking lot, an informational kiosk, and two picnic areas. This trailhead directly accesses the southeast corner of the Canyon Loop Trail and the Canyon Link Trail.

The east trailhead parking lot provides nine standard parking spaces. Circulation through the parking area is one-way in a counterclockwise direction with the parking spaces generally oriented 30 degrees from perpendicular to the driveway. Parking spaces are delineated by timber curbing and recycled plastic wheel stops. The surface of the parking lot is compacted road base. There are two corrugated plastic drainage culverts, one on

the west side and one on the north side of the parking lot, which divert storm water run-off. There are no inlet or outfall structures associated with either of these culverts.

The informational kiosk at the east trailhead is BCPOS's standard full size mountain-style kiosk. The kiosk features an area map of Betasso Preserve, park rules and regulations, brochures, and other information. The kiosk is located to the east of the parking lot and is accessed via many short crusher fines trails.

There are two picnic areas accessed from the east trailhead, one to the west and one to the east. The west picnic area is located approximately 100 feet from the parking lot and contains one wooden table that can accommodate approximately 8-10 people. There is no formal trail to the picnic table and it is situated on native soil. The picnic area to the east is located approximately 200 feet from the parking lot and kiosk and contains two wooden tables and a grill placed on a 4' x 4' concrete pad. The picnic area is accessed via a crusher fines trail and the tables are situated on native soil. The picnic area can accommodate approximately twenty (20) people.

The east trailhead contains one 'Bear-Saver' trash receptacle. This unit is placed on a concrete pad. The unit is located to the right of the kiosk adjacent to the trail to the east picnic area.

e. Bummer's Rock Trailhead. Bummer's Rock trailhead is located approximately 375 feet southeast of primary park road turn-off on Betasso Road and is on land owned by the City of Boulder. The City and County have an agreement to allow the County to use the site for a trailhead. This trailhead contains a parking lot and informational kiosk. This trailhead directly accesses Bummer's Rock Trail.

The parking lot is unstructured with no formal circulation or formal parking spaces. The lot is a large generally semi-circular area with the perimeter of the parking lot delineated by large boulders. The lot can accommodate approximately 18 vehicles oriented perpendicular to the perimeter. The lot can also accommodate two to four buses or vehicles with horse trailers if no other vehicles are present. The lot is surfaced with compacted road base and there are no drainage structures.

The informational kiosk is an older BCPOS style mini-kiosk. The kiosk features an area map of Betasso Preserve, park rules and regulations, and information about climbing at Bummer's Rock.

f. Drainage. Approximately 200 feet up the primary park road, a corrugated metal pipe diverts storm water run-off beneath the road. The pipe inlet is a relatively deep pit adjacent to the north edge of the road, protected by a couple segments of log rail fence. There is no inlet or outfall structure associated with this pipe. This pipe receives the majority of the run-off generated by the primary park road. Farther up the road a corrugated plastic culvert diverts storm water beneath the west trailhead egress. There is no inlet or outlet structure associated with this culvert. The culvert outfall is very close to the edge of the road and is marked by a t-post with a reflector.

g. Benches. Four benches are currently located around the Canyon Loop Trail. Two are located near the southwest corner of the trail, one is located at the north end of the trail, and one is located along the eastern portion of the trail.

2. Current Trail System. Betasso Preserve has three designated trails totaling 4.7 miles in length including the 3.2-mile Canyon Loop Trail, the 0.25-mile Bummer's Rock Trail, and the 1.25-mile Canyon Link Trail (Figure 11). All trails, except the Bummer's Rock Trail, are multi-use with some restrictions and allow passive recreational use only. Hikers, mountain bikers, trail runners, and horseback riders, among other users, utilize these trails year round. All trails are natural surface. Due to the nature of some sections of the existing Betasso trails, minor trail reroutes may be warranted.

a. Canyon Loop Trail. The 3.2-mile Canyon Loop Trail was constructed in 1981 with subsequent re-routes of steep and unsustainable portions of the trail in 1992 and 1999. The current trail includes portions of pre-existing roads on the south and west sides. These trails were built 2-3 feet wide and have expanded over time to an average of 8-10 feet wide. The remaining portions of the trail were built 2.5 feet wide and have expanded to an average of 3.5 feet wide with some isolated areas expanding to 8-10 feet in width. The average grade of the trail is roughly 8% with short stretches of 15-20%. Overall, the trail is in good condition with some localized areas of erosion. The Canyon Loop Trail is closed to mountain bikes on Wednesdays and Saturdays to allow other users a different and somewhat safer user experience. Equestrians and older and younger visitors, among others can enjoy the trail without the prospect of encountering the faster bicycle users on the sometimes-narrow trail. Mountain bikes are also required to go one way around the loop, with the direction changing monthly to provide a varied user experience. Betasso Preserve is currently the only BCPOS property with this suite of user regulations.

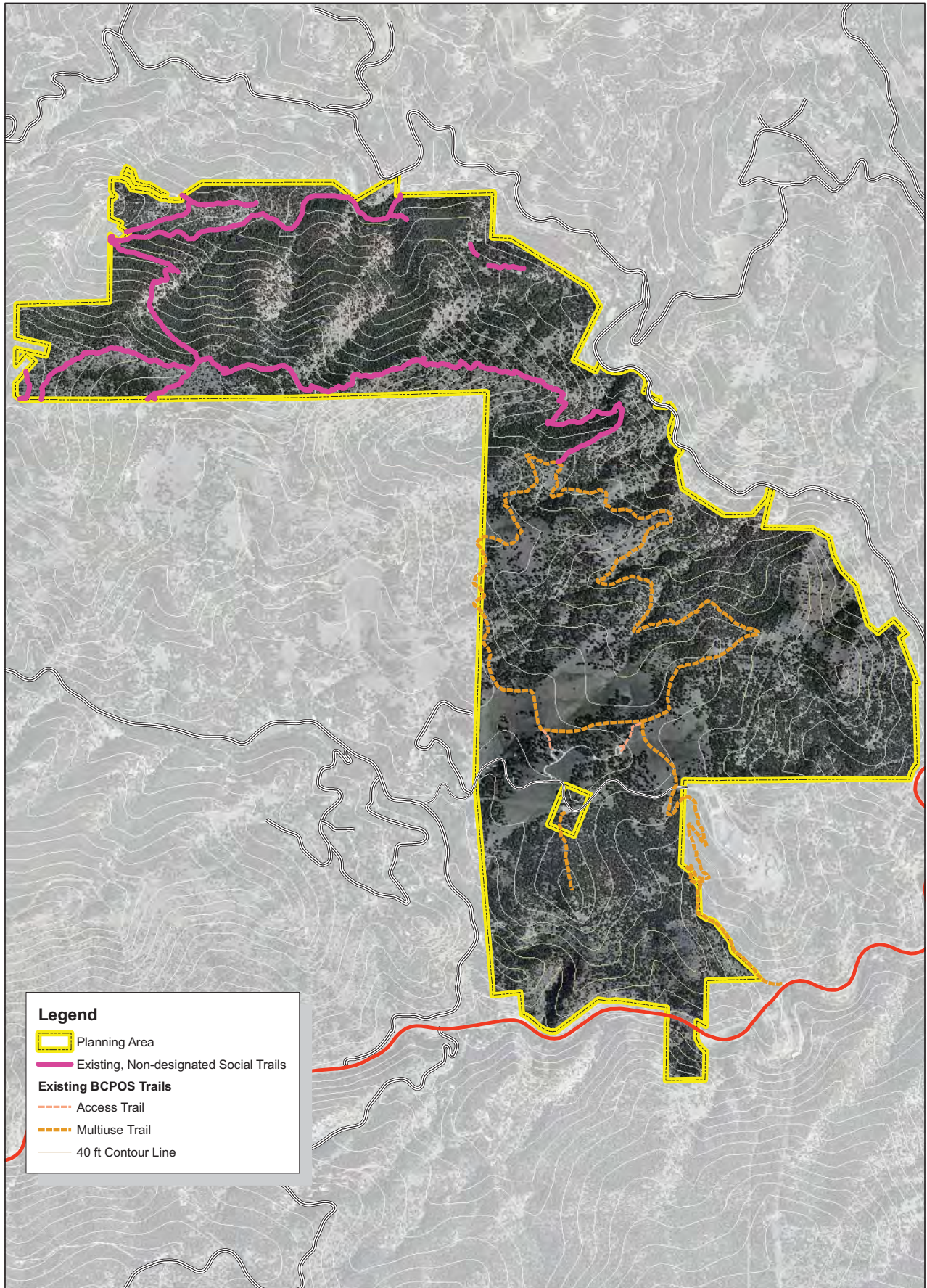
b. Bummer's Rock Trail. The 0.25-mile Bummer's Rock trail consists of a relatively short out-and-back trail to the top of Bummer's Rock, which provides views of Boulder Canyon and surrounding hillsides. The average trail width is 2-3 feet, and the trail is in fair condition with a relatively steep grade and considerable areas of erosion, with trail grades approaching 30-35% near the peak. The trail is closed to mountain bikes at all times.

c. Canyon Link Trail. The 1.25-mile Canyon Link Trail was constructed in 2000 by BCPOS in response to concerns about multiple, unsustainable social trails being formed across the steep slopes throughout the southeast portion of Betasso Preserve. The primary users of these social trails were individuals accessing the site from Boulder Canyon via the Boulder Canyon Trail, which ends at the intersection of Fourmile Canyon and Boulder Canyon. Users were seeking access to the Canyon Loop Trail without needing to continue along the narrow to non-existent shoulders of Boulder Canyon Drive. In particular, the Boulder Canyon tunnel between Fourmile Canyon Drive and Sugarloaf Road provided a particularly dangerous situation for pedestrians and bikers.

In response to public concerns and the environmental damage of these multiple social trails, BCPOS chose one feasible route that allowed users to access the Canyon Loop Trail from Boulder Canyon Drive without needing to pass through the tunnel. The access point for the Canyon Link Trail is located immediately east of the tunnel at the terminus of a pre-existing road cut up the hillside, which has the Orodell Pipeline underneath it and is used by the City of Boulder for the Betasso Water Treatment Plant. The trail, which parallels an intermittent drainage, follows this road straight up the hill until about half way up the hillside it begins to switchback. Portions of the trail extend onto the City of Boulder's property. The trail eventually crosses Betasso Road and then continues across an open meadow to the southeast corner of the Canyon Loop Trail.

The Canyon Link Trail is approximately 10 feet wide along the old access road and approximately 2-3 feet wide along the remainder of the trail. Overall, the trail is in fair to poor condition due to steep grades of 35-40% with areas of excessive erosion. However, the trail provides the only currently feasible alternative route between Boulder Canyon and the Canyon Loop Trail. It provides an opportunity for hikers, trail runners, and mountain bikers starting in Boulder to access Betasso Preserve without driving to the trailhead in a vehicle. The Canyon Link Trail is open to all users, including mountain bikers, seven days a week.

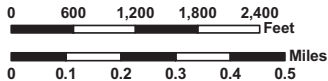
d. Social Trails. A number of non-designated, social trails exist throughout the northern portion of Betasso Preserve, including the Benjamin property (Figure 12, BCPOS 2007, ERO Resources Corp. 2007). These trails were created over time by neighbors and the general public and used by hikers, mountain bikers, and equestrians. The majority of these trails are unsustainable and do not meet accepted standards for trail design. Appendix L provides the rapid resource assessment, which was completed for the Benjamin property following its acquisition and provides an assessment of the existing social trails (ERO Resources Corp. 2007).



Legend

- Planning Area
- Existing, Non-designated Social Trails
- Existing BCPOS Trails**
- Access Trail
- Multiuse Trail
- 40 ft Contour Line

**Betasso Preserve Management Plan
Figure 12**



Existing Social Trails

3. Current Visitor Use

a. Visitor Use Estimates. In 1985, an estimated 3,000 people visited Betasso Preserve each year (BCPOS 1985). Today, it is estimated by BCPOS that approximately 30,000 – 70,000 people utilize the open space annually (Table 5). Between 1998 and 2008, the average annual number of people visiting Betasso Preserve was 43,559, with most visitors coming in summer and fall, followed by spring, and then, winter. Lower winter use is more than likely due to the overall poorer weather conditions and the at-times difficult, icy trail conditions.

Table 6 provides a breakdown of visitor use at Betasso Preserve by activity between January and December 2008. Results for 2008 are separated by all days combined, non-biking days, and biking days. These survey results show that, overall, hikers (49%) make up more of the users at Betasso Preserve than mountain bikers (35%). Picnickers (7%) and runners (4%) are the next highest user groups overall, while equestrians make up a small percent (<1%) of all users at Betasso Preserve. Because mountain bikers are not allowed on the Canyon Loop Trail on Wednesdays and Saturdays, hikers (77%) make up a larger majority of all users on these days of the week. However, on days that mountain biking is allowed on the Canyon Loop Trail, mountain bikers account for 56% of all users.

Table 6. Betasso Preserve Visitor Use Numbers between January and December 2008.

Activity	All Days	Non-biking Days (Wed and Sat)	Biking Days (Sun-Tues / Thurs-Fri)
Hikers	49%	77%	35%
Mountain Bikers	35%	3% ¹	56%
Picnickers	7%	6%	5%
Runners	4%	7%	2%
Equestrians	<1%	<1%	<1%
Other	5%	6%	1%

¹ Includes the Canyon Link Trail, which is open to mountain bikes on Wednesdays and Saturdays, as well as the Canyon Loop Trail
 Note: Data collected by BCPOS Education and Outreach staff and volunteers and are based on the number of visitors that were observed by field staff.

These numbers closely corroborate data on visitor use at Betasso Preserve in other annual and five-year surveys. The 2005 *Five-Year Visitor Study* surveyed visitors of BCPOS open spaces to find out their opinions, preferences, and demographics, as well as park visitation patterns (BCPOS 2006). For Betasso Preserve, the study showed the following activity types in 2005:

- 47% hikers
- 33% bikers (68% of bikers refused to take survey)
- 14% runners
- 2% picnic
- 2% special event
- 4% other

Table 5. Estimated Seasonal, Total, and Average Visitation Numbers at Betasso Preserve Between 1998 and 2008.

Visitation	1998	1999	2000	2001¹	2002	2003	2004	2005	2006²	2007	2008	Average
Spring	13,338	12,851	17,307	13,351	6851	5425	14,788	8712	7016	8499	9842	10,725
Summer	16,393	15,073	18,788	13,572	10,907	13,714	18,362	17,521	9887	9966	14,047	14,385
Fall	11,232	13,201	13,771	9568	10,022	10,022	30,404	27,308	11,226	7102	11,092	14,086
Winter	1463	7020	9330	3796	3175	3175	5883	4048	4690	1901	3507	4363
Total	42,426	48,145	59,196	40,287	30,955	32,336	69,437	57,589	32,819	27,468	38,488	43,559

1 Alternative day use restriction for mountain bikers began in October 2001

2 Began applying percent error to counts each month in 2006 to reflect hardware precision; partly explains drop from 2005

4. Education and Community Outreach. BCPOS education and community outreach staff and their volunteers currently offer a variety of programs and services to the public at Betasso Preserve. These programs and services are based on the overall goals of the education and community outreach program, which are:

- Inform the public about the County's natural and cultural resources, resource management practices, visitor opportunities, facilities, services, park regulations and visitor safety.
- Influence visitor use patterns, activities, and behaviors to minimize impacts on the resources and conflicts between users.
- Facilitate the public's involvement within BCPOS so they better understand their connection to the natural and cultural landscape.
- Offer a variety of educational programs and services throughout Boulder County that meet the interests of our diverse population.
- Create an understanding and appreciation for earlier Boulder County residents, lifestyles, and trades.
- Routinely solicit feedback and conduct visitor studies to evaluate the department's services and programs to better meet the public's needs.

In the past five years, programs sponsored at Betasso Preserve by BCPOS have typically taken place during the warmer, spring and summer months. The overall number of programs has been steadily decreasing during that time, from approximately 20 per year to 10 programs. This change is most likely due to programs at the new Caribou Ranch property (opened in 2004) and opportunities for similar programs at Heil Valley Ranch Open Space, which has the 1.3-mile pedestrian-only Lichen Loop ideal for foothill-related nature hikes. May continues to be the busiest month for natural history programming, reflecting the spring school field trip season. Wildlife and wildlife habitat topics are the most requested program themes.

The education and outreach staff sponsor trailhead displays at Betasso Preserve each year. The number of trailhead displays varies from year to year, but Betasso Preserve is one of the top four parks where seasonal interpreters staff a table at the trailhead to talk with visitors informally for a two-hour shift. In the past couple of years, black bears and mountain lions have been highlighted at trailhead displays. Also during the first month of classes in the fall at the University of Colorado-Boulder, education and outreach staff stage "trail share" displays that center on trail etiquette and talk with visitors about sharing the trail among hikers, equestrians and mountain bikers. In addition, Betasso Preserve is one of six properties for which BCPOS created a family-oriented guide called "The Nature Detective Club." The mystery guide provides some guidance for families with young children visiting Betasso Preserve, so they hopefully gain a better appreciation of the property's natural and cultural resources.

Volunteer naturalists conduct a variety of programs at Betasso Preserve and are free to determine the route and length for each nature hike. However, groups typically do not go beyond 1.5 miles round trip on the Canyon Loop Trail and routinely start at the covered shelter at the west Canyon Loop trailhead. There are currently two annual hikes on Bummer's Rock (i.e. a women's hike and a local geology hike), but otherwise nature

hikes on this trail are limited because of the steep grade.

BCPOS staff encourages volunteer naturalist group leaders to schedule hikes on Wednesdays or Saturdays, as mountain bikes are not permitted on those days of the week. Volunteer naturalists have been very complimentary about the alternating biking dates stating that it was more difficult to lead hikes when bikers were using the trails because their group had to step off trail so often during their hike. BCPOS has also received some complaints from bikers that large groups take up a lot of space on the trail.

BCPOS also helps manage two volunteer patrol groups. The Volunteer Park Hosts group currently has 38 members and patrols only on BCPOS properties by foot, bike and horseback. The Boulder Mountain Bike Patrol group, which is connected with the Boulder Mountainbike Alliance, currently has 43 members and patrols a number of BCPOS properties, including Betasso Preserve, as well as City of Boulder Open Space and Mountain Parks and United States Forest Service lands. Both of these groups are trained to make contacts with the public and assist in emergencies. These two volunteer programs have been instrumental in BCPOS's efforts to educate and reach out to specific neighborhoods, the general public, and special interest groups with respect to the rules and regulations on BCPOS lands. In 2008, the Volunteer Park Hosts and the Boulder Mountain Bike Patrol contributed a total of 678 and 409 hours, respectively, on BCPOS land. At Betasso Preserve, the Volunteer Park Hosts and Boulder Mountain Bike Patrol provided 98 and 33 hours, respectively in 2008.

5. Resource Protection and Patrol. The heavy visitor use and multiple-use trail options make Betasso Preserve one of BCPOS's principal open spaces. Because of this and the unique regulations at Betasso Preserve (e.g. alternative day use), BCPOS resource protection staff spends numerous hours patrolling the site and interacting with the public. Resource protection staff provides enforcement of BCPOS rules and regulations, emergency response, open space management, and education and community outreach. In addition, five Sheriff's Office deputies are assigned to BCPOS.

In 2008, the Resource Protection team patrolled Betasso Preserve a total of 214 hours over 225 visits (Table 7). This is comparable to other major open space within the BCPOS system with similar multiple trail options. If patrols done by BCPOS's education and outreach staff and volunteer parks hosts are included, the total number of patrol hours at Betasso Preserve for 2008 is 432 hours (Table 8). Over the past eight years, resource protection staff along with outreach staff and volunteer park hosts has spent a minimum of 174 hours and a maximum of over 400 hours on-site annually. In addition, since 2002, there has been a total of thirteen reported emergencies at Betasso Preserve, which is defined as a medical, fire, search and rescue, or wildlife incident.

Table 7. Number of Patrol Hours and Patrols at Betasso Preserve and Other BCPOS Properties by Resource Protection Staff in 2008.

Resource Protection Patrol	Betasso Preserve	Rabbit Mountain	Rock Creek Farm	Walker Ranch
Total Number	225	380	198	188
Total Hours	214	296	129	306

Table 8. Total Number of Patrol Hours at Betasso Preserve Between 2002 and 2008.

Year	Total Patrol Hours
2002*	277
2003	190
2004	303
2005*	174
2006	178
2007*	272
2008	432

*Only Resource Protection hours available

Table 9 provides the top violations at Betasso Preserve between 2002 and 2008. Bike violations and dogs off leash typically are the top two infractions. However, in 2008, bike violations were dramatically reduced and weren't the leading violation at Betasso Preserve. This may be due to more education about the regulations on the part of mountain bikers, the level of publicity of this management planning process, more patrol, or a combination of these factors.

Table 9. Top Violations at Betasso Preserve Between 2002 and 2008.

Violation	2002	2003	2004	2005	2006	2007	2008
Bike Violations	86	36	33	31	23	41	11
Dogs Off Leash	51	22	20	8	12	19	12
Parking Violations	1	2	1	1	1	3	0
Glass	0	2	0	0	0	4	1
Alcohol	0	3	1	0	1	4	0
Illegal Camping	0	0	0	0	0	3	0
Illegal Fire	0	0	0	0	1	0	0
Illegal Vehicles	2	0	3	0	0	0	0
After Hours Use	6	9	1	0	0	0	0

6. User Conflict. During summer and fall 2003, BCPOS staff and volunteers conducted interviews with open space visitors regarding interpersonal conflict at six Boulder County

open space properties and trails, including Betasso Preserve (BCPOS 2004a). While only 3% of those interviewed at Betasso Preserve stated they had experienced visitor conflict on the day the interview was conducted, 43%, or 45 individuals out of the 105 interviewed, stated they had experienced it at some point in the past at Betasso Preserve. This was the highest percentage for visitor conflict of the six open space properties and trails surveyed. The most significant concerns expressed at Betasso Preserve were the speed of mountain bikers (18% of total conflicts reported), mountain bikers not complying with use restrictions (15%), dogs off leash (11%), communication and courtesy of bikers along trail (8%), and the control of dogs on leash (7%).

The 2005 *Five-Year Visitor Study* also provided data on user conflict at Betasso Preserve (BCPOS 2006). Of the visitors surveyed at Betasso Preserve, 5% had experienced conflict on the trail on the day of the survey, while 13.5% had experience conflict over the past year. The average for all BCPOS properties surveyed was 3% of visitors experiencing conflict on the day of the survey and 7% experiencing conflict over the past year.

7. Mountain Biking at Betasso Preserve. Mountain biking has been a popular activity at Betasso Preserve for the majority of time that the open space has been open to the public. During the mid-1980's, as mountain biking gained in popularity, the Canyon Loop Trail became a well known single-track ride for many local bikers. With the closure of most local trails in the Boulder area to mountain bikes (e.g. many of the City of Boulder foothills trails are closed to mountain bikes), the Canyon Loop Trail became increasingly more popular as a local ride. By 1996, BCPOS staff noted that many mountain bikers were riding the loop two or more times to extend their ride length and that many were riding their bikes up from Boulder through Boulder Canyon to get to Betasso Preserve.

The increase in popularity of mountain biking at Betasso Preserve also led to an increase in the level of user conflict amongst mountain bikers, hikers, trail runners, and equestrians. By the early 1990's, BCPOS began receiving comments from members of the public concerned about the increasing number of mountain bikers and its implications on user conflict and safety. Beginning in 1993, BCPOS staff began taking steps to alleviate the public's concerns. Signs warning mountain bikers to be cautious, a re-route of one section of the Canyon Loop Trail (completed in 1993), increased education by staff and volunteers, distribution of brochures and flyers, partnerships with local bicycle clubs, and other measures were implemented in an attempt to reduce conflict on the trail. In fall of 1998, an extensive re-route of about 1/3 of the trail was planned and implemented. The goal of the re-route was to minimize conflicts due to blind corners, steep and narrow downhill sections, and extended gradual downhill sections where high speed could be achieved. At that time, a required directional use trail system was also implemented for mountain bikers.

As part of the creation of Canyon Link Trail, the BOCC requested staff look into alternative day use on the Canyon Loop Trail (i.e. prohibit mountain bikes on certain days). On July 24, 2001, the Commissioners enacted alternate day use on the Canyon Loop Trail, prohibiting mountain bike use on Wednesday and Saturdays. This regulation

went into effect in the fall of 2001. The primary reason for the regulation was to provide non-mountain bikers an opportunity to utilize the trail on two days a week without the presence of mountain bikes, thus providing a measure of safety on the trail and enjoyment of the open space for non-mountain bike users. In addition, it was found prior to the regulation that some people felt unsafe on the trail because of mountain bikes and that others were avoiding Betasso Preserve all together. BCPOS staff and the Commissioners at the time felt the alternative day use regulation was a balanced approach that provided a compromise that allowed mountain bikes on the Canyon Loop Trail five days a week, rather than a complete ban, and allowed other users access to the trail without bikes present two days a week. The Commissioners requested a review of this new management tool one year after implementation to determine if the closure was meeting its goals. A survey of visitors conducted in fall 2002 found 67% of the people interviewed supported the regulation including many mountain bikers. Based in part on this data, the County Commissioners voted on February 13, 2003, to extend the alternate day use regulation, which is still enforced today.

Table 10 shows the general trend in use by mountain bikers and hikers between 1998 and 2008 based on data collected by BCPOS. In 2000, the year before the alternative day use restriction went into effect, hikers made up approximately 37% of all users at Betasso Preserve, while mountain bikers accounted for approximately 45% of users. In the years following implementation of this restriction, hiking has consistently accounted for a higher percentage of all users compared to mountain biking. This change can partially be explained by the fact that little to no mountain bikers use Betasso Preserve on two days of the week.

Table 10. Estimated Percent of Hikers Versus Mountain Bikers at Betasso Preserve (1998-2008).

Activity Type	1998	1999	2000	2001 ¹	2002	2003	2004	2005	2006	2007	2008
Hiking	34%	30%	37%	29%	41%	43%	52%	44%	46%	47%	49%
Biking	34%	35%	45%	47%	23%	31%	26%	33%	36%	32%	35%

¹ Alternative day use restriction for mountain bikers began in October 2001

A 2003 study of mountain bikers on Boulder County open spaces showed that mountain bikers in general at that time preferred a “less rugged trail surface and shorter trails” at Betasso Preserve (Planning Alternatives 2003, p. 6). Overall, this user group wanted single-track trails that are greater than six miles in length with short climbs and descents. Only 31% of those interviewed preferred long climbs and descents, while 8% enjoy gentle slopes.

Between March and October 2004, BCPOS interpretation staff with the assistance of volunteers conducted a study to assess mountain bikers’ compliance of the “no mountain biking on Wednesdays and Saturdays” (alternative day use) regulation on the Canyon Loop Trail (BCPOS 2004b). The data collected was on the number of mountain bikers that had arrived at Betasso Preserve with the assumed intent of riding the Canyon Loop Trail, and then decided to either ride the trail or not after observing the posted regulation.

The study did not take into account mountain bikers who knew about the regulation, and therefore, did not go to Betasso Preserve. The data, however, suggest that this later group is the majority of mountain bikers as only 14% of all users were mountain bikers on Wednesdays and Saturdays, compared to 60% on all other days (Table 11). (Note: The Canyon Link Trail is open to mountain bikes seven days per week and is not included in the alternative day use regulation. The study did not take into consideration mountain bikers observed who only planned to ride this trail.)

Table 11. Visitation to Canyon Loop Trail at Betasso Preserve on Non-biking and Biking Days (BCPOS 2004)

Activity	Non-biking Days Wednesdays and Saturdays (% of Overall Visitation (N))	Biking Days (% of Overall Visitation (N))
Mountain Bikers	14% (119)	60% (353)
Hikers	61% (511)	29% (169)
Picnickers	11% (95)	2% (11)
Runners	8% (64)	3% (20)
Relax/Do Nothing	4% (31)	2% (11)
Dog Walkers	2% (13)	1% (5)
Other	<1% (8)	3% (15)
Equestrian	<1% (2)	0
Wildlife Viewing	0	<1% (4)
TOTAL	843	588

Of the visitors observed at the trailhead on Wednesdays and Saturdays, 14% were mountain bikers, 61% were hikers, 11% were picnickers, 8% were runners, 4% relaxed or did nothing, 2% walked their dog, and <1% were equestrians (Table 11). On “biking days” (i.e. Sundays-Tuesdays and Thursdays-Fridays), 60% of visitors mountain biked, 29% hiked, 3% were runners, 3% were “other” (e.g. artists), 2% picnicked, 2% relaxed or did nothing, 1% were dog walkers, and <1% came to view wildlife. Of the 119 mountain bikers observed on Wednesdays and Saturdays during the study period, 56% decided to continue using the Canyon Loop Trail, thus breaking the alternative day use regulation. Based on the data collected, fall had the lowest level of compliance (68% of mountain bikers observed failed to comply), while spring had the highest (45% of mountain bikers observed failed to comply). This may partially be explained by the flush of new students at the University of Colorado, who are unfamiliar with the regulations.

In 2008, the percent of users that mountain biked on Wednesdays and Saturdays was only 3% (Table 6). In addition, the number of bike violations also dropped significantly (Table 9). These changes may be due to better awareness and education regarding the regulations, increased patrol on those days, or an anomaly, as future years may show fluctuations in these numbers.

8. Future Visitor Use. Although it can be assumed that visitation will generally increase over time based on population growth and increased demand for recreational trails, exact quantification of this increase is difficult to determine based on a variety of factors. Based on data from the past 11 years (1998-2008), visitor use at Betasso Preserve appears to be cyclical with total number of users rising over periods of 2-3 years until reaching a peak and then steadily declining before rising again (Table 5). One potential explanation for this trend may be that as trails become more crowded, visitors are less likely to go to the site because it becomes more difficult to achieve the desired outcome for their visit (e.g. peace and quiet, wildlife viewing, uninterrupted hike or mountain bike ride, etc.). Another possible explanation may be that as new trails open at other nearby open spaces, people are going elsewhere to recreate before returning to Betasso once again. Other explanations may include weather conditions (both at Betasso Preserve and at other destinations such as the Indian Peaks Wilderness Area), promotions of Betasso Preserve in newspaper articles or guidebooks, special events at the open space, or other random causes.

If a new trail is opened to the public, overall visitor use will likely increase. Between 1998 and 2008, the average annual number of visitors to Betasso Preserve was 43,559 people, or on average, approximately 119 people daily. If visitor use increased by 25%, the annual average would be 54,449 people, and the daily average would be 149 people. A 50% increase in visitors would result in an average of 65,339 visitors annually, or an average of 179 people daily. With any new trails, however, any increase in visitor use would be spread out over more trail miles. Areas of concern would be at and nearby the trailheads and parking lots where people start and finish their trail use and typically are the busiest portion of an open space. One potential future visitor use change at Betasso Preserve may be an increase in higher skill level mountain bikers who are looking for longer, more challenging rides and regional trail connections.

Another possible future scenario may be that visitor use at Betasso Preserve increases initially over the first year or two following the opening of any potential new trails and then holds steady or declines slightly thereafter. This general trend has been witnessed at other BCPOS trails following their grand opening to the public (e.g. the Wild Turkey Trail at Heil Valley Ranch). This may be due to changes in visitors' attitudes toward the new trail. After exploring the new trails multiple times over the first year or so, they may want new "adventures", which they seek out elsewhere. Other factors such as those described above regarding the cyclical nature of use may also play a role.

9. Future Trail Options

a. Trail Feasibility Study. Through the public process, it was determined by BCPOS that many members of the public are interested in new multi-use trails at Betasso Preserve, including trails that extend into the Benjamin property. In addition, many individuals expressed interest in potential connections to regional trail routes, including roadways that extend beyond the borders of Betasso Preserve.

In May 2008, BCPOS hired a private consultant to determine the feasibility and potential options for new trails within the northern portion of Betasso Preserve, including the Benjamin property. The project objective as stated in the project's request for proposal, or RFP ("Benjamin Property & Betasso Preserve Trail Connection Feasibility Study", Boulder County Purchasing Office, RFP #5017-08, pages 4-5) was:

The objective of this study is to determine conceptual trail alignment(s) for public input and management plan direction for Betasso Preserve and the Benjamin Property. Conceptual alignments will be developed into three broad base themes if feasible on the ground, with the understanding that loop trails, out and back trails, and one-way trails will be considered. The Contractor will analyze the Benjamin Property and the northern part of the Betasso Preserve for a connection to the Canyon Loop Trail and regional trail systems. All trail design themes shall be for sustainable, multi-use trails that minimize impacts to significant natural and cultural resources, as well as to adjacent neighbors. Contractor will analyze and incorporate the use of existing social trails if sustainable and appropriate. Trail design themes are:

- A. Limited recreation: *the emphasis of this theme is to maximize preservation of the natural and cultural resources and evaluate limited recreational opportunities.*
 - *Provide minimal trail development for multiple users*
 - *Provide viewing and scenic opportunities*
 - *Avoid trails in close proximity to neighboring properties*
 - *Avoid trails in core/sensitive habitat areas. Consolidate areas without trails to maximize core habitat areas. If a loop trail is considered, it should be done with the assumption that a large core habitat area would be preserved and the trail would not dissect large areas of the Benjamin Property.*
 - *Use portions of existing social trails if appropriate and sustainable*
- B. Moderate recreation: *the emphasis of this theme is to balance recreation opportunities with the preservation of natural and cultural resources.*
 - *Provide moderate trail development for multiple users*
 - *Provide viewing and scenic opportunities*
 - *Avoid trails in close proximity to neighboring properties*
 - *Provide diversity of recreation experience (loop trail, out-and-back, etc.) while protecting significant natural and cultural resources*
 - *Attempt to provide trail access from Betasso Preserve and/or the Benjamin Property to Fourmile Canyon Drive, Arkansas Mountain Road, and/or Alaska Road. These potential access points could provide possible connections to surrounding roads and trails, which could create informal regional trail connections. No additional vehicle parking will be considered for these potential new access points; vehicle parking will only be provided at the existing Betasso Preserve Trailhead.*
 - *Use portions of existing social trails if appropriate and sustainable*
- C. Maximize recreation: *the emphasis of this theme would be to provide the most recreational opportunities available that do not substantially impact significant natural and cultural resources.*

- *Provide maximum trail development for multiple users*
- *Provide viewing and scenic opportunities*
- *Protect the most significant natural and cultural resources*
- *Avoid trails in close proximity to neighboring properties*
- *Provide diversity of recreation experience (loop trail, out-and-back, etc.)*
- *Analyze a loop trail potentially covering a large portion of the Benjamin Property with some spur trails to scenic vistas or other interesting points*
- *Attempt to provide trail access from Betasso Preserve and/or the Benjamin Property to Fourmile Canyon Drive, Arkansas Mountain Road, and/or Alaska Road. These potential access points could provide possible connections to surrounding roads and trails, which could create informal regional trail connections. No additional vehicle parking will be considered for these potential new access points; vehicle parking will only be provided at the existing Betasso Preserve Trailhead.*
- *Use portions of existing social trails if appropriate and sustainable*
- *Analyze the potential for separate use trails to minimize conflicts*

The RFP was sent out to seven Colorado-based consultants with known trail experience, was posted on the county's web site, and was an open bid process. IMBA Trail Solutions with their sub-consultant, ERO Resources, was selected to prepare the Trail Feasibility Study based on cost (low bid), the contractor's ability to meet timeline, technical skills of consulting company's staff, and BCPOS's past experience working with IMBA Trail Solutions on the *Walker Ranch Loop Trail Reroute Feasibility Study* and ERO Resources on the *Rapid Resource Assessment Benjamin/Betasso Open Space*. A complete copy of the *Benjamin Property and Betasso Preserve Trail Feasibility Study* (TFS) can be found in Appendix M.

The TFS was prepared prior to the completion of wildlife and vegetation surveys at Betasso Preserve, and therefore, without complete knowledge of significant natural resource issues within each alignment. Trail alignments were selected by the consultant primarily based on topography, trail design specifications provided by BCPOS, available accesses, property shape and boundaries, and potential visitor use experience (IMBA Trail Solutions and ERO Resources 2008). The TFS serves as one piece of the puzzle toward determining the best future management of Betasso Preserve. Other concerns and issues, which need to be taken into consideration, include:

- The need or desire of Boulder County residents for additional trails
- The level and type of use each proposed trail may receive
- Specific trail design criteria (e.g. trail width)
- Impacts of new trails to drainages/riparian areas and upland plant communities
- Impacts of new trails to wildlife and wildlife habitat
- Impacts of new trails to rare plants and rare plant communities
- Introduction of unwanted plant species due to new trails
- Potential permit requirements for new trails (e.g. Section 404 permit from US Army Corps of Engineer for crossing Fourmile Creek)
- Cost of long-term maintenance of new trails

- Size of new trail footprint across the property including cut and fill
- Post-construction restoration requirements for impacted land within footprint of new trail
- Erosion potential of new trails
- Potential for new social trails off of new trails
- Impacts to neighboring properties due to new trails
- Concerns about increased wildfire danger due to new trails

b. Conceptual Trail Options. Based on the findings in the TFS, BCPOS staff selected five conceptual trail alignments for analysis, which included the primary themes in the TFS, and included a no new trail option. The conceptual trail options included (Figure 13):

No New Trail Option. The no new trail option would retain the existing condition without any new designated trails within the northern portion of Betasso Preserve, including the Benjamin property. The property would continue to have 4.7 miles of trail, including the Canyon Loop Trail, Canyon Link Trail, and Bummer’s Rock Trail.

Trail Concept 1 (TC1). Trail Concept 1 would provide an out-and-back trail primarily along the east facing slopes of Betasso Preserve connecting at the northern tip of the Canyon Loop Trail and extending down to Fourmile Creek in the northeast corner of the Benjamin property. This trail could connect to Fourmile Drive via the Fourmile Connection Option (see below).

Approximate Length of Trail: 2.2 miles one-way (TC1)

Length of TC 1 and Canyon Loop Trail Combined: 5.4 miles total (note: miles are one way for TC1)

Total Estimated Cost of Construction of TC1: \$156,615 / \$234,923*

Trail Concept 2. Trail Concept 2 would provide additional trail miles to Trail Concept 1 by adding a connecting trail to the west that extends into the Benjamin property, thus creating a loop trail. This trail concept would provide access to “Peak 6600”, which is a prominent point that provides views of the surrounding landscape. Two alternatives exist under Trail Concept 2:

Trail Concept 2A (TC 2A): This trail would extend a little less than half way into the Benjamin property crossing twice over an intermittent drainage on the eastern side of Benjamin and extending across the lower and mid-slopes of the property. This trail concept also provides access to a historic mine adit.

Approximate Length of Trail: 4.3 miles (includes TC1 + TC 2A)

Length of TC 2A and Canyon Loop Trail Combined: 7.5 miles total

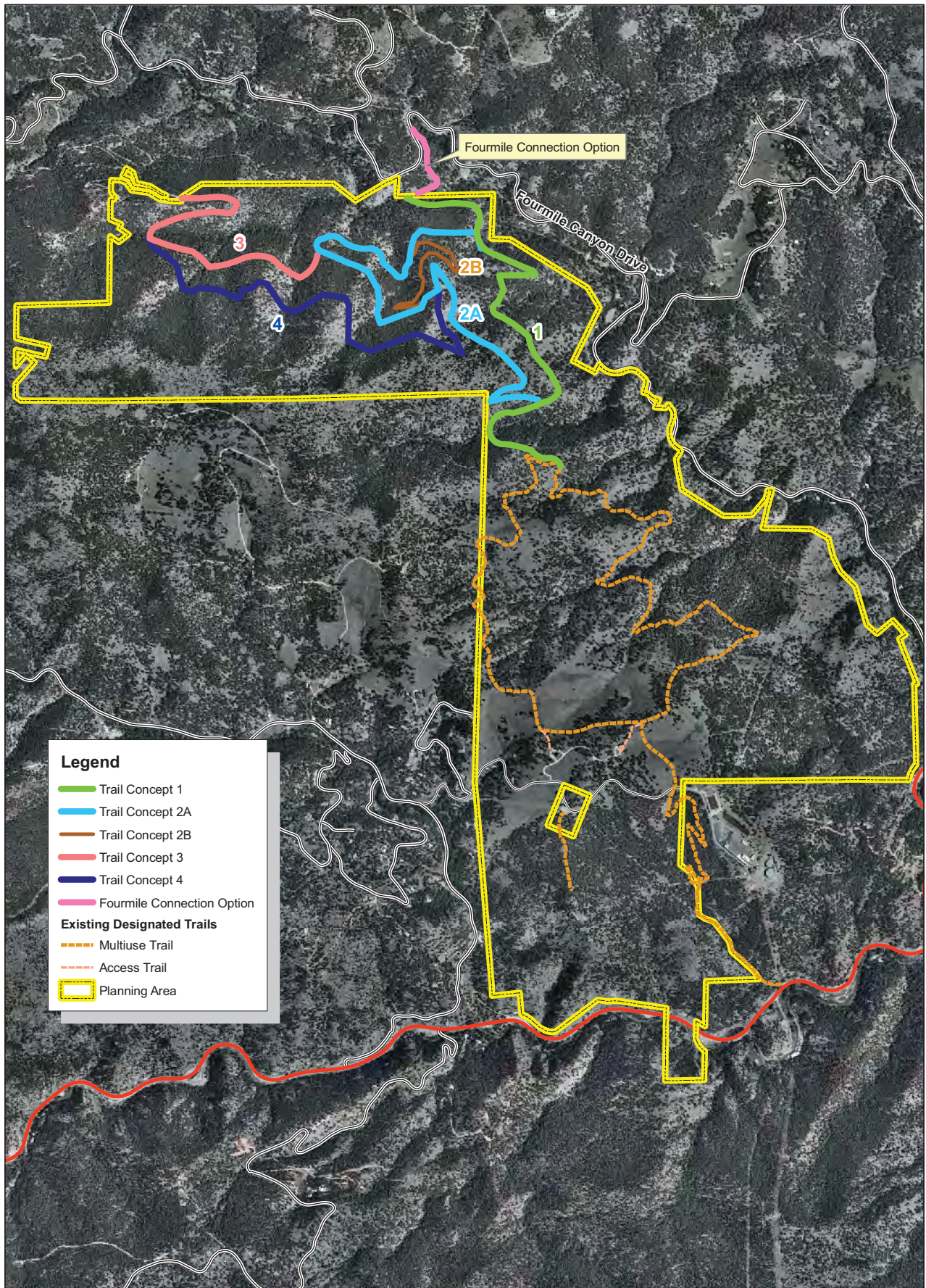
Total Estimated Cost of Construction of TC2A: \$277,053 / \$415,580*

Trail Concept 2B (TC 2B): This trail would extend into the Benjamin property, but would avoid crossing the intermittent drainage by creating a series of switchbacks along the adjacent hillside.

Approximate Length of Trail: 4.2 miles (includes TC1 + TC 2B)

Length of TC 2B and Canyon Loop Trail Combined: 7.4 miles total

Total Estimated Cost of Construction of TC2B: \$274,658 / \$411,987*



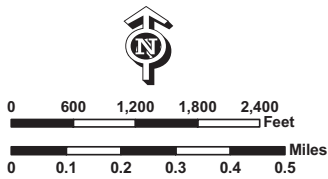
Legend

- Trail Concept 1
- Trail Concept 2A
- Trail Concept 2B
- Trail Concept 3
- Trail Concept 4
- Fourmile Connection Option

Existing Designated Trails

- Multiuse Trail
- Access Trail
- Planning Area

Betasso Preserve Management Plan
Figure 13



Conceptual Trail Options

Trail Concept 3 (TC3): Trail Concept 3 would add approximately one additional mile of trail to Trail Concept 2A by including a connector trail to Alaska Road.

Approximate Length of Trail: 5.3 miles (includes TC1 + TC 2A + TC3)

Length of TC3 and Canyon Loop Trail Combined: 8.5 miles total

Total Estimated Cost of Construction of TC3: \$324,679 / \$487,019*

Trail Concept 4 (TC4). Trail Concept 4 would add approximately 1.3 miles of additional trail to Trail Concept 3 by including a trail across the middle slope of Benjamin connecting to both Trail Concepts 2A and 3, thus creating a second trail loop.

Approximate Length of Trail: 6.6 miles (includes TC1+TC2A+TC3+TC4)

Length of TC4 and Canyon Loop Trail Combined: 9.8 miles total

Total Estimated Cost of Construction of TC4: \$403,439 / \$605,159*

Fourmile Connection Option. The Fourmile Connection Option would add an additional 0.4 miles to all trail options by providing a “no parking” access to Fourmile Canyon Drive. This trail would require the construction of stairs to get up an approximately 10-foot high cliff. Currently, BCPOS has a trail easement across the private parcel to allow this connection. BCPOS will need to obtain a formal access across the Bureau of Land Management parcel to complete the connection.

Approximate Length of Trail: 0.4 miles

Total Estimated Cost of Construction of TC4: \$43,064 / \$64,596*

(* Cost estimates = cost estimate for 18-30” wide trail / cost estimate for > 30” wide trail (based on IMBA Trail Solutions and ERO Resources 2008))

c. Comparison of Trail Options. Tradeoffs are defined as “a balancing of factors all of which are not attainable at the same time” and “a giving up of one thing in return for another” (Merriam-Webster 2009). The five trail options can be thought of as being on a continuum of tradeoffs that goes from no new trails (No New Trail Option) with the least amount of new impact on wildlife habitat and the environment and no additional trail costs, but no additional trail opportunities for recreationists, to the maximum extent of trails (Trail Option 4) with the most disturbance to habitat and the environment and the highest costs, but provides the most opportunity for recreationists.

In selecting a trail option for Betasso Preserve, BCPOS with the help of the public and the Betasso Preserve Stakeholder Group had to assess the tradeoffs, as well as the pros and cons (i.e. the arguments for and against), of each trail option. Some of these conditions are permanent and some are short-term impacts. Some will vary by degree relative to the trail layout and length (e.g. the amount of cut in trail construction and its impact). Based on initial public comments and the results of the stakeholder group, it is very clear to BCPOS staff that every option has its pros and cons and that every option will have its proponents and opponents (Appendices D and E). The following is a list of tradeoffs and pros and cons prepared by BCPOS based on resource surveys and general knowledge of the project area, public and stakeholder input, the findings of the Trail Feasibility Study, the mission and goals of the Parks & Open Space program, and the policies of the Boulder County Comprehensive Plan.

No New Trail Option

Arguments For / Positives / Opportunities

- No new impacts to wildlife, habitat, or soils within trail footprint and the trail's zone of influence (i.e. the area adjacent to the trail of varying width that is either directly or indirectly influenced by the trail, such as flushing of wildlife adjacent to trail, reduction of reproductive success of species near trail, introduction and spread of non-native and invasive species, increased erosion, etc.)
- Setting aside large block of land for wildlife and plant conservation
- No fragmentation of wildlife habitat due to presence of new trail
- Does not cut trail into sensitive habitat areas such as drainages or nest sites
- Fully meets conservation and preservation goals
- Property part of larger corridor of natural areas in County, including U.S. Forest Service land, BLM land, City of Boulder's Mountain Parks, and other BCPOS lands
- No additional cost for trail construction and long-term maintenance
- No additional impact to surrounding properties and roadways
- Even without any new trails, Betasso Preserve already has one of the highest densities of trails within BCPOS portfolio of properties based on its size (1180 acres) and the total length of current trails (4.7 miles)
- Allows visitors to explore areas (not closed to the public) without trails
- Boulder County has many trail options available to the recreation community already in existence

Arguments Against / Negatives / Constraints

- Does not meet recreational demand for site as expressed by user groups
- Population is growing and wants access to public lands, especially close to urban centers such as the City of Boulder
- More well planned and managed trails are wanted by user groups within the County
- Does not provide people with additional access to nature and the unique habitats of northern Betasso Preserve
- Does not provide new trails to disperse users, which may reduce user conflict on current trail system
- Property already surrounded by roads and residential development
- Property has historically been utilized for timber harvest, grazing, and mining, and therefore is not undisturbed
- Property part of larger regional trail corridor
- Does not provide regional trail connections, which has been requested by some members of the public
- Without new trails, the potential for unmanaged, uncontrolled access into the Benjamin property and the creation of unsustainable social trails increases

Trail Option 1

Arguments For / Positives / Opportunities

- Provides additional trail mileage to meet the recreational needs of the public including a potential future “no parking” access point to Fourmile Canyon
- Provides public access to some interesting natural features such as drainages and the riparian forests of Fourmile Creek
- Disperses users across more of the property (i.e. potentially less users per mile of trail)
- Opens up regional recreational options for mountain bikers with Fourmile Canyon connection
- Visits the historic railroad grade (i.e. Switzerland Trail), which could be interpreted for its cultural and historical significance
- Provides a potential loop for mountain bikers when combined with roads like Fourmile Canyon Drive, Boulder Canyon Drive, the Canyon Loop Trail, and the Betasso Link Trail
- Potentially removes mountain bikers from dangerous uphill use of Fourmile Canyon Drive by placing them on-trail in Betasso Preserve to achieve the same distance, workout, or experience goals
- Avoids the majority of the high value wildlife area by consolidating new trail on northeast section of Betasso Preserve
- Least amount of impacts to wildlife, habitat, or soils within trail footprint and the trail’s zone of influence compared to other new trail options (Trail Options 2A, 2B, 3 and 4)

Arguments Against / Negatives / Constraints

- Will create new impacts to wildlife, habitat, and soils within trail footprint, the trail’s zone of influence, and increase habitat fragmentation
- Crosses some high value wildlife areas including Skunk Gulch (i.e. the drainage north of Canyon Loop Trail) and Fourmile Creek
- Creates a relatively large scar on land within trail footprint due to cut required to create trail on steep slopes
- Difficulties of post-construction habitat restoration of trail edge areas
- Does not include loop trail within the property, which helps manage users and provides a more diverse experience
- Trail may not provide a destination that users want (e.g. high vantage points)
- Out-and-back trail will increase the amount of two-way traffic creating a feeling of crowding and increasing the potential for user conflict and dangerous interactions amongst users along steep slopes
- Recreation potential not maximized in space available for it
- Some recreationists may find the trail too short and boring
- Limited viewing and scenic opportunities
- Without extending to the west, the potential for unmanaged, uncontrolled access into the Benjamin property and the creation of unsustainable social trails increases especially along Switzerland Trail and up Arkansas Gulch

- Bridges required at Fourmile Creek and Skunk Gulch, which will increase cost of construction and impact to the environment
- Fourmile Canyon connection will put more users on Fourmile Canyon Drive
- A constructed staircase required to ascend the short cliff at railroad grade north of Fourmile Creek (currently on BLM land), which will increase cost of construction and the impact to the environment
- Short connection spur to Fourmile Drive not accessible by equestrians and not useful to the majority of hikers as it will be a “no parking”, dead-end access point
- Will require additional planning and permitting to complete trail connection to Fourmile Canyon (e.g. NEPA requirements for trail easement across BLM parcel, Section 404 from US Army Corps of Engineer to cross Fourmile Creek)

Trail Option 2A

Arguments For / Positives / Opportunities

- Provides additional trail mileage to meet the recreational needs of the public including new trails that extend almost halfway into the Benjamin property, as well as a potential future “no parking” access point to Fourmile Canyon
- Nearly doubles existing trail miles at Betasso Preserve
- New mileage and loop trail provides a more diverse experience for users, including gaining greater elevation, greater feeling of remoteness, and additional points of interest (e.g. Peak 6600, Fourmile Creek, historic mine)
- Provides public access to some interesting natural features such as diverse plant communities, rock outcrops, steep slopes, drainages, and Fourmile Creek
- Excellent viewing and scenic opportunities at higher elevations (e.g. Peak 6600)
- Creation of a loop trail makes it easier to manage users by providing a better flow of trail users
- Greater dispersion of trail users (i.e. potentially less users per mile of trail)
- Opens up regional recreational options for mountain bikers and others with Fourmile Canyon connection
- Potentially removes mountain bikers from dangerous uphill use of Fourmile Canyon Drive by placing them on-trail in Betasso Preserve to achieve the same distance, workout, or experience goals
- Visits the historic railroad grade (i.e. Switzerland Trail) and historic mine site, which could be interpreted for their cultural and historical significance
- Creates less impact to hillside (i.e. switchbacks and other structures) compared to Trail Option 2B.
- Creates less impacts to wildlife, habitat, or soils within trail footprint has a smaller zone of influence, and creates less of a habitat fragmentation impact than Trail Options 3 and 4, which bisect the high value wildlife habitat area

Arguments Against / Negatives / Constraints

- Will create new impacts to wildlife, habitat, unique plant communities, and soils within trail footprint, the trail’s zone of influence, and increase habitat fragmentation

- Crosses some high value wildlife areas including Skunk Gulch (i.e. the drainage north of Canyon Loop Trail), Fourmile Creek, and the eastern half of the Benjamin property
- Extends further into the high value wildlife habitat area than Trail Option 2B
- Crosses east drainage (Prospector Gulch) within high value wildlife habitat area twice
- Narrow trail loop layout can exclude some wildlife species from the inside the loop as well as adjacent to trail, although not as concentrated as Trail Option 2B
- Closure of mine site and placement of trail adjacent to it would have negative impacts on some wildlife that need access inside the mine (i.e. mine may be potential bat hibernacula, den site, or water source for wildlife)
- Create a relatively large scar on land within trail footprint due to cut required to create trail on steep slopes
- Difficulties of post-construction habitat restoration of trail edge areas
- Remoteness of trails and rugged topography makes enforcement and emergency response more difficult
- Difficult and costly trail construction and maintenance on steep, highly erosive slopes
- Does not provide regional trail connections to the west provided by Trail Options 3 and 4
- Without fully extending to Alaska Road to the west, the potential for the creation of unsustainable social trails to Alaska Road and Arkansas Mountain increases
- Bridges required at Fourmile Creek and Skunk Gulch, which will increase cost of construction and impact to the environment
- Fourmile Canyon connection will put more users on Fourmile Canyon Drive
- A constructed staircase required to ascend the short cliff at railroad grade north of Fourmile Creek (currently on BLM land), which will increase cost of construction and the impact to the environment
- Short connection spur to Fourmile Drive not accessible by equestrians and not useful to the majority of hikers as it will be a “no parking”, dead-end access point
- Will require additional planning and permitting to complete trail connection to Fourmile Canyon (e.g. NEPA requirements for trail easement across BLM parcel, Section 404 from US Army Corps of Engineer to cross Fourmile Creek)

Trail Option 2B

Arguments For / Positives / Opportunities

- Provides compromise between providing recreational opportunities and preserving highest quality wildlife habitat and significant vegetation
- Creates less impacts to wildlife, habitat, or soils within trail footprint, the trail’s zone of influence, and habitat fragmentation impacts compared to Trail Option 2A, and also Trail Options 3 and 4, which bisect the high value wildlife habitat area
- Avoids the majority of the high value wildlife habitat area including multiple crossings of east drainage (Prospector Gulch)

- Provides additional trail mileage to meet the recreational needs of the public including new trails in portions of the Benjamin property and a potential future “no parking” access point to Fourmile Canyon
- Nearly doubles existing trail miles at Betasso Preserve
- New mileage and loop format provides a more diverse experience for users, including gaining greater elevation, greater feeling of remoteness, and additional points of interest (e.g. Peak 6600, Fourmile Creek)
- Provides public access to some interesting natural features such as diverse plant communities, rock outcrops, steep slopes, drainages, and Fourmile Creek
- Excellent viewing and scenic opportunities at higher elevations (e.g. Peak 6600)
- Creation of a loop trail makes it easier to manage users by providing a better flow of trail users
- Greater dispersion of trail users (i.e. potentially less users per mile of trail)
- Opens up regional recreational options with Fourmile Canyon connection
- Potentially removes mountain bikers from dangerous uphill use of Fourmile Canyon Drive by placing them on-trail in Betasso Preserve to achieve the same distance, workout, or experience goals
- Visits the historic railroad grade (i.e. Switzerland Trail), which could be interpreted for its cultural and historical significance

Arguments Against / Negatives / Constraints

- Stacked switchbacks on northwest side of Peak 6600 may impact users’ experience of the trail
- Potentially higher construction and maintenance costs due to stacked switchbacks
- Switchbacks may be tight and dense, encouraging shortcutting
- Steep stacked switchbacks may exclude some users, including some equestrians
- Will create new impacts to wildlife, habitat, unique plant communities, and soils within trail footprint, the trail’s zone of influence, and increase habitat fragmentation
- Crosses some high value wildlife areas including Skunk Gulch (i.e. the drainage north of Canyon Loop Trail) and Fourmile Creek
- Narrow trail loop layout can exclude some wildlife species from inside the loop as well as adjacent to trail. The stacked switchbacks are more concentrated than Trail Option 2A, but affect less overall area inside the loop
- Create a relatively large scar on land within trail footprint due to cut required to create trail on steep slopes
- Difficulties of post-construction habitat restoration of trail edge areas
- Remoteness of trails and rugged topography makes enforcement and emergency response more difficult
- Difficult and costly trail construction and maintenance on steep, highly erosive slopes
- Does not provide regional trail connections to the west provided by Trail Options 3 and 4
- Without extending to the west, the potential for the creation of unsustainable social trails to Alaska Road and Arkansas Mountain may increase

- Fourmile Canyon connection will put more users on Fourmile Canyon Drive
- Bridges required at Fourmile Creek and Skunk Gulch, which will increase cost of construction and impact to the environment
- A constructed staircase required to ascend the short cliff at railroad grade north of Fourmile Creek (currently on BLM land), which will increase cost of construction and the impact to the environment
- Short connection spur to Fourmile Drive not accessible by equestrians and be of no value to equestrians or the majority of hikers as it will be a ‘no parking’, dead-end access point
- Will require additional planning and permitting to complete trail connection to Fourmile Canyon (e.g. NEPA requirements for trail easement across BLM parcel, Section 404 from US Army Corps of Engineer to cross Fourmile Creek)

Trail Option 3

Arguments For / Positives / Opportunities

- Provides additional trail mileage to meet the recreational needs of the public including new trail entirely crossing the Benjamin property and two potential future “no parking” access points to Fourmile Canyon and Alaska Road
- More than doubles existing trail miles at Betasso Preserve
- Opens up regional recreational options for mountain bikes and others to the west side of the property via Alaska Road, as well as the connection to Fourmile Canyon
- Potentially removes mountain bikers from dangerous uphill use of Fourmile Canyon Drive by placing them on-trail in the Betasso Preserve to achieve the same distance, workout, or experience goals
- By providing a trail to Alaska Road, it potentially reduces the potential for creation of social trails meant to accomplish the same goal
- Provides a more diverse experience for users, including gaining greater elevation, greater feeling of remoteness, and points of interest (e.g. Peak 6600, Fourmile Creek, historic mine, Alaska Road)
- Provides public access to some interesting natural features such as diverse plant communities, rock outcrops, steep slopes, drainages, and Fourmile Creek
- Excellent viewing and scenic opportunities at higher elevations (e.g. Peak 6600)
- Creation of a loop trail makes it easier to manage users by providing a better flow of trail users
- Very high dispersion of trail users
- Visits the historic railroad grade (i.e. Switzerland Trail) and historic mine site, which could be interpreted for their cultural and historical significance

Arguments Against / Negatives / Constraints

- Alaska Road is a county road but is privately maintained
- Access to Alaska Road for regular patrol and parking compliance would be time-consuming and limited due to its remote location and limited legal parking for Rangers

- Safety concerns along Alaska Road, a narrow, winding road, if trail users are allowed onto the road
- Brings users closer to existing social trails which may increase the possibility of re-use or continued use, thus interfering or reversing rehabilitation efforts
- Connection to Alaska Road would potentially have limited use due to its distance from the existing trailheads and lack of parking access at Alaska Road
- A regional trail connection will be provided at Fourmile Canyon, which will have less issues associated with it than a connection to Alaska Road
- Will create new impacts to wildlife, habitat, unique plant communities, and soils within trail footprint, the trail's zone of influence, and a high degree of habitat fragmentation
- Crosses and loops through much of the high value wildlife areas including Skunk Gulch (i.e. the drainage north of Canyon Loop Trail), Fourmile Creek, and large portion of the Benjamin property including Arkansas Gulch
- Extends further into the high value wildlife habitat area than Trail Option 2A or 2B
- Continued disturbance impact by paralleling Arkansas Gulch
- Crosses all drainages within high value wildlife habitat area
- Bisection of all unique and rare vegetation population types
- Crosses or is near perennial seep in west drainage, which is an important water source for wildlife
- Narrow trail loop layout can exclude some wildlife species from inside the loop as well as adjacent to trail. Not as concentrated as 2B, but affects more area the same as 2A
- Closure of mine site and placement of trail adjacent to it would have negative impacts on some wildlife that need access inside the mine (i.e. mine may be potential bat hibernacula, den site, or water source for wildlife)
- Creates a relatively large scar on land within trail footprint due to cut required to create trail on steep slopes
- Difficulties of post-construction habitat restoration of trail edge areas
- Remoteness of trails and rugged topography makes enforcement and emergency response more difficult
- More difficult and costly trail construction and maintenance on steep, highly erosive slopes compared to Trail Options 1, 2A, and 2B
- Fourmile Canyon and Alaska Road connections may put more users on these roads. However, users traversing through Betasso Preserve will be removed from roads for that duration
- Bridges required at Fourmile Creek and Skunk Gulch, which will increase cost of construction and impact to the environment
- A constructed staircase required to ascend the short cliff at railroad grade north of Fourmile Creek (currently on BLM land), which will increase cost of construction and the impact to the environment
- Short connection spur to Fourmile Drive not accessible by equestrians and of no value to equestrians or to the majority of hikers as it will be a 'no parking', dead-end access point

- Will require additional planning and permitting to complete trail connection to Fourmile Canyon (e.g. NEPA requirements for trail easement across BLM parcel, Section 404 from US Army Corps of Engineer to cross Fourmile Creek)

Trail Option 4

Arguments For / Positives / Opportunities

- Provides the maximum trail mileage that is feasible on the property to meet the recreational needs of the public including new loop trail across the Benjamin property and two potential future “no parking” access points to Fourmile Canyon and Alaska Road
- More than doubles existing trail miles at Betasso Preserve
- Opens up regional recreational options for mountain bikes and others to the west side of the property via Alaska Road, as well as the connection to Fourmile Canyon
- Potentially removes mountain bikers from dangerous uphill use of Fourmile Canyon Drive by placing them on-trail in the Betasso Preserve to achieve the same distance, workout, or experience goals
- By providing a trail to Alaska Road and across the slopes of Benjamin, it potentially reduces the potential for creation of social trails meant to accomplish the same goal
- Provides the most diverse experience for users, including gaining greater elevation, greater feeling of remoteness, and points of interest (e.g. Peak 6600, Fourmile Creek, historic mine)
- Provides the most public access to some interesting natural features such as diverse plant communities, rock outcrops, steep slopes, drainages, and Fourmile Creek
- Excellent viewing and scenic opportunities at higher elevations (e.g. Peak 6600)
- Creation of two loop trails makes it easier to manage users by providing a better flow of trail users
- Greatest dispersion of trail users
- Visits the historic railroad grade (i.e. Switzerland Trail) and historic mine site, which could be interpreted for their cultural and historical significance

Arguments Against / Negatives / Constraints

- Extends the maximum amount of all trail options into and through the high value wildlife habitat area
- Alaska Road is a county road but is privately maintained
- Access to Alaska Road for regular patrol and parking compliance would be time-consuming and limited due to its remote location and limited legal parking for Rangers
- Safety concerns along Alaska Road, a narrow, winding road, if trail users are allowed onto the road
- Brings users closer to existing social trails which may increase the possibility of re-use or continued use, thus interfering or reversing rehabilitation efforts

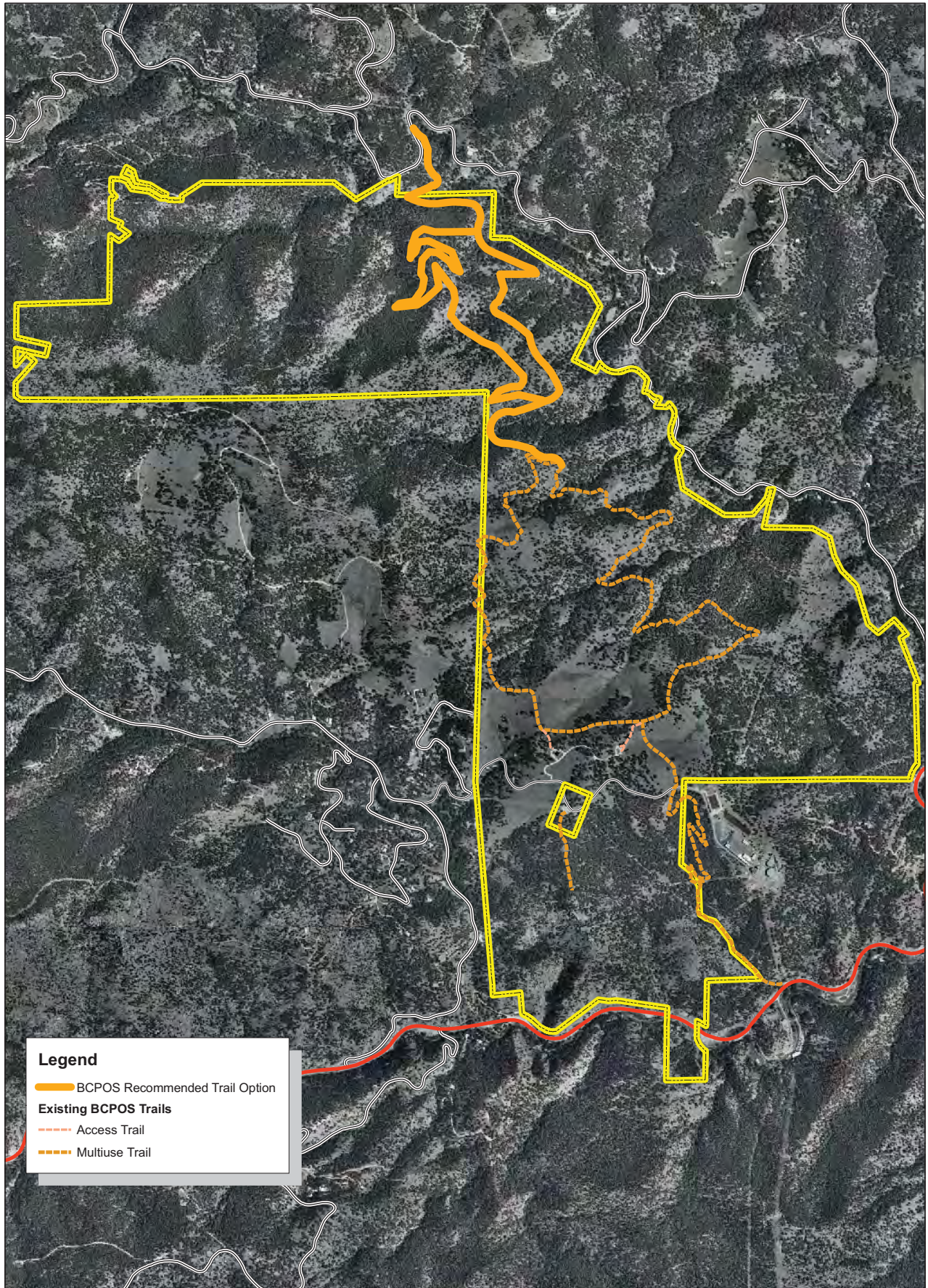
- Connection to Alaska Road would have limited use due to its distance from the existing trailheads and lack of parking access at Alaska Road
- A regional trail connection will be provided at Fourmile Canyon, which will have less issues associated with it than a connection to Alaska Road
- Will create new impacts to wildlife, habitat, unique plant communities, and soils within trail footprint, the trail's zone of influence, and the greatest habitat fragmentation impacts
- Crosses and loops through high value wildlife areas including central core of Benjamin, Skunk Gulch (i.e. the drainage north of Canyon Loop Trail) and Fourmile Creek
- Continued disturbance impact by paralleling Arkansas Gulch
- Crosses all drainages within high value wildlife habitat area twice
- Bisects all unique and rare vegetation population types
- Crosses or is near perennial seep in west drainage, which is very important water source for wildlife
- Narrow trail loop layout can exclude some wildlife species from inside the loop as well as adjacent to trail. This option contains 2 loops inside the high value wildlife habitat area
- Closure of mine site and placement of trail adjacent to it would have negative impacts on some wildlife that need access inside the mine (i.e. mine may be potential bat hibernacula, den site, or water source for wildlife)
- Creates a relatively large scar on land within trail footprint due to cut required to create trail on steep slopes
- Difficulties of post-construction habitat restoration of trail edge areas
- Remoteness of trails and rugged topography makes enforcement and emergency response more difficult
- Most difficult and costly trail construction and maintenance on steep, highly erosive slopes compared to Trail Options 1, 2A, 2B, or 3 with longest trail mileage
- Fourmile Canyon and Alaska Road connections will put more users on these roads. However, users traversing through Betasso Preserve will be removed from roads for that duration
- Bridges required at Fourmile Creek and Skunk Gulch, which may increase cost of construction and impact to the environment
- A constructed staircase required to ascend the short cliff at railroad grade north of Fourmile Creek (currently on BLM land), which will increase cost of construction and the impact to the environment
- Short connection spur to Fourmile Drive not accessible by equestrians and of no value to equestrians or to the majority of hikers as it will be a 'no parking', dead-end access point
- Will require additional planning and permitting to complete trail connection to Fourmile Canyon (e.g. NEPA requirements for trail easement across BLM parcel, Section 404 from US Army Corps of Engineer to cross Fourmile Creek)

B. Visitor Use and Services Management

1. Staff Recommendations. BCPOS recommends Trail Option 2B for construction at Betasso Preserve (Figure 14). Staff believes this trail option is the most balanced of all options, providing both new and diverse trail opportunities and protection of the most important wildlife habitat and rare and unique plant communities. It provides what staff feels is the best compromise between these two competing interests and the goals of BCPOS and the citizens of Boulder County. This trail recommendation was determined by staff prior to the delineation of the Habitat Conservation Area, which is recommended for closure to the public for its high significance (see Natural Resource section above), and therefore, only highlights the fact that staff views that portion of the Benjamin property to be of high value for its natural resource values. As stewards of the natural environment and a provider of recreational opportunities for all citizens of Boulder County, BCPOS seeks to find the best approach to managing the resources it has been charged to protect and oversee. Therefore, staff recommends Trail Option 2B based on the following reasons:

- Best compromise and most balanced approach
- Provides double the amount of trail currently at Betasso Preserve (Current total trail miles: 4.7 miles / Total trail miles with Trail Option 2B: 9.3 miles)
- Preserves the highest quality wildlife habitat and significant vegetation
- Minimizes and clusters the environmental impacts of trail footprint, the trail's zone of influence, and the impacts of habitat fragmentation
- Provides a diversity of trail experiences for multiple user groups including significant elevation gains, varied topography, high vantage points, and a blend of distinct plant community types
- Allows the public to see and experience a variety of natural features such as diverse plant communities, rock outcrops, steep slopes, drainages, and Fourmile Creek
- The additional loop trail will make it easier to disperse use and manage user conflict
- Provides additional opportunity for natural and cultural resource interpretation
- Provides a "no parking" access point to Fourmile Canyon

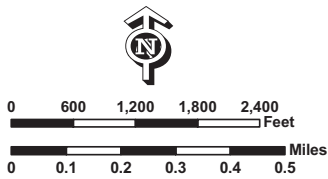
The new trail will be a multiple use trail for pedestrians, equestrians, and bikers. Due to the steep terrain, however, the trail will be narrow, steep and more technical than most other open space trails, and thus may not be appropriate for all users' abilities. The surrounding steep slopes (i.e. greater than 30 degrees in many locations) will make it necessary to create a relatively narrow trail (\approx 2 feet width). This width of trail will limit the environmental impacts by creating less cut and fill along the trail, be more sustainable over the long-term, and help to reduce the speed of mountain bikes as it forces them to slow down. A number of safety measures (e.g. signage, pullouts, increased sightlines, etc.) will be incorporated throughout the new trail system where determined necessary and feasible by BCPOS staff and with input from a variety of user groups following the final staking of the trail alignment.



Legend

- BCPOS Recommended Trail Option
- Existing BCPOS Trails**
- - - Access Trail
- . . . Multiuse Trail

Betasso Preserve Management Plan
Figure 14



BCPOS Recommended Trail Option

In addition, BCPOS recommends the creation of a new full-time, on-site, caretaker position at Betasso Preserve. A Resource Protection Ranger or Deputy will fill the position. This position will help to increase BCPOS's presence at Betasso Preserve, help manage user conflicts, increase enforcement of regulations, be available for emergency response, and help to build better partnerships. This individual would live on-site at one of the existing houses (currently rented to a private individual) and provide daily patrol and enforcement, as well as work with the diverse user groups and neighboring property owners in a collaborative approach to help preserve, protect, and manage Betasso Preserve more effectively.

BCPOS staff also recommends that the existing rules and regulations at Betasso Preserve remain in place for the time being. The alternative day use regulation, which allows mountain bike use on the Canyon Loop Trail five days a week, but prohibits them on Wednesdays and Saturdays, will be continued and be applied to the new trail system for at least two years following the construction and opening of the new trail system. After two years, a Betasso Preserve user survey will be conducted to evaluate public opinion about the alternative day use regulation. If a majority of the public shows support for continuation of the alternative day use regulation, then the regulation will remain in effect. If not, then a public review process of the regulation will occur. In addition, the directional use (one-way) regulation for mountain bikers will continue for the Canyon Loop Trail, but will not initially be applied to the new trail system. However, BCPOS will have the option at any time to institute the directional use regulation on all or part (e.g. the west side of the loop only) of the new trail if the need arises.

These regulations will be kept in place for following reasons:

- Since implemented, these regulations have helped BCPOS to manage user conflict on the Canyon Loop Trail
- Following implementation of the alternative day use regulation, a majority (67%) of visitors including many mountain bikers supported the regulation
- Provides other users, especially those with young children, equestrians, naturalist programs, and others uncomfortable sharing the trail with mountain bikes, an opportunity to utilize the trail two days a week, while still providing mountain bikers five days a week to ride the Canyon Loop Trail and the new trail system
- The education and outreach effort to date regarding the regulations has been immense and changes would be difficult to publicize, implement, and enforce.

Other future improvements at Betasso Preserve recommended by staff include:

- Improvements to the existing horse trailer parking
- Rehabilitation of all highly erosive social trails and all social trails within and leading into the Habitat Conservation Area
- Upgrades to the Canyon Link Trail where possible,
- An interpretive trail from the existing Canyon Loop Trail trailhead to the Betasso Homestead,
- Potential future expansion of the Canyon Loop trailhead parking lots if increases in visitor use numbers warrant it

In addition, if an opportunity arises, BCPOS will investigate the feasibility of a potential new trail in the southeast corner of Betasso Preserve that would provide a new link between Boulder Canyon and the Canyon Loop Trail. The goals of this new trail would be to eliminate the need to hike or bike on Boulder Canyon Drive to access Betasso Preserve from the Boulder Canyon Trail. In addition, it would provide a more sustainable trail system compared to the existing Canyon Link Trail. A new trail at this location would provide for a safer, easier, and potentially more environmentally sound connection between the City of Boulder and Betasso Preserve. If the opportunity arose for a new trail at this location, extensive resource surveys would be required to avoid and minimize impacts to natural resources, and the existing Canyon Link Trail would be closed and rehabilitated.

2. Visitor User and Services Goals, Objectives, and Management Strategies

VUS Goal 1. Provide sustainable, passive recreational trails at Betasso Preserve for the use and enjoyment by multiple user groups, while limiting recreational impacts to natural and cultural resources and neighboring properties.

Objectives and Strategies

A. Approved new recreational trails will be designed and constructed to be safe and sustainable and to limit impacts to the environment.

1. Utilize recognized sustainable trail building standards and practices.
2. Due to the steepness of the terrain and desire to minimize environmental impacts, some segments of the new trail may not support the ability of all users. Trails will need to be narrower (\approx 2-foot width) along steep slopes to create a more sustainable trail system and to avoid the environmental impacts of additional cut required for wider trails and pullouts. BCPOS will incorporate safety measures (e.g. signs, pullouts along trail, etc.) into the final trail design, construction, and maintenance where feasible and appropriate.
3. BCPOS will gather input from user groups (pedestrians, equestrians and bikers) on the new trail following the final staking of the trail alignment by conducting a site visit with user group representatives.
4. Consult with cultural resource and resource management staff when necessary to avoid potential impacts to natural and cultural resources due to new trail construction

B. All designated trails will be maintained to ensure their longevity and sustainability for the long-term use and enjoyment by the public.

1. Regularly monitor trails for maintenance needs.
2. Consult with cultural resource and resource management staff when necessary to avoid potential impacts to natural and cultural resources due to large-scale trails maintenance projects
3. Implement improvements as necessary and as available funds allow.

- C. Impacts to neighboring properties from designated trails will be limited.
1. Utilize signs, maps showing boundaries of Betasso Preserve, fencing, and enforcement to the extent possible to reduce illegal trespass.
 2. Create a neighborhood group with resource protection staff including the new Betasso Preserve caretaker that will meet regularly and address neighbor concerns and issues.
 3. Work with user groups to find reasonable methods to stop illegal trespass on neighboring properties.
 4. Monitor for and close all new social trails.
 5. Continue regular patrols and response to reports of illegal trespass
- D. User conflict on the trails will be monitored and assessed on a regular basis.
1. Install standard "share the trail" signs along trails and address any immediate trail safety concerns
 2. Conduct periodic visitor surveys including the Five-Year visitor study to gauge user conflict on trails and compare to past studies
 3. Work with user groups to find reasonable methods to reduce user conflict
 4. Continue regular patrols and response to reports of user conflict from trail users.
 5. Continue alternative day use regulation, which restricts mountain bikes on the Canyon Loop Trail on Wednesdays and Saturdays. Include the new trail in this regulation. Two years following the construction and opening of the new trail system, conduct a Betasso Preserve user survey to evaluate public opinion about the alternative day use regulation. If a majority of the public shows support for continuation of the alternative day use regulation, then the regulation will remain in effect. If not, then a public review process of the regulation will occur.
 6. Continue the one-way trail restriction for mountain bikes, which restricts mountain bikes to one direction on the Canyon Loop Trail with the direction reversing on a monthly basis. The one-way restriction will not initially apply to the new trail system. However, BCPOS will have the option at any time to institute the directional use regulation on all or part (e.g. the west side of the loop only) of the new trail if the need arises.
 7. If user conflict reaches an unacceptable level, it will be addressed with appropriate measures such as additional educational programs, signs and brochures, regulations, and trail closures, among others
- E. Abandoned mine sites with open adits, shafts, or other dangerous conditions will be evaluated, and if necessary, properly closed.
1. Where human health and safety concern warrant, mine sites including open adits, shafts, and other dangerous conditions will be closed prior to any allowed public use.
 2. If closure is warranted, an evaluation of wildlife use and rare plants surveys will be undertaken, and if necessary, mitigation measures implemented.
 3. Where necessary, hazardous condition signs will be posted prior to any new portions of the property being opened to the public.

4. Because the Habitat Conservation Area will be closed to the public, any mines within this area will not be closed, unless local, state, or federal regulations require such closures.

F. All social trails will be evaluated and potentially closed to the public and rehabilitated using generally practiced methods.

1. All social trails within the Habitat Conservation Area and those social trails, which lead into the closure area from existing trails, will be closed and rehabilitated.
2. All other highly eroded and erosive social trails throughout Betasso Preserve will be rehabilitated as resources permit and as determined by BCPOS resource management staff
3. The construction of new non-designated social trails will not be permitted, and if discovered, will be closed and rehabilitated.

G. Connections to regional trails and roadways will be pursued at Fourmile Canyon Drive across BLM parcel and the existing trail easement across private property, as well as near intersection of Fourmile Canyon Drive and Boulder Canyon Drive if opportunity arises.

1. Work with Bureau of Land Management to secure a trail easement across BLM parcel in northeast corner of Betasso Preserve, including necessary applications and environmental impact analysis.
2. Continue to work with private landowner adjacent to BLM parcel to finalize trail alignment within easement and ensure long-term compliance with terms of trail easement.
3. Evaluate and pursue any opportunity that becomes available for a feasible trail access point near the intersection of Fourmile Canyon Drive and Boulder Canyon Drive.

H. Evaluate the potential for a new Canyon Link Trail within the southeast portion of Betasso Preserve.

1. A new Canyon Link Trail will not be pursued until a new access point near the intersection of Fourmile Canyon Drive and Boulder Canyon Drive can be secured.
2. Conduct natural and cultural resource surveys of area prior to determining a trail alignment to avoid sensitive resources.
3. Determine a trail alignment that minimizes disturbance, but meets safety and sustainable trail design standards.
4. If a new Canyon Link Trail is constructed, the current Canyon Link Trail will be closed and rehabilitated.

I. Provide a no parking access point along Fourmile Canyon Drive at terminus of Fourmile Connector Trail

1. Work with Boulder County Transportation Department and Sheriff's Office to formulate appropriate measures to enforce "no parking" restriction along Fourmile Canyon Drive

2. Post no parking signs along perimeter of “no parking” access point and provide regular patrol

J. Views along the trail system will be enhanced and preserved to the extent possible.

1. Implement proper trail design and maintenance.
2. Enhance vistas through selective vegetation removal
3. Construct pull-outs or bench spots that allow for appreciation of views and vistas away from trail use

VUS Goal 2. Provide adequate facilities at Betasso Preserve for all user groups.

Objectives and Strategies

A. Improve facilities and parking access at the current Canyon Loop and Bummer’s Rock trailheads where necessary and allowed.

1. Existing facilities will be upgraded as needed and as available funds allow.
2. Redesign parking area to provide adequate horse trailer parking including working with the City of Boulder on redesign of the Bummer’s Rock Trailhead.
3. Expand or redesign the current parking areas at Betasso Preserve if future visitor use warrants it.
4. Inspect and evaluate all facilities on a periodic basis to ensure it meets the needs of the public
5. Incorporate sustainable measures in design and construction wherever possible
6. Consult with cultural resource, operations, and resource management staff when necessary to avoid potential impacts to natural, cultural, and recreational resources due to facilities projects

B. Maintain facilities and trailheads at Betasso Preserve in good condition so that they are accessible and usable by the general public.

1. Provide regular trash removal and maintenance where necessary
2. Inspect and evaluate all facilities on a periodic basis to ensure they are being properly maintained

VUS Goal 3. Provide natural and cultural history educational programs and information on-site for the public to help create understanding and an appreciation of the history and resources at Betasso Preserve and beyond.

Objectives and Strategies

A. Education and community outreach programs will be conducted on a regular basis highlighting the site’s flora, fauna, ecological processes, natural resource management activities, Betasso Homestead, and ranching and mining history.

1. Continue current education and community outreach programming.
2. Design and construct a self-guided interpretive loop trail to Betasso Homestead.
3. Design and install interpretive panels for Betasso Homestead loop trail.

4. Potentially expand Nature Detectives program to include portions of Benjamin property.
- B. Additional interpretive materials and information will be provided to the public.
1. Update brochures, kiosks, and maps when necessary.
 2. Utilize kiosks, brochures, interpretive signs, and BCPOS web site to distribute information.

VUS Goal 4. Ensure public safety at Betasso Preserve as well as the protection of natural and cultural resources.

Objectives and Strategies

- A. Create a new on-site Ranger/Deputy caretaker position
1. As available funds allow, advertise and hire a new on-site caretaker.
 2. The caretaker will be responsible for patrol, emergency response, general open space management, special projects, and working collaboratively with neighbors and user groups. Patrol by other Resource Protection staff will continue
- B. Conduct regular patrols to mitigate violations and user conflicts.
1. Utilize consistent and enforceable signage.
 2. Provide trail user education, trailhead displays, and patrol by rangers, education and outreach staff, and volunteer park hosts.
 3. Provide increased patrol during the first year of new trail opening, as well as increased coverage after the University of Colorado resumes classes in the fall.
 4. Where necessary, cite violators.
- C. Identify, map, and regularly inspect all emergency access points and roads.
1. Acquire firm access agreements from neighbors for emergency and regular maintenance access to the property.
 2. GPS all trails, emergency access routes and landing zones and incorporate into BCPOS's GIS layers.
- D. Work with local emergency response personnel
1. Meet with local fire and rescue authorities periodically to discuss emergency response plans and identify possible landing zones and other evacuation routes.
 2. Distribute all trails, emergency access routes, and landing zones to local fire and rescue authorities.
- E. Work with neighbors and adjacent landowners.
1. Work with the adjacent neighborhoods and landowners to identify trespass and social trails that cross private lands not otherwise granted by easement.

2. Implement strategies and infrastructure necessary to reduce unwanted visitation and trespass (e.g. signage, barriers, closure and rehabilitation of social trails, increased enforcement presence and ticketing)

VUS Goal 5 Create volunteer partnerships at Betasso Preserve.

Objectives and Strategies

A. Utilize volunteers to interpret and preserve the cultural and natural resources and help with the management of the trail system at Betasso Preserve

1. Continue Park Hosts and Volunteer Naturalists programs.
2. Include an Adopt-A-Trail section for the new trail as well as utilizing the Trail Stewardship Program.
3. Develop training opportunities with volunteers to help them become more familiar with the property.
4. Seek new volunteer opportunities for existing and new partners.

B. Utilize volunteers to build and maintain the trail system at Betasso Preserve.

1. Schedule trail volunteer opportunities.

VUS Goal 6. Maintain open communication with public and other agencies.

Objectives and Strategies

A. Work with outside agencies, neighbors, fire districts, and the public regarding management of Betasso Preserve.

1. Meet with outside agencies, neighbors, fire districts, and the public periodically and when necessary to discuss management activities at Betasso Preserve.

VUS Goal 7. Acquire interest in key parcels of land adjacent to or within the vicinity of Betasso Preserve for the protection of wildlife habitat and to acquire trail connections, as opportunities arise.

Objectives and Strategies

A. Acquire fee simple interest or easements from willing landowners over key parcels near Betasso Preserve, if desirable.

1. Evaluate and potentially pursue real estate opportunities adjacent to or within the vicinity of Betasso Preserve that provide significant wildlife habitat, trail connections, or other values of the citizens of Boulder County.

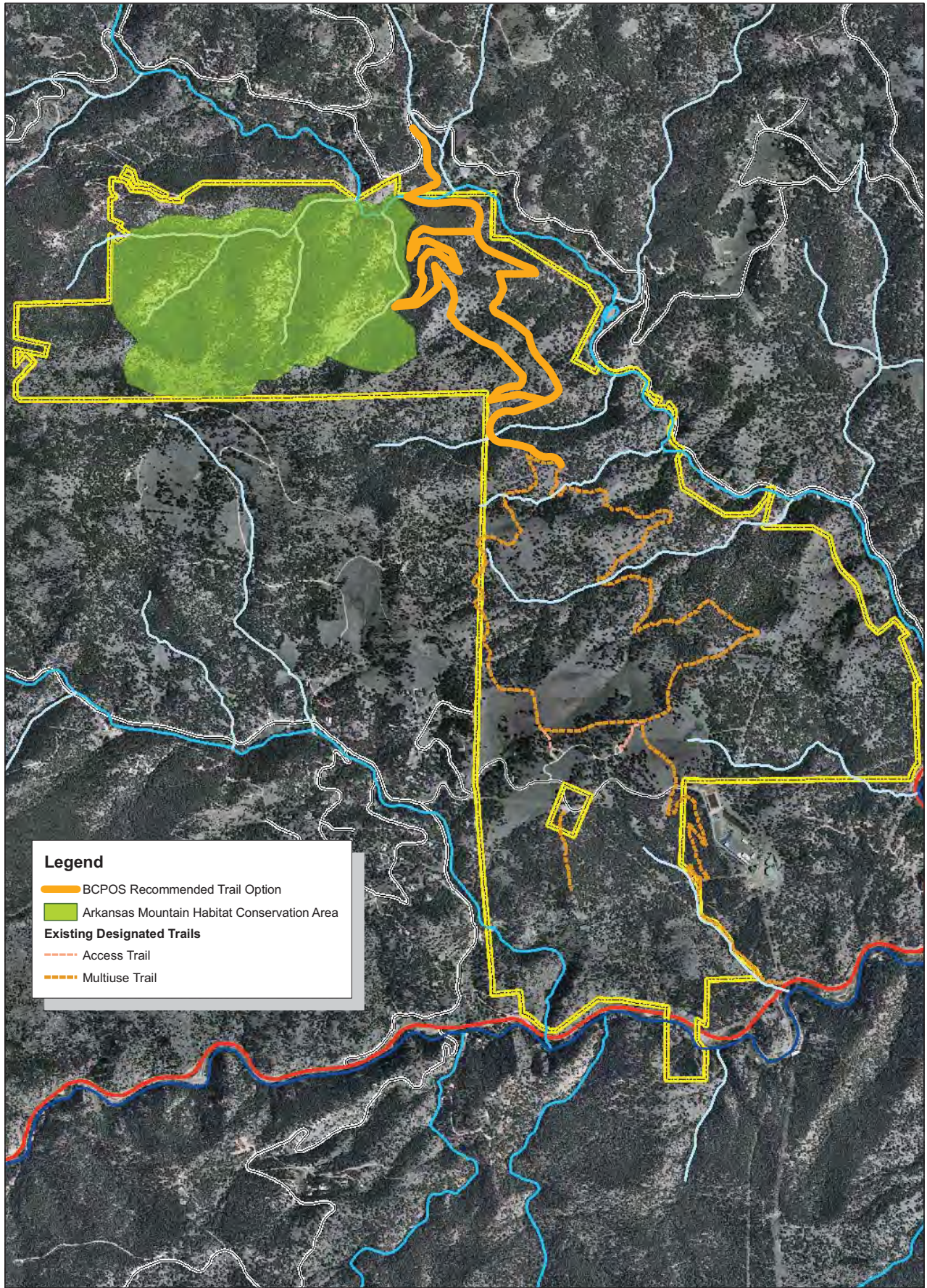
B. Acquire trail access across the U.S. Bureau of Land Management parcel located on the northeast corner of the property

1. Pursue a trail easement or land trade with BLM under the Recreation and Public Purposes Act (43 USC 869 et. seq.) including any necessary applications or further environmental impact analysis.

VII. Summary of Management Actions

The following is a summary of management actions proposed in this plan. Figure 15 shows the new trail alignment and the location of the Habitat Conservation Area. Table 12 provides all management goals, objectives, and strategies along with the timing and priority for each strategy. The future management of Betasso Preserve will include:

- The addition of 4.6 new miles of sustainable, multi-use trail, thus creating a total of 9.3 miles of trail at Betasso Preserve (Figure 15)
- The 202-acre Arkansas Mountain Habitat Conservation Area, which will be managed for its unique and significant natural resource values and closed to the public (Fig 15)
- The creation of a new on-site ranger/deputy caretaker position, who will be responsible for patrol, emergency response, general maintenance, special project, and improving communication and collaboration with neighbors and user groups
- Actively work with user groups, neighbors, and other agencies to better manage Betasso Preserve, including meeting with each group regularly
- Actively work with neighboring property owners to resolve issues of illegal trespass
- Provide regional trail / roadway connection at Fourmile Canyon Drive
- Continue alternative day use regulation, which restricts mountain bikes on the Canyon Loop Trail on Wednesdays and Saturdays, and include new trail. Conduct a Betasso Preserve user survey two years following the opening of the new trail system to evaluate public opinion about the regulation. If a majority of the public shows support for continuation of the regulation, then it will remain in effect. If not, then a public review process of the regulation will occur.
- Continue the one-way trail restriction for mountain bikes on the Canyon Loop Trail. The one-way restriction will not initially apply to the new trail system. However, BCPOS will have the option at any time to institute the directional use regulation on all or part (e.g. the west side of the loop only) of the new trail if the need arises.
- Rehabilitation and closure of all social trails that are within and around the Habitat Conservation Area and those outside of this area as resources and need dictate
- A potential future new Canyon Link Trail near the intersection of Fourmile Canyon Drive and Boulder Canyon Drive if a feasible access opportunity arises and a trail can be constructed in the southeast portion of Betasso Preserve without significant impacts to sensitive resources and with the closure of the existing Canyon Link Trail
- An adaptive management approach to natural resource management using the best available science and accepted standards and practices
- Forest management within areas identified as needing treatments
- Continued weed control using an approved integrated pest management approach
- Preservation and protection of historic buildings, structures, and features, with the future creation of a self-guided interpretive trail to the Betasso Homestead
- Continued maintenance and improvements to existing trails and facilities as the need warrants, focusing on sustainability in design and construction
- Continuation of current education and community outreach efforts and expand the use of volunteers through a variety of existing and new partnerships
- Continuation of regular patrol of Betasso Preserve



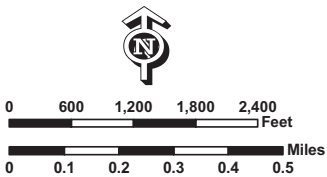
Legend

- BCPOS Recommended Trail Option
- Arkansas Mountain Habitat Conservation Area

Existing Designated Trails

- Access Trail
- Multiuse Trail

Betasso Preserve Management Plan
Figure 15



BCPOS Management Recommendations

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS		OBJECTIVES		STRATEGIES		TIMING PRIORITY	
NATURAL RESOURCES (NR)							
NR Goal 1. Protect, preserve, maintain, and restore the ecological integrity of Betasso Preserve's native ecosystems and the natural ecological processes that sustain them.	A. Natural resource management decisions and assessment of impacts to the resources from management activities and public use will be based on the best available science and accepted standards and practices.	1. Stay informed of current natural resource management issues through professional journals, conferences, and consultation with outside experts (e.g. CDOW, USFWS, CNHP, etc.) when necessary and apply to management decisions and assessments				O	M
	B. Viable populations of existing native plant and wildlife species will be maintained throughout the site to the extent possible by using appropriate management tools.	1. Utilize integrated pest management, mechanical thinning of forests, prescribed fire, native plant restoration, soil stabilization, and installation of necessary wildlife structures such as blue bird boxes, where appropriate and necessary 2. Protect and preserve high quality habitat through the designation of the Arkansas Mountain Habitat Conservation Area, where there will be no public use, closure of social trails, and appropriate management				P	M
		3. The exact boundary of the HCA will be delineated in the field by BCPOS staff and be defined with signs. Slight alterations to the east boundary of the HCA may occur to allow sufficient room for the construction of the adjacent trail, if necessary.				O	H
		4. Protect and preserve habitat within other undeveloped areas of Betasso Preserve with closure of social trails, limited future trail development, and appropriate management				O	M
		5. Prior to any land management activity, the effects of the activity on existing native plant and wildlife species will be taken into consideration to ensure that potential negative impacts are mitigated.				P	M
	C. Sensitive resource areas, including any known or discovered nest sites for sensitive bird/raptor species, den sites for large mammals, or rare plant communities, will be protected from impacts from recreational use, trails, and other infrastructure.	1. Inventory new trail corridor for sensitive resources before construction with potential for realignment based on findings.				S	H
		2. Survey all trail corridors periodically during use for presence of sensitive resources				P	M
		3. Institute temporary or seasonal trail closures where necessary and appropriate due to presence of sensitive resources				P	H
		4. Use appropriate and necessary management tools within sensitive resource areas				P	M
		5. Revegetate disturbed soils with native species where necessary and appropriate				P	M
	D. An adaptive management approach will be utilized to ensure the most effective management of natural resources.	1. Develop plan of action based on current management goals and objectives and predicted outcomes based on current information and understanding				P	M

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
Priority: H: high priority, M: medium priority, L: low priority

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS	OBJECTIVES	STRATEGIES	TIMING	PRIORITY
		2. Implement plan of action	P	M
		3. Monitor the resource prior to, during, and following the management action	P	M
		4. Revise plans based on monitoring results and new information and understanding, and begin adaptive management process again	P	M
	E. Biological data will be collected and analyzed on a regular basis to document existing plant and wildlife species, track trends in species composition and numbers, and assess the effects of management decisions.	1. Periodically monitor indicator wildlife species including raptors (goshawk), large carnivores, ungulates, bats, breeding birds, Abert's squirrel, and mesopredators (e.g. marten)	P	M
		2. Reassess the need for remapping the vegetation within 10 years and re-map if necessary	L	L
		3. Periodically re-assess forest condition	P	M
	F. A matrix of habitat types and movement corridors will be provided for wildlife species.	1. High quality habitat and movement corridors will be protected and preserved with the designation of the Arkansas Mountain Habitat Conservation Area which will have no public use, closure of social trails, and appropriate management	O	H
		2. Habitat and movement corridors within the remainder of Betasso Preserve will be protected through closure of social trails, limited future trail development, and appropriate management	O	M
	G. Maintenance of native plant communities will be dependent on natural ecological processes, or prescriptions based on these processes, to the extent possible to allow ecological systems to function within their natural range of variability, thus encouraging healthy native plant communities.	1. To the extent possible, a hands off approach to management of natural resource will be taken, allowing natural processes to occur. However, if necessary, appropriate, and desirable, active management (e.g. prescribed fire) will be undertaken.	O	M
	H. Plant communities that have been significantly disturbed or degraded by past or current land uses will be revegetated and restored with appropriate native species where feasible and desirable.	1. Use local genotypic seed and plant stock whenever possible.	P	H
		2. Prioritize and close existing social trails beginning in fall 2009.	S	H
		3. Revegetate all disturbed soils adjacent to new trails or facilities or areas of excessive disturbance due to weed or forest management	P	M
		4. Where necessary, appropriate, and desired, restore other disturbed plant communities within Betasso Preserve	P	L
		5. Consult with cultural resource, operations, and other resource management staff when necessary to avoid potential impacts to other natural, cultural, and recreational resources due to restoration projects	P	M

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
 Priority: H: high priority, M: medium priority, L: low priority

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS	OBJECTIVES	STRATEGIES	TIMING	PRIORITY
	I. Excessive soil erosion along trails, facilities, and elsewhere will be kept in check via appropriate erosion control measures to minimize impacts to habitats and water quality.	1. Implement best management practices for soil erosion during new trail construction and around any new or renovated facilities 2. Periodically monitor entire site to track changes in erosion and implement best management practices where necessary and appropriate	P	M
NR Goal 2. Manage forested ecosystems within Betasso Preserve within their natural range of variability, while first and foremost ensuring public safety.	A. The density of woody vegetation within forested systems will be managed based on historic density levels and desired future conditions.	1. Plan, develop, and implement forest management plan for Betasso Preserve based on best available science and accepted standards and practices. 2. Consult with cultural resource, operations, and other resource management staff when necessary to avoid potential impacts to other natural, cultural, and recreational resources due to forestry projects. 3. Utilize mechanical thinning, which may include the use of temporary roads/landings and forest extraction equipment, and prescribed fire treatments, which may include construction of fire containment lines and temporary roads and fire equipment, where necessary and appropriate, and with proper approvals 4. Monitoring of forestry projects will be completed to track and mitigate any potential erosion.	S	H
	B. Mitigation measures will be pursued on-site to reduce the risk of catastrophic wildfire spreading to and from the site, while maintaining the site's ecological integrity.	1. Work with local fire protection districts, adjacent landowners, and other agencies on cross-boundary wildfire mitigation measures.	P	M
NR Goal 3. Control and suppress non-native invasive species.	A. Manage State and County listed noxious weeds and other undesirable non-native species throughout Betasso Preserve.	1. Survey and map State and County listed and other undesirable non-native species regularly 2. Utilize county weed management plan to identify State list A and B weed species, which require targeted control.	O	H
		3. Utilize County-approved integrated pest management plan to control and suppress non-native species 4. Consult with cultural resource, operations, and other resource management staff when necessary to avoid potential impacts to other natural, cultural, and recreational resources due to weed management projects	O	M
NR Goal 4. Conduct natural resource research at Betasso Preserve	A. Natural resource research at Betasso Preserve will be conducted whenever possible to help formulate a better understanding of the resources, present on-site and their response to various management scenarios.	1. Encourage and utilize BCPOS staff, outside researchers (e.g. university staff and students), BCPOS Small Grants recipients, and others to conduct research at Betasso Preserve whenever possible 2. Incorporate research finding in management planning where appropriate	P	M
CULTURAL RESOURCES (CR)				

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
Priority: H: high priority, M: medium priority, L: low priority

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS	OBJECTIVES	STRATEGIES	TIMING	PRIORITY
CR Goal 1. Preserve and protect the historic buildings, structures, and features within Betasso Preserve important to the cultural heritage of the property and Boulder County.	A. Prevent excessive deterioration of historic buildings and structures.	1. Inspect and evaluate historical buildings and structures periodically for necessary repairs 2. Consult with operations and resource management staff when necessary to avoid potential impacts to natural and recreational resources due to improvement projects 3. Implement improvement projects as necessary and as available funds allow.	P	M
	B. Protect historic buildings and structures from vandalism and looting.	1. Regularly patrol historic sites for vandalism and looting.	O	M
	C. Preserve the historic landscape around the McDonald cabin	1. If possible and desirable, preserve the genetic stock of the plum trees within the orchard adjacent to the McDonald cabin	S	M
VISITOR USE AND SERVICES (VUS)				
VUS Goal 1. Provide sustainable, passive recreational trails at Betasso Preserve for the use and enjoyment by multiple user groups, while limiting recreational impacts to natural and cultural resources and neighboring properties.	A. Approved new recreational trails will be designed and constructed to be safe and sustainable and to limit impacts to the environment.	1. Utilize recognized sustainable trail building standards and practices. 2. Due to the steepness of the terrain and desire to minimize environmental impacts, some segments of the new trail may not support the ability of all users. Trails will need to be narrower (≈ 2-foot width) along steep slopes to create a more sustainable trail system and to avoid the environmental impacts of additional cut required for wider trails and pullouts. BCPOS will incorporate safety measures (e.g. signs, pullouts along trail, etc.) into the final trail design, construction, and maintenance where feasible and appropriate. 3. BCPOS will gather input from user groups (pedestrians, equestrians and bikers) on the new trail following the final staking of the trail alignment by conducting a site visit with user group representatives. 4. Consult with cultural resource and resource management staff when necessary to avoid potential impacts to natural and cultural resources due to new trail construction	S	H
	B. All designated trails will be maintained to ensure their longevity and sustainability for the long-term use and enjoyment by the public.	1. Regularly monitor trails for maintenance needs. 2. Consult with cultural resource and resource management staff when necessary to avoid potential impacts to natural and cultural resources due to large scale trail maintenance projects 3. Implement improvements as necessary and as available funds allow.	P	M
				O
			P	M

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
Priority: H: high priority, M: medium priority, L: low priority

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS	OBJECTIVES	STRATEGIES	TIMING	PRIORITY
	C. Impacts to neighboring properties from designated trails will be limited.	<ol style="list-style-type: none"> Utilize signs, maps showing boundaries of Betasso Preserve, fencing, and enforcement to the extent possible to reduce illegal trespass. Create a neighborhood group with resource protection staff including the new Betasso Preserve caretaker that will meet regularly and address neighbor concerns and issues. Work with user groups to find reasonable methods to stop illegal trespass on neighboring properties. Monitor for and close all new social trails. Continue regular patrols and response to reports of illegal trespass. 	<p>O</p> <p>S</p> <p>S</p> <p>O</p> <p>O</p>	<p>H</p> <p>H</p> <p>H</p> <p>H</p> <p>M</p>
	D. User conflict on the trails will be monitored and assessed on a regular basis.	<ol style="list-style-type: none"> Install standard "share the trail" signs along trails and address any immediate trail safety concerns Conduct periodic visitor surveys including the Five-Year visitor study to gauge user conflict on trails and compare to past studies Work with user groups to find reasonable methods to reduce user conflict Continue regular patrols and response to reports of user conflict from trail users. Continue alternative day use regulation, which restricts mountain bikes on the Canyon Loop Trail on Wednesdays and Saturdays. Include the new trail in this regulation. Two years following the construction and opening of the new trail system, conduct a Betasso Preserve user survey to evaluate public opinion about the alternative day use regulation. If a majority of the public shows support for continuation of the alternative day use regulation, then the regulation will remain in effect. If not, then a public review process of the regulation will occur. Continue the one-way trail restriction for mountain bikes, which restricts mountain bikes to one direction on the Canyon Loop Trail with the direction reversing on a monthly basis. The one-way restriction will not initially apply to the new trail system. However, BCPOS will have the option at any time to institute the directional use regulation on all or part (e.g. the west side of the loop only) of the new trail if the need arises. If user conflict reaches an unacceptable level, it will be addressed with appropriate measures such as additional educational programs, signs and brochures, regulations, and trail closures, among others 	<p>S</p> <p>P</p> <p>O</p> <p>O</p> <p>S</p> <p>S</p> <p>P</p>	<p>H</p> <p>M</p> <p>H</p> <p>M</p> <p>H</p> <p>H</p> <p>H</p>

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
 Priority: H: high priority, M: medium priority, L: low priority

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS	OBJECTIVES	STRATEGIES	TIMING	PRIORITY
	E. Abandoned mine sites with open adits, shafts, or other dangerous conditions will be evaluated and if necessary property closed.	<ol style="list-style-type: none"> Where human health and safety concern warrant, mine sites including open adits, shafts, and other dangerous conditions will be closed prior to any allowed public use. If closure is warranted, an evaluation of wildlife use and rare plants surveys will be undertaken, and if necessary, mitigation measures implemented. Where necessary, hazardous condition signs will be posted prior to any new portions of the property being opened to the public. Because the Habitat Conservation Area will be closed to the public, any mines within this area will not be closed, unless local, state, or federal regulations require such closures. 	S	H
		<ol style="list-style-type: none"> All social trails will be evaluated and potentially closed to the public and rehabilitated using generally practiced methods. 	S	H
		<ol style="list-style-type: none"> All social trails within the Habitat Conservation Area and those social trails which lead into the closure area from existing trails will be closed and rehabilitated. All other highly eroded and erosive social trails throughout Betasso Preserve will be rehabilitated as resources permit and as determined by BCPOS resource management staff The construction of new non-designated social trails will not be permitted, and if discovered, will be closed and rehabilitated. 	O	H
	G. Connections to regional trails and roadways will be pursued at Fourmile Canyon Drive across BLM parcel and the existing trail easement across private property and near intersection of Fourmile Canyon Drive and Boulder Canyon Drive if opportunity arises.	<ol style="list-style-type: none"> Work with Bureau of Land Management to secure a trail easement across BLM parcel in northeast corner of Betasso Preserve, including necessary applications and environmental impact analysis. Continue to work with private landowner adjacent to BLM parcel to finalize trail alignment within easement and ensure long term compliance with terms of trail easement. Evaluate and pursue any opportunity that becomes available for a feasible trail access point near the intersection of Fourmile Canyon Drive and Boulder Canyon Drive. 	S / L	H
	H. Evaluate the potential for a new Canyon Link Trail within the southeast portion of Betasso Preserve.	<ol style="list-style-type: none"> A new Canyon Link Trail will not be pursued until a new access point near the intersection of Fourmile Canyon Drive and Boulder Canyon Drive can be secured. Conduct natural and cultural resource surveys of area prior to determining a trail alignment to avoid sensitive resources. Determine a trail alignment that minimizes disturbance, but meets safety and sustainable trail design standards. If a new Canyon Link Trail is constructed, the current Canyon Link Trail will be closed and rehabilitated. 	L	M
			L	M
			L	M
			L	M
			L	L

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
 Priority: H: high priority, M: medium priority, L: low priority

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS	OBJECTIVES	STRATEGIES	TIMING	PRIORITY
	I. Provide a no parking access point along Fourmile Canyon Drive at terminus of Fourmile Connector Trail	1. Work with Boulder County Transportation Department and Sheriff's Office to formulate appropriate measures to enforce no parking restriction along Fourmile Canyon Drive 2. Post no parking signs along perimeter of no parking access point and provide regular patrol	S	H
	J. Views along the trail system will be enhanced and preserved to the extent possible.	1. Implement proper trail design and maintenance. 2. Enhance vistas through selective vegetation removal 3. Construct pull-outs or bench spots that allow for appreciation of views and vistas away from trail use	P	L
	A. Improve facilities and parking access at the current Canyon Loop and Bummer's Rock trailheads where necessary and allowed.	1. Existing facilities will be upgraded as needed and as available funds allow. 2. Redesign parking area to provide adequate horse trailer parking including working with the City of Boulder on redesign of the Bummer's Rock Trailhead. 3. Expand or redesign the current parking areas at Betasso Preserve if future visitor use warrants it. 4. Inspect and evaluate all facilities on a periodic basis to ensure it meets the needs of the public 5. Incorporate sustainable measures in design and construction wherever possible 6. Consult with cultural resource, operations, and resource management staff when necessary to avoid potential impacts to natural, cultural, and recreational resources due to facilities projects	O	M
	B. Maintain facilities and trailheads at Betasso Preserve in good condition so that they are accessible and usable by the general public.	1. Provide regular trash removal and maintenance where necessary 2. Inspect and evaluate all facilities on a periodic basis to ensure they are being properly maintained	P	M
	VUS Goal 3. Provide natural and cultural history educational programs and information on-site for the public to help create understanding and an appreciation of the history and resources at Betasso Preserve and beyond.	1. Continue current education and community outreach programming. 2. Design and construct a self guided interpretive loop trail to Betasso Homestead. 3. Design and install interpretive panels for Betasso Homestead loop trail. 4. Potentially expand Nature Detectives program to include portions of Benjamin property.	O	M
			S	M
			S	M
			S	M

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
Priority: H: high priority, M: medium priority, L: low priority

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS	OBJECTIVES	STRATEGIES	TIMING	PRIORITY
	B. Additional interpretive materials and information will be provided to the public.	<ol style="list-style-type: none"> 1. Update brochures, kiosks, and maps when necessary. 2. Utilize kiosks, brochures, interpretive signs, and BCPOS web site to distribute information. 	P	M
VUS Goal 4. Ensure public safety at Betasso Preserve as well as the protection of natural and cultural resources.	A. Create a new on-site Ranger/Deputy caretaker position	<ol style="list-style-type: none"> 1. As available funds allow, advertise and hire a new on-site caretaker. 2. The caretaker will be responsible for patrol, emergency response, general open space management, special projects, and working collaboratively with neighbors and user groups. Patrol by other Resource Protection staff will continue. 	S	H
	B. Conduct regular patrols to mitigate violations and user conflicts.	<ol style="list-style-type: none"> 1. Utilize consistent and enforceable signage. 2. Provide trail user education, trailhead displays, and patrol by rangers, education and outreach staff, and volunteer park hosts. 3. Provide increased patrol during the first year of new trail opening, as well as increased coverage after the University of Colorado resumes classes in the fall. 4. Where necessary, cite violators. 	O	H
	C. Identify, map, and regularly inspect all emergency access points and roads.	<ol style="list-style-type: none"> 1. Acquire firm access agreements from neighbors for emergency and regular maintenance access to the property. 2. GPS all trails, emergency access routes and landing zones and incorporate into BCPOS's GIS layers 	S	H
	D. Work with local emergency response personnel	<ol style="list-style-type: none"> 1. Meet with local fire and rescue authorities periodically to discuss emergency response plans and identify possible landing zones and other evacuation routes. 2. Distribute all trails, emergency access routes, and landing zones to local fire and rescue authorities. 	P	H
	E. Work with neighbors and adjacent landowners.	<ol style="list-style-type: none"> 1. Work with the adjacent neighborhoods and landowners to identify trespass and social trails that cross private lands not otherwise granted by easement. 2. Implement strategies and infrastructure necessary to reduce unwanted visitation and trespass (e.g. signage, barriers, closure and rehabilitation of social trails, increased enforcement presence and ticketing) 	S	H
VUS Goal 5 Create volunteer partnerships at Betasso Preserve.	A. Utilize volunteers to interpret and preserve the cultural and natural resources and help with the management of the trail system at Betasso Preserve	<ol style="list-style-type: none"> 1. Continue Park Hosts and Volunteer Naturalists programs. 2. Include an Adopt-A-Trail section for the new trail as well as utilizing the Trail Stewardship Program. 3. Develop training opportunities with volunteers to help them become more familiar with the property. 	O	M
			O	M
			O	M

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
 Priority: H: high priority, M: medium priority, L: low priority

Table 12. Betasso Preserve Management Plan - Summary of Management Goals, Objectives, and Strategies

GOALS	OBJECTIVES	STRATEGIES	TIMING	PRIORITY
		4. Seek new volunteer opportunities for existing and new partners.	O	H
	B. Utilize volunteers to build and maintain the trail system at Betasso Preserve.	1. Schedule trail volunteer opportunities.	O	H
VUS Goal 6. Maintain open communication with public and other agencies.	A. Work with outside agencies, neighbors, fire districts, and the public regarding management of Betasso Preserve.	1. Meet with outside agencies, neighbors, fire districts, and the public periodically and when necessary to discuss management activities at Betasso Preserve.	P	H
VUS Goal 7. Acquire interest in key parcels of land adjacent to or within the vicinity of Betasso Preserve for the protection of wildlife habitat and to acquire trail connections, as opportunities arise.	A. Acquire fee simple interest or easements from willing landowners over key parcels near Betasso Preserve, if desirable. B. Acquire trail access across the U.S. Bureau of Land Management parcel located on the northeast corner of the property	1. Evaluate and potentially pursue real estate opportunities adjacent to or within the vicinity of Betasso Preserve that provide significant wildlife habitat, trail connections, or other values of the citizens of Boulder County. 1. Pursue a trail easement or land trade with BLM under the Recreation and Public Purposes Act (43 USC 869 et. seq.) including any necessary applications or further environmental impact analysis.	L	L
			S	H

Timing: S: short-term (< 5 years), L: long-term (> 5 years), O: on-going, P: periodic
 Priority: H: high priority, M: medium priority, L: low priority

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PART THREE: APPENDICES

- A. Betasso Preserve Acquisition Map (from BCPOS 1985)**
- B. Property Encumbrances**
- C. Open Space Sections from *Boulder County Comprehensive Plan***
- D. Summary of Initial Public Comments (February – March 2008)**
- E. Summary of the Betasso Preserve Stakeholder Group (October 2008 – January 2009)**
- F. U.S. National Vegetation Classification System**
- G. Betasso Preserve Plant Species List**
- H. Summary of 2008 Wildlife Surveys**
- I. Betasso Preserve Wildlife Species List**
- J. Historical Land Ownership of Betasso Preserve (from BCPOS 1985)**
- K. Betasso Ranch – Boulder County Historic Landmark Nomination Form**
- L. Rapid Resource Assessment, Benjamin/Betasso Open Space, Boulder County, Colorado (ERO Resources Corporation 2007)**
- M. Benjamin Property and Betasso Preserve Trail Feasibility Study (IMBA Trail Solutions and ERO Resources 2008)**
- N. BCPOS Interdisciplinary Team Members**

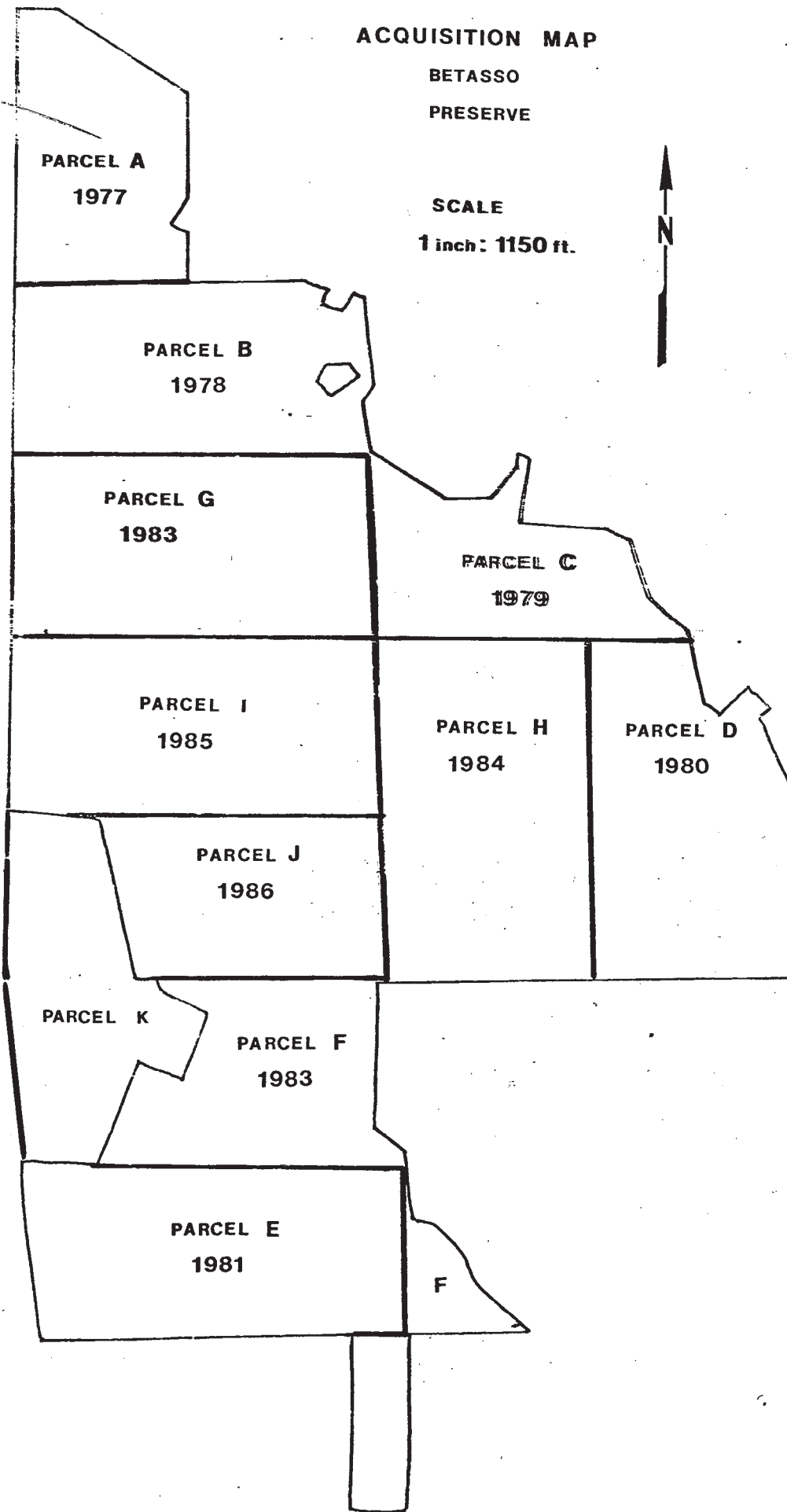
A. Betasso Preserve Acquisition Map (from BCPOS 1985)

ACQUISITION MAP

Figure 5

**BETASSO
PRESERVE**

**SCALE
1 inch: 1150 ft.**



B. Property Encumbrances

Appendix B

Property Encumbrances

Betasso Property

1. Right of way, whether in fee or easement only, for County Road No. 118 (Fourmile Canyon Drive); and Colorado State Highway 119 (Boulder Canyon).
2. Any rights, interest or easements in favor of the United States, the State of Colorado or the Public, which exists or are claimed to exist in and over the present and past bed, banks or waters of Fourmile Creek.
3. Right of way for ditches and canals constructed by the authority of the United States, as reserved in United States Patent recorded September 21, 1920 in Book 75 at Page 91.
4. Right of way for ditches and canals constructed by the authority of the United States, as reserved in United States Patent recorded February 2, 1923 in Book 75 at Page 131.
5. The right of proprietor of a vein or lode to extract or remove his ore should the same be found to penetrate or intersect the premises thereby granted as reserved in United States patent recorded December 18, 1893 in Book 100 at Page 75; and any and all assignments thereof or interest therein.
6. Right of way for ditches and canals constructed by the authority of the United States, as reserved in United States Patent recorded September 10, 1928 in Book 369 at Page 109.
7. An easement for electrical appurtenances and incidental purposes granted to Public Service Company of Colorado by the instrument recorded December 28, 1948 in Book 840 at Page 242.
8. An easement for electrical appurtenances and incidental purposes granted to Public Service Company of Colorado by the instrument recorded April 20, 1954 in Book 949 at Page 151.
9. Right of way, agreements, and obligations contained in the Right of Way Deed, granted to the City of Boulder, a municipal corporation recorded April 17, 1962 in Book 1226 at Page 213.
10. An easement for water pipeline and incidental purposes granted to the City of Boulder, a municipal corporation by the instrument recorded June 21, 1962 in Book 1234 at Page 383.

11. Covenants, conditions and restrictions, which do not include a forfeiture or reverter clause, set forth in the instrument recorded October 11, 1973 at Reception No. 83395. Provisions regarding race, color, creek, and national origin, if any, are deleted.
12. Terms, conditions, provisions, agreements and obligations contained in the Easement Agreement between the City of Boulder and the County of Boulder for the Lakewood Pipeline recorded October 4, 1994 at Reception No. 1467761.
13. Terms, conditions, provisions, agreements, and obligations contained in the Permanent Easement Deed and Agreement recorded March 17, 1999 at Reception No. 1917437.
14. The affects of Resolution 99-81 (A resolution conditionally approving Docket #HP-99-04: Designation of the Betasso Ranch complex and site in unincorporated Boulder County as an historic landmark under the Boulder County Historic Preservation Regulations) recorded August 13, 1999 at Reception No. 197351.
15. Survey matters as set forth on Land Survey Plat dated May 2000, File No. 3-911.

Benjamin Property

1. Reservation by the State of Colorado for all rights to any and all minerals, ores, and metals of any kind and character and all coal, asphaltum, oil, gas, or other like substance in or under said land, the right of ingress and egress for the purpose of mining, together with enough of the surface of the same as may be necessary for the proper and convenient working of such minerals and substances, as reserved in Patent recorded April 26, 2007 as Reception No. 2851778. (Affects Parcel I)
2. Reservation of all rights to any and all minerals, ores, and metals of any kind and character and all coal, asphaltum, oil, gas, or other like substance in or under said land, the right of ingress and egress for the purpose of mining, together with enough of the surface of the same as may be necessary for the proper and convenient working of such minerals and substances, as set forth in Patent recorded July 15, 1993 on Film 1846 as Reception No. 1314631. (Affects Parcel II)
3. Such rights as may exist in and to the County Road shown on the map on file in the office of the Boulder County Assessor and as set forth in document recorded February 6, 1976 on Film 914 as Reception No. 166180. (Affects Parcel II)
4. Reservation contained in Patent recorded September 23, 1919 in Book 385 at Page 142, which provide as follows:

First, there is reserved from the lands herein, a right of way for ditches or canals constructed by the authority of the United States.

Second, that in the absence of necessary legislation by Congress, the Legislature of Colorado may provide rules for working the mining claims or premises hereby granted, involving easements, drainage, and other necessary means to its complete development. (Affects Parcel III)

5. Reservation of all rights to any and all minerals, ores, and metals of any kind and character and all coal, asphaltum, oil, gas, or other like substance in or under said land, the right of ingress and egress for the purpose of mining, together with enough of the surface of the same as may be necessary for the proper and convenient working of such minerals and substances, as set forth in Patent recorded August 13, 1976 on Film 934 as Reception No. 187899. (Affects Parcel IV)
6. A right of way for ditches or canals constructed by authority of the United States as reserved in Patent recorded April 26, 1945 in Book 756 at Page 223. (Affects Parcel V)
7. Reservation of all the coal and other minerals, together with the right to prospect for, mine and remove the same as set forth in Patent recorded April 26, 1945 in Book 756 at Page 223. (Affects Parcel V)
8. Such rights as may exist in and to Salina Road aka Four-Mile Canyon Road aka County Road No. 118 as shown on the map on file in the office of the Boulder County Assessor. (Affects Parcel V)
9. A right of way for ditches or canals constructed by authority of the United States as reserved in Patent recorded September 10, 1928 in Book 369 at Page 110. (Affects Parcels VI and VII)
10. All coal and other minerals in the lands so entered and patented, together with the right to prospect for, mine and remove the same pursuant to the provisions and limitation of the Act of December 29, 1916 (39 STAT. 862), as reserved in Patent recorded September 10, 1928 in Book 369 at Page 110. (Affects Parcels VI and VII)
11. A right of way for ditches or canals constructed by authority of the United States as reserved in Patent recorded December 15, 1952 in Book 918 at Page 513. (Affects Parcel VIII)
12. That in the absence of necessary legislation by Congress, the Legislature of Colorado may provide rules for working the mining claim or premises, involving easements, drainage, and other necessary means to its complete development, as reserved in United States Patent, recorded December 15, 1952 in Book 918 at Page 513. (Affects Parcel VIII)

13. Subject to the provisions of the Act of December 29, 1916 (39 STAT. 862) with reference to the disposition, occupancy and use of the land as permitted to an entryman under said Act, as set forth in Patent recorded December 15, 1952 in Book 918 at Page 513. (Affects Parcel VIII)
14. The grazing rights only, on the surface of the land, not inconsistent or in conflict at any time with mining operations, as reserved by Charles R. Weaver in Deed recorded July 16, 1934 in Book 624 at Page 23. (Affects Parcel VIII)
15. Right of way for ditches or canals constructed by the authority of the United States as reserved in United States Patent, recorded September 13, 1893 in Book 106 at Page 169. (Affects Parcel IX)
16. Right of a proprietor of any other vein, lode or ledge, to enter the premises (with the exception of the surface) for the purpose of removing the ore from such vein, lode, or ledge, as reserved in United States Patent, recorded September 13, 1893 in Book 106 at Page 169. (Affects Parcel IX)
17. That in the absence of necessary legislation by Congress, the Legislature of Colorado may provide rules for working the mining claim or premises, involving easements, drainage, and other necessary means to its complete development, as reserved in United States Patent, recorded September 13, 1893 in Book 106 at Page 169. (Affects Parcel IX)
18. The terms, conditions, provisions and obligations of an Agreement concerning roads recorded August 7, 1980 on Film 1128 as Reception No. 406681. (Affects Parcels I, II, III, IV, VI, and VII)
19. Such rights as may exist in and to the Arkansas Gulch, and Four Mile Creek traversing over and across said land as shown on map on file in the office of the Boulder County Assessor. (Affects Parcels III, V, VII, VIII, and IX)

Tinsley Property

1. Reservation of right of proprietor of any penetrating vein or lode to extract his ore, in U.S. Patent recorded July 30 1908 in Book 167 at Page 93.
2. Right of way, whether in fee or easement only, for Bummer Gulch over, through, upon, and across subject property.

Williams Property

1. The right of the proprietor of a vein or lode to extract and remove his ore should the same be found to penetrate or intersect the premises as contained in Patent recorded July 30, 1908 in Book 167 at Page 93.

2. Right-of-way for ditches or canals constructed by the authority of the United States as reserved in Patent recorded July 30, 1908 in Book 167 at Page 93.
3. Right-of-way for Middle Boulder Creek traversing a portion of said land as shown on map on file in the office of the Boulder County Assessor.

Hannum Property

1. Reservations and rights-of-way as set forth in Patent recorded April 26, 1945 in Book 756 at Page 223
2. Such rights as may exist in and to Fourmile Canyon Dr. (Boulder County Road No. 118) over and across said land as shown on the map on file in the office of the Boulder County Assessor.
3. Such rights as may exist in and to Fourmile Creek as it traverses said land as shown on the map on file in the office of the Boulder County Assessor.

C. Open Space Sections from *Boulder County Comprehensive Plan*

Appendix C
Relevant Goals and Policies of the
Boulder County Comprehensive Plan

Comprehensive Plan Goals

The goals of particular relevance to Betasso Preserve deal with Environmental Management, Parks and Open Space, Public Involvement, Cultural Resources, and Sustainability. These include:

Environmental Management

- B.1 Unique or distinctive natural features and ecosystems, and cultural features and sites should be conserved and preserved in recognition of the irreplaceable character of such resources and their importance to the quality of life in Boulder County. Natural resources should be managed in a manner, which is consistent with sound conservation practices and ecological principals.

- B.2 Air, water and noise pollution; inappropriate development in natural hazard areas; and overall environmental degradation should be reduced as much as possible or eliminated in order to prevent potential harm to life, health and property.

- B.3 Critical wildlife habitats should be conserved and preserved in order to avoid the depletion of wildlife and to perpetuate and encourage a diversity of species in the County.

- B.4 Significant natural communities, including significant riparian communities and rare plant sites, should be conserved and preserved to retain living examples of natural ecosystems, furnish a baseline of ecological processes and function, and enhance and maintain the biodiversity of the region.

- B.5 Wetlands, which are important to maintaining the overall balance of ecological systems, should be conserved.

- B.9 Riparian ecosystems, which are important plant communities, wildlife habitat and movement corridors, shall be protected.

Parks and Open Space

- C.1 Provision should be made for open space to protect and enhance the quality of life and enjoyment of the environment.

- C.3 Open space shall be used as a means of preserving the rural character of the unincorporated county and as a means of protecting from development those areas which have significant environmental, scenic or cultural value.

Public Involvement

- H.1 The county shall encourage public participation in the making of decisions by public and quasi-public bodies which significantly affect citizens.

Cultural Resources

- K.1 Every effort shall be made to identify and protect historic sites which meet national, state, or local criteria for historic designation from destruction or harmful alteration.

County-Wide Elements

The following policies are from specific County-Wide Elements from the Boulder County Comprehensive Plan and are of particular relevance to Betasso Preserve. These include:

Natural Hazards Element

Erosion

- NH 3.01 Erosion from development and other land use activities should be minimized, and disturbed or exposed areas should be promptly restored to a stable, natural, and/or vegetated condition using native plants and natural material.

Wildfire

- NH 5.01 The county recognizes the wildland urban interface as an area particularly at risk to wildland fires or wildfires.

- NH 5.02 Fire should be recognized as a natural and/or human-caused occurrence with certain benefits to the ecosystem. The county should strive towards balancing the natural processes of the ecosystem with development concerns so that residents may co-exist in a fire-dependent ecosystem.

- NH 5.06 Accepted methods of forest land ecosystem management should be used to reduce all severe wildfire hazard areas to a low or moderate rating, particularly in those areas inhabited with human development as defined by WHIMS.

- NH 5.07 The county should encourage private and public landowners to manage their forests to preserve the forests' ecosystem processes by developing and maintaining a diversity of species, ages, and stand densities to serve as a natural deterrent to pest and fire outbreaks. The county should implement measures to guard against the danger of fire in developments within and adjacent to

forests or grasslands.

- NH 5.08 The county should continue to work in partnership with the local fire protection districts and departments in improving fire protection services to address the increasing concerns of wildfire and the increase in development in the mountainous areas of the county.

Environmental Resources Element

Natural Areas Policies

- ER 2.07 The county shall identify and work to assure the preservation of critical wildlife habitats, Natural Areas, environmental conservation areas and significant agricultural land.
- ER 2.08 The county shall use its open space program as one means of achieving its environmental resources and cultural preservation goals.

Riparian Areas

- ER 6.01 The county will work with appropriate management agencies and property owners to protect and restore riparian areas.
- ER 6.02 The county shall work toward minimizing human impacts to riparian ecosystems from development, roads, and trails.
- ER 6.03 The county will work with appropriate entities to ensure suitable minimum and maximum stream flows that maintain channel morphology, support hydrologically connected wetlands and perpetuate species, both plant and animal, dependent on riparian ecosystems.
- ER 6.05 Management of riparian areas shall encourage use or mimicry of natural processes, maintenance or reintroduction of native species, restoration of degraded plant communities, elimination of undesirable exotic species, minimizing human impacts, and development of long-term ecological monitoring programs.

Open Space Element

Open space is defined in the Open Space Element as:

Those lands referred to in the Boulder County Comprehensive Plan, as being intentionally left free from future development, and in which it has been determined that it is, or may in the future be, within the public interest to acquire an interest in order to assure their protection. (BCCP, Open Space Element, p. 2)

In addition, passive recreation is defined as:

Outdoor activities that create opportunities for independence, closeness to nature, and a high degree of interaction with the natural environment and which requires no organization, rules of play, facilities, or the installation of equipment, other than those which may be necessary to protect the natural environment. (BCCP, Open Space Element, p. 2)

The functions of open space are:

- *Urban shaping between or around municipalities or community service areas, and buffer zones between residential and non-residential development;*
- *Preservation of: critical ecosystems; natural areas; scenic vistas and areas; fish and wildlife habitats; natural resources and landmarks; outdoor recreation areas; cultural, historic, and archaeological areas; linkages and trails; access to public lakes, streams and other useable open space lands; and scenic and stream or highway corridors;*
- *Conservation of natural resources, including but not limited to forest lands, range lands, agricultural lands, aquifer recharge areas and surface water;*
- *Protection of designated areas of environmental concern, generally in multiple ownership, where several different preservation methods (including other governmental bodies' participation or private ownership) may need to be utilized; these lands will not be considered for control by the county open space program provided sufficient evidence exists that these lands are to be preserved in a natural state.*

Resource Management

OS 2.01 The county shall identify and work to assure the preservation of Environmental Conservation Areas, critical wildlife habitats and corridors, Natural Areas, Natural Landmarks, significant areas identified in the Boulder Valley Natural Ecosystems Map, historic and archaeological sites, and significant agricultural land.

OS 2.02 Significant natural communities, rare plant sites, wetlands, and other important stands of vegetation, such as willow carrs, should be conserved and preserved.

OS 2.03 The county shall provide management plans and the means for the implementation of said plans for all open space areas that have been acquired by or dedicated to the county.

OS 2.03.01 The foremost management objectives of individual open space

lands shall follow directly from the purposes for which the land was acquired.

- OS 2.03.02 Management of county open space lands shall consider the regional context of ecosystems and adjacent land uses.
- OS 2.03.03 Management of individual open space lands, including those under agricultural leases, shall follow good stewardship practices and other techniques that protect and preserve natural and cultural resources.
- OS 2.04 The county, through its Parks and Open Space Department, shall provide appropriate educational services for the public which increase public awareness of the county's irreplaceable and renewable resources and the management techniques appropriate for their protection, preservation, and conservation.
 - OS 2.04.01 The Parks and Open Space Department shall cooperate with schools and non-profit organizations in the county to provide environmental education activities which increase awareness, understanding, appreciation, and support for stewardship of the natural and cultural resources on open space.
 - OS 2.04.02 The Parks and Open Space Department shall seek to meet the needs of diverse populations in the county by providing information and programming to accommodate special groups such as disabled persons, young people, senior citizens, and Spanish-speaking citizens.
 - OS 2.04.03 The Parks and Open Space Department shall develop and disseminate information through publications, exhibits, and other media on the uniqueness, importance, and appropriate stewardship and management of open space areas in the county.
 - OS 2.04.04 The Parks and Open Space Department shall utilize trained volunteers, cooperating groups, and private individuals to assist in the delivery of environmental education and interpretive services.
- OS 2.05 The county, through its Weed Management Program, shall discourage the introduction of exotic or undesirable plants and shall work to eradicate existing infestations through the use of Integrated Weed Management throughout the county on private and public lands.

Scenic Area and Open Corridor Protection

- OS 3.01 Where necessary to protect water resources and/or riparian habitat the county shall ensure, to the extent possible, that areas adjacent to water bodies, functional irrigation ditches and natural water course areas shall remain free from development (except designated aggregate resource areas). The county may preserve these open corridor areas by means of appropriate dedication during the development process, reasonable conditions imposed through the development process, or by acquisition.
- OS 3.02 Where appropriate the county shall continue to acquire parcels of land or right-of-way easements to provide linkages between public lands.
- OS 3.04 Areas that are considered as valuable scenic vistas and Natural Landmarks shall be preserved as much as possible in their natural state.

Recreational Use

- OS 4.02 Except as the county may establish a regional park, such as the Boulder County Fairgrounds, or others similar facilities, the county will provide only a minimum level of maintenance or development on park land (consistent with policy OS 2.03).
- OS 4.03 Recreational use of county open space land may be permitted where such use is consistent with the management plan for the property and does not adversely impact natural and cultural resources or other management objectives of the property.
 - OS 4.03.01 Recreational use shall be passive, including but not limited to hiking, photography or nature studies, and, if specifically designated, bicycling, horseback riding, or fishing. Only limited development and maintenance of facilities will be provided.
 - OS 4.03.02 Accessibility for special populations such as disabled persons, young people, senior citizens, and Spanish-speaking people shall be addressed on a system-wide basis.
- OS 4.04 Requests for special uses or events on county open space shall be evaluated for their impacts to natural and cultural resources as well as other management objectives and maintenance considerations.
- OS 4.05 Any development of regional county facilities or of county park or open space land shall be based on a plan approved by the County Commissioners after review by the Parks and Open Space

Advisory Committee.

Trails

- OS 6.01 Trails and trailheads shall be planned, designed, and constructed to avoid or minimize the degradation of natural and cultural resources, especially riparian areas and associated wildlife habitats.
- OS 6.02 Adverse effects on private lands shall be minimized insofar as possible by trail and trailhead placement, posting of rules and signs against trespassing, installation of containing fences where critical, and any other appropriate measures.
- OS 6.04 Trails shall provide for pedestrian, equestrian, bicycle, and/or other non-motorized uses, where each is warranted. Incompatible uses shall be appropriately separated.
- OS 6.08 Trails constructed by the county Parks and Open Space Department shall be soft-surface except where necessary to prevent erosion and/or other resource damage.

Public Decision Making

- OS 8.03 In developing management plans for open space areas, Parks and Open Space staff shall solicit public participation of interested individuals, community organizations, adjacent landowners and the Parks and Open Space Advisory Committee. Plans shall be reviewed by the Parks and Open Space Advisory Committee, including public comment, and recommended for adoption after public hearing by the Board of County Commissioners.
- OS 8.04 Significant changes to overall management direction or techniques shall be presented to the Parks and Open Space Advisory Committee and/or the Board of County Commissioners, with opportunity for public comment before a decision is made.

Cultural Resource Element

- CR 1.02 Significant archaeological and historic sites and structures acquired by the county both in unincorporated and incorporated areas, shall be documented, protected, preserved, and where appropriate restored.
- CR 1.02.1 After acquisition, an inventory of cultural resources on the property shall be undertaken and the historic significance of each resource shall be determined.

- CR 1.02.2 Resources that meet the criteria for local landmark, or State or National Register status should be nominated for such status by the County.

Sustainability Element (adopted May 16, 2007)

“Sustainability” means the use, development and protection of all our resources in a manner that does not deplete them while enabling the residents of Boulder County to meet their current needs and maintain a fulfilling quality of life without compromising or foregoing the ability of and opportunity for future residents to do the same.

In this context, “resources” includes the land, air and water along with the inherent value of the natural resources, biodiversity, and life-supporting functions associated with them; energy and materials for development and habitation; the essential rural, low-density character of the unincorporated county; the special historic, cultural and geographic composition of distinct rural communities within the county; the diversity of economic activities and opportunities available to individuals; and the people who live within and continue to shape our developed and natural environment. (BCCP, Sustainability Element, p. 5)

Sustainability Element Goals

1. The county recognizes and accepts that weighing individual wants and needs with those of the larger public and society is a complex but essential responsibility of government. Implementing the Comprehensive Plan involves the need to balance competing goals and policies in cases where they cannot be harmonized. With that understanding in mind, Boulder County’s land use management tools and practices should be designed to promote decisions and actions supporting outcomes that are consistent with the principles of sustainability.
3. Sustainability actions or programs undertaken by the county should address the following factors:
 - The origins or causes of wasteful resource practices as well as the harmful effects of such practices;
 - The interrelationship of systems and forces that dictate how resources are used, and;
 - The social constituencies and partners that should be involved in and served by sustainability efforts.
6. The preservation and viability of the increasingly precious resources of open and rural lands, whether devoted to agriculture, forestry, open space, or plant and wildlife habitat, as well as the sustainability of uses that provide for the long-term preservation of such lands, should be fostered and promoted through innovative regulatory and acquisition programs,

public-private partnerships, and public education, outreach and participation.

10. The county's rich and varied natural features, scenic vistas, ecosystems, and biodiversity should be protected from further intrusion, disruption, consumption and fragmentation.

**D. Summary of Initial Public Comments
(February – March 2008)**

**Betasso Preserve Management Plan
Including the Benjamin Property**

**Summary of Initial Public Comments
(February – March 2008)**



Boulder County Parks & Open Space



April 2008

Project Background

Boulder County Parks and Open Space Department is in the initial phase of preparing a combined management plan for Betasso Preserve and the recently acquired Benjamin property (Figure 1). The combined management plan will be an update to the 1985 *Betasso Preserve Management Plan* and set the future management direction for both properties, which will be managed as one unit following completion of the plan. The purpose of the management plan will be to establish the vision, goals and objectives, and implementation strategies for the properties. These will be based on an in-depth analysis and evaluation of the existing natural and cultural resources, existing and potential future public use, public sentiment, the goals and policies of the *Boulder County Comprehensive Plan* and other relevant planning documents, and additional opportunities and constraints that come to light during the planning process.

Betasso Preserve and the Benjamin property encompass a total of 1,175 acres of lower montane habitat within the foothills of the Rocky Mountains and offer a variety of open space values. The property consists of a mosaic of native plant communities and important wildlife habitat and movement corridors. Mule deer, mountain lion, black bear, and Abert's squirrel are just a small handful of the wildlife species that inhabit this landscape that is blanketed with Ponderosa pine woodlands, mixed Ponderosa pine and Douglas fir forests, open meadows with a mix of native and introduced pasture grasses, and riparian vegetation. On-site drainages include sections of Arkansas Gulch, Fourmile Creek, and a number of other unnamed, intermittent streams. In addition, the diverse and rugged topography, abundant scenic vistas, and the relative peace and quiet have made Betasso Preserve and the Benjamin property a hub for recreational activities, especially for hikers, mountain bikers, trail runners, and local equestrians. The open space also provides a piece of Boulder County history with its mining and ranching roots, as well as a grand outdoor classroom.

Currently, Betasso Preserve is open to the public seven days a week, sunrise to sunset. Three multi-use trails exist including the 3.2-mile Canyon Loop Trail, the 0.25-mile Bummer's Rock Trail, and the 1.25-mile Link Trail. Trails are open for hiking, mountain biking, trail running, and horseback riding. The Canyon Loop Trail is presently closed to mountain biking on Wednesdays and Saturdays to mitigate user conflict on the trail. Existing Betasso Preserve facilities include four parking areas, five picnic tables, one restroom, two informational kiosks, four benches, and a group shelter, which can accommodate 50 people.

For more information on Betasso Preserve, visit:

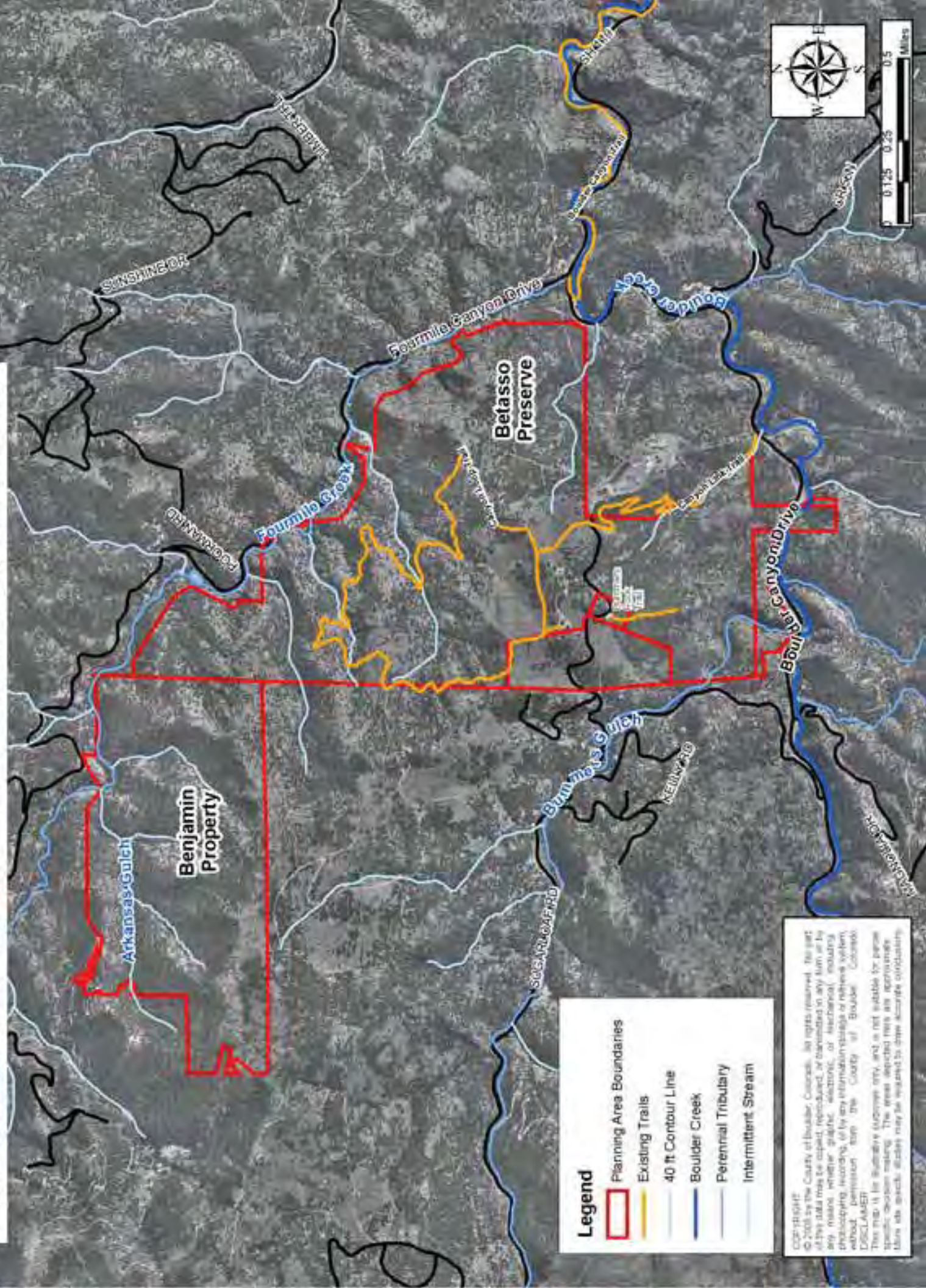
http://www.bouldercounty.org/openspace/recreating/public_parks/betasso.htm

To view the 1985 *Betasso Preserve Management Plan*, visit:

http://www.bouldercounty.org/openspace/management_plans/mgmt_plans.htm

Per the 2007 *Benjamin Property Interim Plan*, the Benjamin property is currently closed to the public pending the adoption of the combined management plan. Presently, the property has no official Parks & Open Space designated trails. However, a number of non-designated "social" trails exist on-site, which were created prior to the acquisition of the property by the County. These social trails are in fair to poor condition with many instances of erosion, downcutting, and

Figure 1. Boundaries of Betasso Preserve and the Benjamin property.



Legend

- Planning Area Boundaries
- Existing Trails
- 40 ft Contour Line
- Boulder Creek
- Perennial Tributary
- Intermittent Stream

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DISCLAIMER
 This map is for illustrative purposes only and is not suitable for precise location decisions relating to the area depicted here. An approximate data set (aerial imagery) may be required to draw accurate conclusions.

braiding, especially on steeper slopes. The future of these social trails and the designation of new sustainable trails will be determined through the management planning process.

For more information on the Benjamin property, visit:

http://www.co.boulder.co.us/openspace/management_plans/Benjamin.htm

Project Timeline

Completed to Date: The first internal interdisciplinary staff meeting regarding the Betasso Preserve Management Plan including the Benjamin property occurred on December 18, 2007. Staff reviewed background information and discussed possible management directions for the properties, as well as brainstormed opportunities and constraints. Following this meeting, staff developed a draft vision statement, draft management goals and objectives, and a list of opportunities and constraints (Appendix A). These drafts were presented to the public along with other background information via Parks and Open Space's website and at two public open house meetings during February and March 2008 (see below for details).

Upcoming Events: During spring and summer 2008, staff will be conducting natural and cultural resource surveys and assessments of the project site. A consultant will also be selected to help determine potential new trail alignments based on the numerous opportunities and constraints for trails that the site presents. In addition, staff will begin preparation of the draft management plan during this time. It is anticipated that this draft plan including a draft trail layout will be completed in September 2008. At that time, a second public meeting, as well as a public comment period, will be scheduled to solicit comments on the draft plan. Following the public comment period, the draft plan will be presented to Parks and Open Space Advisory Committee (POSAC), and then the final plan will be presented to the Board of County Commissioners. At this point, it is expected that the final management plan will be approved by January 2009.

Public Involvement to Date

Two public open house meetings were conducted and initial public input was gathered during February and March 2008. The first open house meeting took place on February 26th at the Boulder County Clerk & Recorder's office and was attended by 25 people. The second meeting occurred on March 4th at the Sugar Loaf Fire Protection District, Station #2, and was attended by 28 people. The purpose of these meetings was to provide the public with background information on the existing natural and cultural resources and public uses at Betasso Preserve and the Benjamin property and to solicit comment on the draft vision, goals and objectives, and opportunities and constraints for the combined management plan. Parks and Open Space staff were on hand to answer questions and discuss issues with the public. In addition to receiving initial public input during the open houses, comments from the public have been received via e-mail and letters mailed to Parks & Open Space. As of April 1, 2008, a total of 277 comments have been received. The following is a summary of these comments.

Public Comments

Between February and March 2008, Boulder County Parks & Open Space solicited initial public comment on the management direction for Betasso Preserve, including the Benjamin property. Staff reviewed all 277 written comments that were submitted and transcribed all substantive comments that provided a recommendation, suggestion, request, or critique of the current and future management of the properties (Appendix B). The purpose of this summary is to provide Parks & Open Space staff involved with the preparation of the management plan and the general public with a list of the public's ideas, concerns, and other recommendations. All public comments will be taken into serious consideration during the preparation of the Betasso Preserve Management Plan (Including the Benjamin Property).

To help staff sort and analyze the initial public comments, comments were divided into the following ten comment categories:

- Management Plan – Draft Vision / Draft Goals and Objectives
- Natural Resources
- Cultural Resources
- Public Use / Opportunities
- Trail Layout and Design
- Access
- Public Safety / Patrol
- Neighboring Properties
- Education and Outreach
- Facilities / Signs

Summary of Findings

The following are summaries of public comments for each of the ten comment categories.

Management Plan – Draft Vision/Draft Goals and Objectives. Many of the comments received regarding the management plan, including the draft vision and draft goals and objectives, were based on two questions that were asked on the public comment form distributed at the public open houses:

1. Do you agree with the draft vision for Betasso Preserve including the Benjamin property? If not, what is your vision for the future management of this property?
2. Do you have any specific comments regarding the draft management goals and objective?

The public's vision for the property ranged from keeping Benjamin property "natural" and "pristine" with little to no trail development to maximizing recreational opportunities to the extent possible. A number of citizens agreed with Parks & Open Space's vision of finding a balance between sustainable recreation and resource protection. One comment suggested that the properties not be managed as one, and therefore, have two separate management plans. A couple of people recommended not making any changes to the current Betasso Preserve

Management Plan. Several comments provided a vision for more regional trails including better connections from the City of Boulder to Betasso Preserve without the use of a car.

Natural Resources. A number of concerns were raised regarding the site's natural resources. Primary topics of concern were impacts of additional trails on wildlife species (especially mountain lions, black bear, foxes, and raptors), potential increase in human-wildlife conflict, and erosion from new and existing trails. One comment requested a multi-year study of the wildlife on the Benjamin property prior to moving forward with the management plan. A number of comments requested Parks & Open Space wait until the Colorado Division of Wildlife's (CDOW) "Front Range Cougar-Human Interaction Pilot Study: Feasibility Assessment of Field Techniques and Protocols, Phase II, Enhancing Assessment of Aversive Conditioning Techniques for Cougar-Human Interactions" is complete before preparing the management plan. One person refuted the idea that the area is "a pristine wildlife sanctuary" stating, "this area has seen European disturbance longer than any other area in Boulder County." Others noted that natural resources should be "paramount" in any management decision.

Cultural Resources. Two comments were received regarding the protection of the top of Arkansas Mountain, which is adjacent to the Benjamin property on the west boundary. The site, which is owned by the Running Horse Foundation and has a County-held conservation easement, is considered to be "sacred Native American land."

Public Use / Opportunities. "Public Use / Opportunities" includes comments that concern the management of users. A number of diverse comments, suggestions, and ideas on this topic were obtained from the public. These were divided into general management considerations, comments on specific user types, comments in favor of multiple use trails, comments in favor of single use trails, input on use and directional restrictions, and concerns regarding visitor numbers.

Suggestions on how to reduce trail congestion and user conflict were made in the written public comments. These included creation of single use trails, longer trails, continuing the one-way designation for mountain bikers and potentially including hikers and equestrians in this regulation, continuing the day use ban, and dispersing users over a well designed trail system. Multiple use trails were supported by a number of respondents. One comment stated, "Managed, fair, and equitable opportunities for multiple user groups must be implemented."

Although the current directional regulation for mountain bikes was praised by a small number of public comments, the closure of the Canyon Loop Trail to mountain bikers on Wednesdays and Saturdays had mixed response. Some want this regulation reversed, while others want it expanded. A few suggested alternative management schemes (e.g. bike-only days, hike-only days, etc.).

Finally, a couple of citizens raised concerns about increase use of Betasso Preserve and its impact on the trails and the surrounding roadways. Another person felt that increasing trails will spread the users out over a larger area, thus reducing conflict.

Trail Layout and Design. The public provided a diversity of options for trail layout and design. These included new single-track trails, a new loop trail, stacked loop trails, a “spider-work” of trails, and connector trails to adjacent roads (e.g. Fourmile Canyon Drive). One comment stated, “Connector trails can be of fairly short length and impact, yet provide access opportunities far beyond their length due to their ability connect and “multiply” the available options.” Some comments requested more technical trails especially on steeper terrain with switchbacks and “lots of climbing and descending”. One commenter asked that the Benjamin property and Betasso Preserve have separate trail systems. A couple of comments suggested the Boulder Canyon Link Trail be reassessed and improved to make it more sustainable and safe.

Access. Several comments focused on alternative access points into the property. The majority of these comments were in favor of additional access points, while others were not in favor of them at specific locations. Those that were in favor suggested access points at Fourmile Canyon Drive, Alaska Road / Logan Mill Road, and in the vicinity of Arkansas Mountain. Reasons for wanting additional access points included reducing the number of social trails and providing access from Betasso Preserve to a larger network of regional trails. In addition, many requested the County consider locating a safer access point from Boulder Canyon into Betasso Preserve compared to the current access point at the Boulder Canyon Link Trail.

Public Safety / Patrol. A number of public safety and patrol issues were raised. These included ensuring an emergency plan of operation was in place including an ingress and egress plan and roles and responsibilities. A number of comments dealt with wildfire and the use of prescribed fire. In particular, the public requested that Parks and Open Space conduct fire mitigation prior to opening the site to the public. Another patrol issue brought up by the public was enforcement of the mountain bike ban on Wednesday and Saturday. Other public safety concerns included the occurrence of abandoned mineshafts, potential mountain lion encounters by the public, very steep terrain, and the lack of enough space for equestrians to allow mountain bikers to safely pass.

Neighboring Properties. Several people expressed concern regarding impacts of trails on neighboring properties. Some suggestions for reducing impacts included placing trails a set distance from private property boundaries, installing property boundary signs, acquiring trail easements from private property owners, and educating trail users about private property boundaries.

Education and Outreach. A small number of comments were made regarding education and outreach. There were requests for classes on wildlife and vegetation as well as naturalist hikes. In addition, a couple of comments suggested volunteers could be used for trail construction, maintenance, and patrol.

Facilities / Signs. Some members of the public provided comments regarding facilities and signs. Many equestrians expressed concern about the lack of adequate space for horse-trailer parking. Others requested permitted camping sites, covered picnic areas, open firepits, a playground, and additional signs to help users better understand regulations. However, one citizen commented, “Does anyone realize that putting signs at “social trails” just draws tons of attention?”

Project Contact

For more information regarding the planning process for the Betasso Preserve Management Plan including the Benjamin property, contact:

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Appendix A

**Draft Vision
Draft Goals and Objectives
Opportunities and Constraints**

DRAFT

A Vision for the Future of Betasso Preserve Including the Benjamin Property

Betasso Preserve, including the Benjamin property, provides a mosaic of native plant communities, important wildlife habitat and movement corridors, diverse and rugged topography, a hub for recreational activities, a piece of Boulder County history, a grand outdoor classroom, abundant scenic vistas, and a place to seek out peace and quiet. Its location between Boulder Canyon and Fourmile Canyon makes it one of Boulder County's most easily accessible open spaces. People from the surrounding communities, throughout the County, and beyond regularly use the site for hiking, mountain biking, trail running, picnicking, nature study, and horseback riding. With so many unique values and varied uses, Betasso Preserve has over the past 30 years provided a high level of visitor satisfaction and has helped preserve the rural landscape, cultural history, and natural state of Boulder County. With the addition of the Benjamin property, the open space will continue to be a unique and important piece of preserved land in the County, set aside for the preservation of natural and cultural resources, as well as public use and enjoyment.

Boulder County Parks and Open Space's vision for Betasso Preserve, including the Benjamin property, is to protect, preserve, interpret, and restore the site's native ecosystems and significant cultural resources, while providing passive, sustainable, and satisfying recreational opportunities.

Parks and Open Space envisions core habitat areas provided at Betasso Preserve, including the Benjamin property, that are of sufficient size to help maintain and perpetuate native plant and wildlife populations, wildlife movement across the property and beyond, and the ecological processes that have shaped the area's landscapes and the species that inhabit them. It is Parks and Open Space's intent to manage the site based on the best available science and an adaptive management approach. Management activities will be selected that help perpetuate and restore healthy native ecosystems.

Integrated with resource protection, Parks and Open Space envisions high quality, passive recreational experiences that meet the needs of multiple user groups. The open space will continue to provide public access, picnic areas, and other developed facilities at the Canyon Loop and Bummer's Rock trailheads that are accessible for a wide diversity of individuals, families, and groups. As part of Parks and Open Space's vision, any potential new designated recreational trails will be designed and constructed to be safe and sustainable and to minimize environmental impacts, as well as limit impacts to neighboring properties. All trails will be managed and maintained to ensure their longevity and sustainability, as well as a high level of visitor satisfaction by multiple user groups.

The public will take pride and ownership in Betasso Preserve through Parks and Open Space's outreach and education efforts. Parks and Open Space envision educational programs that highlight the area's native flora and fauna, geology, hydrology, fire ecology, and Boulder County's ranching and mining history. Historic buildings and structures will continue to be preserved and interpreted. Finally, volunteers will play an important role at Betasso Preserve by helping to interpret and preserve the cultural and natural heritage of the site and with the management of the trail system.

Draft Goals and Objectives

Acquisitions Goals and Objectives

Goal 1. Preserve key parcels of land adjacent to or within the vicinity of Betasso Preserve, including the Benjamin property, wherever possible for wildlife habitat, scenic vistas, and trail connections.

Objectives

- A. The potential for preservation of lands adjacent to or within the vicinity of Betasso Preserve, including the Benjamin property, through acquisitions or conservation easements will be evaluated as opportunities arise.
- B. Acquisition of the U.S. Bureau of Land Management (BLM) parcel located on the northeast corner of the Benjamin property will be considered as part of on-going land trade negotiations with the BLM.

Natural Resource Management Goals and Objectives

Goal 1. Protect, preserve, maintain, and restore the ecological integrity of Betasso Preserve's including the Benjamin property's native ecosystems and the natural ecological processes that sustain them.

Objectives

- A. Natural resource management decisions and assessment of impacts to the resources from management activities and public use will be based on the best available science and accepted standards and practices.
- B. Viable populations of existing native plant and wildlife species will be maintained throughout the site by using appropriate management tools.
- C. A matrix of habitat types and movement corridors will be provided for wildlife species.
- D. Maintenance of native plant communities will be dependent on natural ecological processes, or prescriptions based on these processes, to the extent possible to allow ecological systems to function within their natural range of variability, thus encouraging healthy native plant communities.
- E. Plant communities that have been significantly disturbed or degraded by past or current land uses will be restored with appropriate native species where feasible and desirable.
- F. An adaptive management approach will be utilized to ensure the most effective management of natural resources.

- G. Sensitive resource areas, including any known or discovered nest sites for sensitive bird/raptor species, den sites for large mammals, or rare plant communities, will be protected from impacts from recreational use, trails, and other infrastructure.
- H. Prior to any land management activity, the effects of the activity on existing native plant and wildlife species will be taken into consideration to ensure negative impacts are limited.
- I. Excessive soil erosion along trails, facilities, and elsewhere will be kept in check via appropriate erosion control measures to minimize impacts to habitats and water quality.
- J. Biological data will be collected and analyzed on a regular basis to document existing plant and wildlife species, track trends in species composition and numbers, and assess the effects of management decisions.

Goal 2. Manage forested ecosystems within Betasso Preserve, including the Benjamin property, within their natural range of variability, while ensuring public safety.

Objectives

- A. The density of woody vegetation within forested systems will be managed based on historic density levels and desired future conditions utilizing mechanical thinning and prescribed fire treatments.
- B. Mitigation measures will be pursued on-site to reduce the risk of catastrophic wildfire spreading to and from the site, while maintaining the site’s ecological integrity.
- C. Work with fire protection districts, adjacent landowners, and other agencies on cross-boundary wildfire mitigation.

Goal 3. Manage State and County listed noxious weeds and other undesirable non-native species throughout Betasso Preserve, including the Benjamin property.

Objectives

- A. An integrated pest management approach will be utilized to control and suppress non-native invasive species.

Cultural Resource Management Goals and Objectives

Goal 1. Preserve historic buildings and structures within Betasso Preserve, including the Benjamin property, important to the cultural heritage of the property and Boulder County.

Objectives

- A. Historic buildings and structures will be inspected and evaluated regularly for necessary repairs to prevent excessive deterioration.
- B. Historic buildings and structures will be protected from vandalism and looting.

Recreation/Trails Management Goals and Objectives

Goal 1. Provide sustainable, passive recreational trails at Betasso Preserve, including the Benjamin property, for the use and enjoyment by multiple user groups, while limiting recreational impacts to natural and cultural resources and neighboring properties.

Objectives

- A. Potential new recreational trails will be designed and constructed to be safe and sustainable using recognized sustainable trail building standards and practices.
- B. All designated trails will be maintained to ensure their longevity and sustainability for the long-term use and enjoyment by the public.
- C. Impacts to neighboring properties from designated trails will be limited through the use of signs, fencing, and other means.
- D. User conflict on the trails will be monitored and assessed on a regular basis, and if it reaches an unacceptable level, addressed with appropriate measures such as additional educational programs, signs and brochures, regulations, and trail closures, among others.
- E. Although outdoor recreational activities carry some risk to the user, recreational trails will be designed, constructed, and maintained to ensure the highest level of safety possible, while still allowing for diverse and enjoyable trail experiences.
- F. Abandoned mine sites with open adits, shafts, or other dangerous conditions will be evaluated and if necessary properly closed with consideration for wildlife use prior to any public use of the Benjamin property to protect visitor safety.
- G. All social trails will be evaluated and potentially closed to the public and rehabilitated using generally practiced methods.
- H. The construction of non-designated social trails will not be permitted.
- I. Connections to regional trail systems will be considered as opportunities arise, and if desirable and feasible, will be pursued.

- J. Views along the trail system will be enhanced and preserved to the extent possible.

Goal 2. Maintain facilities and trailheads at Betasso Preserve, including the Benjamin property, in good condition so that they are accessible and usable by the general public.

Objectives

- A. Trailheads and parking access will continue to be provided at the current Canyon Loop and Bummer’s Rock trailheads.
- B. Upgrades to existing restrooms, picnic areas, kiosks, benches, and parking lots will minimize impacts to the environment and will maintain a natural and minimally developed look and feel.

Education and Outreach Goals and Objectives

Goal 1. Provide natural and cultural history educational programs and information on-site for the public to help create understanding and an appreciation of the history and resources at Betasso Preserve, including the Benjamin property, and beyond.

Objectives

- A. Interpretive and outreach programs will be conducted on a regular basis highlighting the site’s flora, fauna, ecological processes, natural resource management activities, Betasso Homestead, and ranching and mining history.
- B. Additional interpretive materials and information will be provided to the public via kiosks, brochures, and interpretive signs.

Goal 2. Recruit and utilize volunteers to interpret and preserve the cultural and natural resources and help with the management of the trail system at Betasso Preserve, including the Benjamin property.

Goal 3. Maintain open communication amongst Boulder County staff, outside agencies, neighbors, fire districts, and the public regarding management of Betasso Preserve, including the Benjamin property.

Patrol Goals and Objectives

Goal 1. Ensure public safety at Betasso Preserve, including the Benjamin property, as well as the protection of natural and cultural resources.

Objectives

- A. Conduct regular patrols to mitigate violations and user conflicts.
- B. Identify, map, and regularly inspect all emergency access points and roads.

- C. Work with other emergency response personnel to identify possible landing zones and other evacuation routes.
- D. Work with neighbors and adjacent landowners to minimize trespass and social trails that cross private lands not otherwise granted by easement.

Research Goals and Objectives

Goal 1. Encourage research at Betasso Preserve, including the Benjamin property, by POS staff and/or outside researchers to help formulate a better understanding of the resources present on-site and their response to various management scenarios.

Opportunities and Constraints for Management of Betasso Preserve and the Benjamin Property

The “opportunities and constraints” for management of Betasso Preserve and the Benjamin property is a brainstormed list developed by staff and the public prior to developing the final management plan. It is a planning tool, whose purpose is to outline all possible management considerations (i.e. the opportunities) and all possible limitations and restrictions to this management (i.e. the constraints). The opportunities and constraints do not necessarily equate to goals and objectives or future management activities. However, they provide guidance and direction in developing the management plan, which in the end is a balance between the opportunities and the constraints.

Opportunities

Through Parks and Open Spaces’ ownership and management of Betasso Preserve and the Benjamin property, the following opportunities arise...

Acquisitions

- The potential for additional acquisitions or conservation easements within vicinity of property for trail and habitat connections and protection of rural lands and scenic vistas
- The potential to acquire adjacent BLM parcel through ongoing land trade negotiations

Natural Resources

- The potential to preserve large blocks of intact, relatively undisturbed wildlife habitat
- The chance to protect wildlife movement corridors
- The opportunity to restore the structure, function, and species composition within disturbed or degraded sites including forests, grasslands and riparian areas
- The chance to control existing and introduced State and County listed noxious weeds and other undesirable non-native species
- The ability to continue to reintroduce fire where appropriate as a natural process and management tool
- The opportunity to protect water quality on site
- The potential to reduce erosion from designated trails, non-designated social trails, and other developed facilities
- The chance to conduct on-site vegetation mapping and wildlife surveys

Cultural Resources

- The potential to protect and preserve existing cultural resources
- The chance to conduct on-site cultural resource surveys and interpretation

Recreation/Trails

- The possibility to extend the Canyon Loop Trail into the Benjamin property as either a loop, out-and-back, or through trail.
- The possibility to evaluate a new loop trail through the historic complex of cabins, corrals, and barns.

- The chance to work with multiple user groups to develop a sustainable, equitable, and enjoyable trail system
- The option to reassess existing trail conditions within Betasso Preserve and improve any areas of concern
- The potential to assess the existing trailheads and parking areas for redevelopment.
- The option to reassess existing trail regulations including one way restrictions for mountain bikers and trail closure days for mountain bikers
- The potential to close and/or stabilize all unsustainable trails within the Benjamin property and Betasso Preserve
- The opportunity to potentially link Boulder Canyon Drive and Fourmile Canyon Drive via existing and potential new trails within Betasso Preserve and the Benjamin property.
- The opportunity to evaluate future link to regional trail system
- The possibility to ride or hike to Betasso Preserve from Boulder without driving

Education and Outreach

- The possibility to interpret the natural history of both properties and the surrounding area including the area's native flora and fauna, geology, hydrology, and fire ecology
- The chance to interpret the cultural history of both properties and the surrounding area including Boulder County's ranching and mining history
- The potential to utilize volunteers to interpret and preserve the cultural and natural resources and help with the management of the trail system
- The opportunity to work cooperatively with the local fire protection districts and neighbors to reduce the risk of catastrophic wildfires
- The ability to work with neighbors, the public, and other agencies to improve management of the property

Patrol

- The chance to combine patrols at both Betasso Preserve and the Benjamin property
- The opportunity to work to minimize trespassing from and to neighboring private properties through signage and trail management.
- The potential to increase patrol in response to new or hazardous use patterns.

Constraints

Despite the many opportunities provided by Parks and Open Spaces' ownership and management of the properties, a number of constraints also exist including...

Acquisitions

- Key parcels for trails and/or wildlife habitat corridors may not be available for acquisition or easement from private landowners

Natural Resources

- Existing data on vegetation and wildlife at both properties is currently limited
- Initial vegetation mapping and wildlife surveys will not be completed until mid to late summer 2008 at the earliest

- Some impacts to natural resources due to trails and public use are unavoidable
- Stream/drainage crossings will be unavoidable if new trail is constructed
- Introduction of non-native plant species is likely unavoidable
- Majority of slopes within Benjamin and north portion of Betasso are greater than 20 degrees (>35%)
- Many of the more moderate slopes capable of supporting a sustainable trail including portions of the former Switzerland Trail grade are along riparian habitats
- Majority of soils have a “severe” erosion hazard rating for roads and trails per the Natural Resource Conservation Service (NRCS) soils map

Cultural Resources

- Cultural resource survey on Betasso has not been completed and is not anticipated to be completed until mid to late summer 2008 at the earliest

Recreation/Trails

- Impacts to neighboring properties needs to be planned for and managed
- Limited ability to construct another trailhead, especially around Benjamin, based on ownership, topography, and road conditions
- New trail across the northern portion of Betasso Preserve and throughout much of the Benjamin property may be difficult and costly to construct, especially a loop trail, due to the topography and amount of rocks and boulders across the site
- Limited access points onto trail system may lead to the creation of additional illegal, unsustainable, and unsafe social trails
- Public use of existing social trails and creation of new social trails will need to be monitored and managed
- User conflict on trails will need to be monitored and managed through proper trail design, public education efforts, and staff patrol
- Safety of trail users can not be guaranteed due to the nature of outdoor recreation

Education and Outreach

- Interpretation activities involving Benjamin will be limited using only the current Betasso trailheads, due to the distance.

Patrol

- Limited access into Benjamin for patrol and emergencies
- Limited ability to control all trespass and social trail use

Appendix B
Public Comments Table

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

COMMENT CATEGORY	PUBLIC COMMENTS
<p>Management Plan – Draft Vision / Draft Goals and Objectives</p> <p>(Note: The following questions were asked on the public comment form distributed at the public open houses: 1. Do you agree with the draft vision for Betasso Preserve including the Benjamin property? If not, what is your vision for the future management of this property? 2. Do you have any specific comments regarding the draft management goals and objective?)</p>	<p>Preservation Vision</p> <ul style="list-style-type: none"> • My vision would be to leave it open for the animals, i.e. bear, mountain lion, and bobcats that <u>already</u> live there. • Keep it as natural and wild as possible. • I would like to see Benjamin kept pristine • I would prefer to see more natural & pristine areas. • I would like to say that it is my wish that the (Benjamin Property) be preserved as a mountain lion/bear/deer habitat. <p>Balance of Trails and Preservation</p> <ul style="list-style-type: none"> • The Betasso and Benjamin properties are large and can likely accommodate human users in a way that causes minimal disruption to wildlife. • I would enjoy continued appropriate development as possible proposed in the draft vision. • It is not purely a recreational area, it is not purely a wildlife preserve. It is both! <p>Recreational Focus</p> <ul style="list-style-type: none"> • I am very supportive of balance between preservation and recreation. • I hope to be able to have a long mountainous bike ride experience from home (including portions of Betasso and Benjamin) • I think the area should be available but promoted as a “remote” more rustic trail for more adventurous users! • Promoting more riding with more accessible trails to bikes, promotes the “Boulder Lifestyle”. • BCPOS should maximize the recreation experience in the area deemed appropriate (225 comments) • I see this property as Boulder County’s most significant opportunity to give the City of Boulder residents a quality mountain bike experience without the use of a car. (226 comments) • Looks good in principle – especially the possibility of connecting multiple trails in the area (Betasso, Switzerland, etc.) together • It remains an incredible park & I am sure the addition of Benjamin property & potential access for hikers / mtn bikers will truly be an asset and appreciated by trail users. I am confident that Boulder County Open Space can make a usable trail for all to access the Benjamin property. <p>Maintain Present Plan</p> <ul style="list-style-type: none"> • I would very, very much like the Betasso management plan to remain as it is. • Maintain present plan on Betasso. <p>Other Comments</p> <ul style="list-style-type: none"> • The management plan as drafted is hard to object or agree with due to the lack of specifics and broad generalities. • Sounds like if done right this could be wonderful. • Strongly agree with (draft vision) – I think you have done a great job • The language in the “Draft Vision for Betasso Preserve and the Benjamin Property” is a bit overly directive “The public will take pride and ownership in Betasso Preserve...” My vision is very habitat based. • Broad strokes but thoughtful considerations • I do not agree that the two properties should be managed as one property. They are very different pieces of land and should each have their own management plan. • The two properties are vastly different in character and the Benjamin land can not sustain the type of recreation i.e. biking that is on Betasso
<p>Natural Resources</p>	<p>General Comments</p> <ul style="list-style-type: none"> • I believe in the “Natural Resource Opportunities” section as paramount. You cannot have both natural resource and recreational opportunities equally developed. By developing fewer trails and less access you can protect the resources. • These uses (horses and mountain biking) are not really passive & can have negative impact on plant, wildlife, & terrain • Please keep our natural resources – natural • I would also like to suggest that even if you put all new trails in there (Benjamin), please leave some areas alone for a nature preserve. • Maybe create a board walk for pedestrians only so that the vegetation won’t be disturbed. • I want to point out that this area has seen european disturbance longer than any other area in Boulder County. To characterize the area a pristine wildlife sanctuary is ludicrous. This is public property in a semi-rural area.

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

COMMENT CATEGORY	PUBLIC COMMENTS
<p>Natural Resources (continued)</p>	<p>Wildlife</p> <ul style="list-style-type: none"> • Benjamin: This should be left as a nature preserve with no users. This is mountain lion breeding ground. • Don't wish to see the loss of more habitat. This leads to animal / human conflict. • Why put the animal / human factor in any more close proximity than it already is. Your own maps show the Benjamin property as where all 3 of these animals (black bear, mountain lion, and bobcat) live or move thru. We do not need to add humans. • I feel you are setting up the animals & recreationalists for more interaction if you open up this property to the public. Unfortunately the animals always <u>lose</u>. Please protect the land & animals & let them have this place unencumbered by us. • It is important to note that wildlife can and does exist even within the city limits and does flourish • As for wildlife, hopefully the trails could be constructed with minimum impact to wildlife. • This area is habitat for lions, bear, foxes, rabbits, eagles, hawks and other wildlife citizens of the Colorado foothills. Any new trails should avoid proximity to habitats of mountain lion and bear and other wildlife • Bear families make their homes in various parts of the Benjamin property, hibernating in mine shafts and other sequestered places on the property, and foraging for food during the summer months. They should not be disturbed. • The Benjamin Open Space Property is residence to a number of mountain lions, and non-resident mountain lions regularly cross this property. Lions lairs are also found throughout the Benjamin property, in abandoned mine shafts and elsewhere. These should not be disturbed. • I suggest that if possible the Benjamin Open Space Property be left as mountain lion habitat, or at a minimum that any decision about the management of the Benjamin Open Space Property be made only after the CDOW Mountain Lion Study is completed. • Both the Benjamin and the Betasso areas are home to rabbits, foxes, eagles, hawks, and numerous other wildlife. It is an invaluable and irreplaceable habitat for them and I hope that it will not be altered in any way that adversely affects them. • The Benjamin land is very steep and heavily wooded. It is still home to mountain lions, bears, and deer. As such, the Benjamin Property (BP) should not be developed with a system of trails. The wildlife have to have their own sanctuary. • There would be numerous encounters with dangerous wildlife, resulting in either harm to humans, or the wildlife being driven towards more populated areas. • Boulder County Open space spent many years studying the elk herd on Caribou ranch. I think this was a prudent decision and equal care should be given to the Benjamin property. • The wildlife will be threatened (by trails on Benjamin) and move even closer to homes and pets and represent a threat to them and people. • While it was stated that occupied dens would be left in place, it was also noted elsewhere that existing mines would be closed. Since some of these mines serve as dens, I'm curious as to how both of these intentions can be served. <p>Soils / Erosion</p> <ul style="list-style-type: none"> • We have seen extensive erosion on the Benjamin Property due to misuse by bicyclists and motor bikers riding roughshod over the hillsides. • Consider whether more bike traffic will accelerate trail erosion on the Betasso Loop, making it more rocky, ankle-twisting over time. • The terrain (within Benjamin) is not conducive to building trails...due to the steepness of the land, it would quickly deteriorate with erosion. • We must consider erosion, and manage it to the best of our ability. <p>CDOW Mountain Lion Study</p> <ul style="list-style-type: none"> • Nothing should be done until the wildlife studies including the DOW mountain lion study are completed. It is well known and clear that the Benjamin property is home to many wild animals and trail cutting and opening should take this into consideration. • I would like to request that Boulder County Parks and Open Space delay formulating a plan for the Benjamin property until the CDOW Mountain Lion Study is complete... With the hysteria and concern of residents within Boulder about encounters with lions it only seems logical to study the lions movements on the Benjamin property BEFORE spending millions of dollars putting in a trail in this area which is known to be heavily used by lions and bears. • Wait for the results of the study on the wildlife before introducing changes to their home. • Has anyone asked the gentleman in charge of the mountain lion study how working on trails in the Benjamin Property will affect his study? • I understand that the county is studying the wildlife with radio collars. I can only ask that you wait until this study is done, and to please keep the wildlife's best interests at the forefront of any decisions about the use of this land. • The results of (the CDOW Mountain Lion Study) may be critical for the design of any plans to reduce human-mountain lion interaction in the Boulder County area, including incursions of lions into the local cities and towns. These results would surely be corrupted by a change in the populations visiting the Benjamin and the Betasso properties.

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

PUBLIC COMMENTS	
COMMENT CATEGORY	PUBLIC COMMENTS
Cultural Resources	<ul style="list-style-type: none"> At the top of Arkansas Mountain is the Running Horse Foundation land, which abuts the Benjamin Open Space. This is sacred Native American land and it should be protected from violation. Two county signs are presently in place adjacent to the Running Horse Foundation land and the private property adjoining. These signs are vague and misleading, as there is no mention that the tiny piece that the county owns is landlocked by private property. The top of Arkansas Mountain is the Running Horse Foundation land and it must be protected.
Public Use / Opportunities	<p>General Management Considerations</p> <ul style="list-style-type: none"> Managed, fair, and equitable opportunities for multiple user groups must be implemented. Increasing the riding area like that and having multiple access points would certainly reduce the congestion of bikers making it much more pleasurable for all involved and will also make it less impactful to the land. Making the trail a one-way is a huge improvement in reducing trail conflicts not only between cyclists, but most of all between cyclists and hikers. In its current configuration Betasso is fun but too short. This causes riders to do multiple laps in order to get a good ride in. The addition of a rideable route from town and a loop in the Benjamin property would eliminate this need and spread out trail users. As a regular of Betasso, most riders have to do multiple laps and additional mileage will lesson the congestion on the current trails. Dispersing users across a well-designed trail system is the best way to reduce user conflict. Stacked loop trails are a great way to do this. I also believe a stacked loop system incorporating new trails in the Benjamin section greatly reduce the number of encounters and potential for conflict. Increase use may also widen the Loop trail, since people tend to ride and walk around exposed rocks and muddy spots. Trails are a management tool; they take people where they want to go, and if properly designed, they keep people away from areas we don't belong. Trail design can go a very long way towards reducing user conflict and providing a high quality user experience for all. The views from Arkansas Mt are the best ones on the property. Having access to them is something that should be a priority of the new management plan. <p>Comments Regarding Use Type</p> <ul style="list-style-type: none"> The less mountain bikers the better. Please consider the impacts on the Betasso Loop Trail of connecting mountain bike trails from the Benjamin property, in terms of hiker experience and also trail condition. Please do not add any more reasons for mtn bikers to encroach on these trails. Please consider allowing mountain bike use on the newly acquired Benjamin property near Betasso Preserve. There is a critical shortage of trails open to mountain bikers in the county and additional mileage will be used and appreciated by the large cycling community. I encourage you to keep provisions for Hiking and Mountain Biking trails in these areas. Boulder County is a great destination for outdoor enthusiasts and trail systems, both existing and proposed, should be kept accessible to all user groups. Betasso is the only real mountain biking in Boulder accessible via bike, and I very much would like to see it managed in the future as an important recreational resource for local mountain bikers. I think Boulder residents should have a mountain biking experience straight from town. Betasso seems to be the only option. I would still like to ask that you consider equestrians in your planning. As a BMA member I want to see bikers have the ability to ride from town North and West to other trails and dirt roads. Access to Open Space by equestrians <p>Multiple Use Trails</p> <ul style="list-style-type: none"> I really want to see multiple use trails that connect to other trail systems and provide a great environmental and recreational experience for bikers, horses, hikers, and dog walkers. First consideration for trail development should be multi-use (bike, ped, horse) Use non-motorized – mountain bike / hike / equestrian /cross country skiing Please consider unrestricted multi use for the Betasso / Benjamin property. Please add new shared-use trails on the Benjamin Property. Ideally, these would replace the unsustainable social routes currently in use. I see this as an opportunity to mitigate environmental impacts of poorly designed trails and disperse users over greater miles of trail.

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

COMMENT CATEGORY	PUBLIC COMMENTS
Public Use / Opportunities (continued)	<p>Single Use Trails</p> <ul style="list-style-type: none"> • Please consider single use trails. • Why not use all this wonderful property to create <u>separate</u> trails for the bikers? • If one can dream big, separate trails would be <u>ideal</u>. • (Consider) creating bike-only and hike-only trails at Benjamin and Betasso • I would like to suggest that two trails be built so that mountain bikers can have (and maintain) their own trail and not conflict with hikers and equestrians at all. • The preferred characteristics of a mountain bike trail are not necessarily the same as the preferred characteristics of a horse and / or hiking trail. Mountain bikers like to go up and down steep trails, while horses and people prefer to zigzag up and down a hill. • I would like to see the creation of several biking-only trails, ie no horses...and no pedestrians. • Single-use trails should be equitable – if no bike on one trail, then no ped on another. <p>Restrictions / Regulations</p> <p>Use Restrictions</p> <ul style="list-style-type: none"> • Reconsider Weds/Sat bike exclusion • Not sure if already in place, but ban horses • Please restrict hikers 2 days a week just to be fair to all users. • Not in favor of bike-exclusions from local trails. • Really appreciate days when mt. bikers don't have access – would like that to <u>continue</u>. • Betasso: <u>No bikes on Wednesday & Saturday</u>. This has worked well. • Benjamin: <u>no users</u> • Do not restrict public access on the public lands. • I like the present management plans for Betasso, especially no bikers on Wednesday and Saturday • I understand that Boulder County Parks and Open Space is reconsidering this policy and considering going back to the dark ages of allowing mountain bikers to use Betasso and the Benjamin property 7 days a week. This is a HUGE MISTAKE. • If it is not possible to build another trail in Betasso, then PLEASE KEEP THE MOUNTAIN BIKER RESTRICTIONS IN PLACE, for safety and recreational pleasure of hikers and equestrians. • My biggest concern is the possibility of you removing the restrictions that closes Betasso to mountain bikers for two days each week. • I would like to propose that the days closed to mountain bikers be increased to three so it's more of a fair split than just two. • We would like to encourage BCPOS to eliminate the day bike ban which closes the area to cyclists two days a week. Trail design does a better job of managing user conflict than restriction. We encourage BCPOS to disperse the users to reduce the conflict (222 comments) • I do not have an issue with the current 2-day limitation on bike access - as long as it remains only 2-days per week • Look at Centennial Cone, where hikers and bikers are given alternate weekend days all to themselves. It's a great plan and works out well. • The delimiting of certain days where I can hike without bikes works for me, but I do not want to see any expansion of the limitation of bikes using the property. • Betasso should be open to bikes 7 days a week. • If you have to keep the Bikes off the trails 2 days a week (or lessen them) then maybe consider a no-parking-you-have-to-ride up policy? That would encourage alternative transportation and spread the trail users out. • Separating in time, (mountain biking) use of the trails as was done in Betasso is mandatory. I have heard that you may be changing the Betasso rules. Don't do it! • I would also like to see an elimination of the ban on bikes on Wednesdays and Saturdays. I believe that user conflicts would be alleviated with trail design rather than bans. • I do not believe bikes should be restricted from the trails at Betasso. • The plan should not allow for mountain bikers to encounter horses on established horse trails. Perhaps the plan should allow access on separate days, or on separate trails. • Since this is an opportunity to start from a blank slate would recommend limiting or preferentially excluding entirely the use of horses & mountain bikes in the Benjamin property. • I suggest that the current restrictions on the use of the Benjamin/Betasso area be maintained, or even increased, that access by mountain bikers be limited to two or three days a week, and further that the rules be enforced.

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

PUBLIC COMMENTS	
COMMENT CATEGORY	PUBLIC COMMENTS
Public Use / Opportunities (continued)	<p>Restrictions / Regulations Use Restrictions (continued)</p> <ul style="list-style-type: none"> • The wed/sat closure is not helping the conflict between users, and only concentrates cyclists during the other 5 days of the week. • I support the mountain biking ban on certain days for this property. I am not sure it will minimize the potential conflict, but it is a measure of good faith for mixed uses for the trail. • If the County must continue with a restrictive schedule for access, I urge adoption of the policy used by Jefferson County at the Centennial Trailhead. In this system, one weekend day is only for hiking and the other weekend day is only for bicycling. • There are numerous hiking trails in Boulder and only one place to mt. Bike. Please make it available on Saturdays, since I go to church on Sundays. • It was disheartening when Betasso became closed to biking two days a week, yet remained always open to pedestrians. It seems only fair that if you close a resource completely to one user group for some of the week, that user group should get exclusive access some other time in the week. • Please reassess the current policy prohibiting bicycling on Wednesdays and Saturdays. • When there is more "open" space, i.e. when the horse and cyclist can see each other, the interaction does not present as much of a problem (e.g. when riding in open space in north Boulder). But due to the limited sight distance in Betasso, I truly think it is best to allow some days when the bicyclists don't have to worry about pedestrians or riders and days when the pedestrians and riders don't have to worry about cyclists. • I also strongly believe that this policy (mtn. bike ban) should be instituted with the Benjamin property in order to keep consistency and avoid confusion. • I would like to request that the current closures to bikes on Betasso Open Space be continued and perhaps even increased. <p>Directional Restrictions</p> <ul style="list-style-type: none"> • Single-direction on Cyn Loop is fine w me! • I really like the 1-way biking rule. • First, I would like to say that the directional travel requirements that change periodically are a great step. <p>Visitor Numbers</p> <ul style="list-style-type: none"> • There will likely be demand for mountain bike use on the Benjamin Property and a desire to connect to the Betasso Loop Trail. The effect would likely be more mountain bike use on the Betasso Loop and a concomitant increase in "rogue" riding on the Loop on no-bike days. • The idea of expanding the trail system at Betasso will not only provide a great outlet for all types of cyclists, it will ease the amount of traffic on the current Betasso trails. • The introduction of new populations of visitors to this open space will likely cause traffic problems on Four Mile Canyon and on Sugarloaf Road. These are narrow mountain roads with little opportunity for widening, and any further congestion will degrade their usability and cause traffic jams. One solution is to allow classes of users on alternate days.
Trail Layout and Design	<ul style="list-style-type: none"> • Please do not bring the trails down to "your" level, please bring "your" level up to the trail (don't dumb down trails!!!) • New trails should be narrow single track (not cut with a bulldozer but hand built – just ask BMA for volunteers) • Switchbacks and lots of climbing and descending would be good – the slopes on the Benjamin lend themselves to this. • Please consult professional trail builders when planning the trail so that you build something that is technical, fun, and sustainable. • New trails: nested loop system – also safe, sustainable • Use extensive local trail design & construction knowledge to deal w potential erosion, steep slopes, etc • Definitely in favor of developing connections w other OS properties & regional trails • Need loop trail on Benjamin – open to horses! • Expanding & connecting the MT bike accessible single track (not dirt road) in this area would be fantastic. • I would prefer that a mountain bike / hiking trail be added to the Canyon Link Trail, so that the property could be enjoyed by these groups • Loop trails to decrease congestion over out and back trails • Construction / restoration of a loop trail • (Consider) not connecting Benjamin bike trails with Betasso Loop • Can trails (within Benjamin) be opened without addressing all the "unsustainable" pieces immediately?

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

COMMENT CATEGORY	PUBLIC COMMENTS
<p>Trail Layout and Design (continued)</p>	<ul style="list-style-type: none"> • The Benjamin property should have a reasonable balance of trails. • I would like to lend my support to allowing bikers to access certain, sustainable sections of the Betasso Preserve and Benjamin Property. Particular attention should be given to “connector” trails; ones that allow the Benjamin property to connect between Betasso and Arkansas Mountain. • Connector trails can be of fairly short length and impact, yet provide access opportunities far beyond their length due to their ability connect and “multiply” the available options. A connector trail to 4 Mile Canyon would allow remarkably long loop journeys, but only minimal/moderate trail length in Benjamin. • Build new sustainable singletrack trails to the North and West to the Benjamin property and connect Betasso trails to these to create a greater experience (see Heil Valley Ranch for example); stacked loops are fun (229 comments). • It is important to consider that users value connecting one trail system to another. (such as what is currently happening at Heil Valley Ranch with the Picture Rock Trail) (226 comments) • There are a few sections (of existing trails in Benjamin) that are in need of some erosion control but most of it is fine as is. The trails are difficult but mountain bikers actually like technical challenge. Please do not let trail difficulty become a limiting factor to bike access. • Currently, social trails exist on the Benjamin property that may be able to be converted to managed trails. • Capitalize on the technical challenge that steeper trails in the Benjamin property can provide to trail users. Trails can be built in a sustainable manner in these areas utilizing switch backs and other techniques. Steeper technical trails utilizing these techniques discourage excessive speeds for mountain bikers and can thus allow for multiple user groups in a safe manner. • When planning new trails and the reclamation of existing trails, consider connections between trail systems as a way to increase quality user experience on BCPOS trails. • Make the connections clean and multiple, a certain spider-work of trails can make the development very interesting and can provide many alternative routes. • Please consider building a connector trail between the Canyon Loop Trail and any future trail network in the Benjamin Property...An additional benefit of this connector would be a reduction in the number of laps most bicyclists ride on the Canyon Loop Trail. Again, another method of reducing the number of encounters. • I'd like to see BCPOS build new singletrack to connect the Benjamin property to Betasso for more riding. • I would love to see expanded opportunities for narrow (singletrack) shared-use trails at Betasso. • The lower section of the connector trail badly needs a redesign and improvements. • The Benjamin property should be developed with a system of stacked loops, allowing a variety of experiences. They should be designed in a way that is sustainable, and safe. No long downhill straights, etc. (The Pipeline Trail (Boulder Canyon Link Trail) is a classic example of an unsustainable and unsafe trail.) • Create new sustainable trails onto Benjamin property that are technical and challenging, to not only fit in with what the historic use was, but to allow users that want to seek out a longer journey something that is rewarding to them. This will also disperse users throughout the entire area, helping to alleviate any user conflict. • The best way to eliminate concerns about cyclists shuttling to the top using a vehicle is to create trails that have elevation gains along with losses from one access point to the other. This way it is not possible to access the trail at one point and descend all the way to an exit point, such as what is currently possible on the Betasso Link trail.
<p>Access</p>	<p>Alternative Access Points</p> <ul style="list-style-type: none"> • To prevent excessive traffic at the Betasso Park Preserve it would be ideal to have at least 1 or maybe 2 access / parking points • Connection to Betasso/Benjamin via 4 mile canyon drive would be good – safe riding from Boulder. • Trail access from Betasso, Alaska, logan mill / Arkansas mtn, and 4 mile if possible • I urge you to provide as much access as possible on this newly acquired land • It would also be nice to have more than one access point for the trails so that you can link up different rides. • I believe there is potential for additional access points along Four Mile Canyon Road, on either side of Poorman Road. Please consider adding primitive trailheads (parking spots unnecessary) at one or two locations along Four Mile Canyon. These trailheads could provide access to the Canyon Loop Trail and future trails in the Benjamin section. • I would really appreciate the opportunity to jump onto the trail system at a point from four mile canyon, or a safer access point than the current “connector” trail provides. (Boulder) Canyon is always busy with traffic, and while a few do drive there, it is really not necessary. • Considering that I am in favor of new access points to Betasso to allow bikers and hikers different and closer points to access the property. • As a long term goal, BCPOS should pursue a ‘no parking’ access point from the top of Arkansas Mountain (227 comments) • If additional trails / access is developed on the Benjamin property I would actually prefer no official trailhead / parking lot be built

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

COMMENT CATEGORY	PUBLIC COMMENTS
<p>Access (continued)</p>	<p>Alternative Access Points (continued)</p> <ul style="list-style-type: none"> • Create alternate access points. This gives users the opportunity to create a varied experience rather than one that is always the same. The "historic use" of the Benjamin property's social trails was part of a much greater trail system that included the use of county roads, old mining roads, forest service trails and roads, and others, that not only enabled riding from your house without the use of a car, but also allowed for a connection between Nederland and other ridding options to the West & North of Boulder. Alternate access points create differing usage patterns. These points of entry to the new sustainable trail system need to be designated as legal access points. We encourage BCPOS to eliminate parking at these points to relieve neighborhood concerns. (229 comments) • Alternative access points are needed to allow the surrounding area residents, in the Crisman area and the top of Arkansas Mt, legal access and reduce the number of social trails that could possibly arise if they are not given access options. They have historically been use to accessing this area in the past and I do not see it stopping. • The pursuit of 2 access points in the Crisman area seems unnecessary, if a trail could connect Alaska rd with Betasso. Historically the reason for the trail onto Fourmile rd at the bend was because the trail along Arkansas Gulch ended at that point. One access point in the Crisman area is all that is needed to satisfy access issues in that area. Alaska rd makes the most sense, being that it is a legal access point to the property and no other property would have to be aquired, and it is a historic access point to the property. <p>Boulder Canyon Access</p> <ul style="list-style-type: none"> • Shorten the gap between the Boulder Canyon Trail and current Betasso access. The section of canyon road (CO119) that cyclists have to travel is dangerous. The Pipeline Trail is unsustainable in its current configuration. Please investigate and develop an access point(s) that gets bikes off the highway and on to open space sooner. (227 comments) • Find a way to connect the end of the Boulder Canyon bike path with the Betasso trail system via trails instead of roads. • Safe bike / hike / bus access from Boulder will reduce need for parking @ trailheads. • Consider trail access from Boulder Canyon via the route of the old Sugarloaf wagon road that came up from near the intersection of 4-mile canyon and Boulder canyon. • Betasso is the only MT bike trail available in Boulder that one can ride to, and hence access without a car. • I would highly value better access from town, with minimal cycling on the dangerous Boulder Canyon roads. • I would love to see a connector trail that allowed Betasso to be ridden from town without having to ride the road in Boulder Canyon. The more trails that can be safely ridden without driving the better. • Improved access for cyclists should also be developed as I have many friends who do ride from town to access the trails at Betasso Preserve. <p>No / Limited Alternative Access</p> <ul style="list-style-type: none"> • Please do not connect trails from 4-mile to Betasso. • Keep all access points away from Arkansas Mountain Rd and all Sugarloaf properties. • All parking and access from Betasso. • We live on Alaska Rd. and want to make sure that there is <u>no</u> auto traffic on our road leading to the Benjamin Property.
<p>Public Safety / Patrol</p>	<p>Emergency Access / Situations</p> <ul style="list-style-type: none"> • Emergency ingress and outgress...This is naturally of general and specific concern. There are very few opportunities available given the nature and placement of the Benjamin property. I'm not sure how users can be protected and served given a very specific lack of emergency ingress and outgress. • Users of this area are subjected to various hazards, such as steep terrain, hidden mineshafts, predators, etc. Because of the inaccessibility of many areas, rescue efforts will be seriously impaired. The placement of areas open for public access and the feasibility of emergency rescue operations in those areas should be carefully considered. Rescue efforts in this area are currently done by the Sugarloaf Volunteer Fire Department, which is paid for by the Sugarloaf property owners. This puts the burden of rescuing mountain bikers and others unfairly on the Sugarloaf residents. A very thorough and complete rescue plan of operations needs to be considered and vetted prior to the reopening of the Benjamin property. <p>Wildfire / Prescribed Fire</p> <ul style="list-style-type: none"> • Wildfires are a big concern in the mountains and policing the area will be essential service (as) the added use brings additional problems • One of the opportunities listed in the presentation was the opportunity for working with natural fire burn. As a local resident and property owner, this is, as I'm sure you imagine, of HUGE concern!! This concept needs to be thoroughly vetted and explained to residents before ANYTHING like this can be implemented!! • The Benjamin Property has many north slopes with heavy fuel loads. I didn't see any planning for fire mitigation or concern for this potential hazard.

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

COMMENT CATEGORY	PUBLIC COMMENTS
<p>Public Safety / Patrol (continued)</p>	<p>Wildfire/ Prescribed Fire (continued)</p> <ul style="list-style-type: none"> • Because of the steep and heavily wooded terrain on the Benjamin/Betasso property, especially on the Benjamin property, extreme fire hazard exists, which will only increase with human access and the invasion of pine beetles. This presents a serious threat to the residents of the Four Mile Canyon and Sugarloaf areas. A request was made by the Four Mile Fire Chief that proper fire mitigation be done in these areas before any public access is allowed, which work was started but never completed. No trails should be put in until proper fire mitigation is completed by the county • With the influx of additional people utilizing Betasso and the Benjamin property I believe it is of vital concern for Open Space to rethink the current approach being used for controlled burns. I believe it needs to be part of the Management Plan, and I also believe that meetings on this topic need to be held between Open Space and Sugarloaf and Four Mile residents. <p>Enforcement Concerns</p> <ul style="list-style-type: none"> • From what I have seen you have not been able to manage / control bikes on Betasso. How can you manage them on this additional land. They should have some repercussion for being there on Wed/Sat. • More supervision on Wed & Sat of amongst bikers themselves to not abuse the guidelines. • Creating more entry points to the Betasso Loop will likely make the no-bike day rule <u>more difficult to enforce</u> <p>Other Potential Hazards</p> <ul style="list-style-type: none"> • The Benjamin property in particular is pitted with abandoned mine shafts, which pose potentially lethal hazard to anyone who should fall in. Thus any new trails should avoid proximity to the numerous mine shafts that populate this area. • If the mountain lions are disrupted local residents, especially children, are placed in very real danger. And so will anyone utilizing the Betasso/Benjamin Property. I would suggest that it be considered that the areas where mines are known to exist, as well as the areas where dens are known, be made OFF LIMITS to hikers, bikers, humans in general. Needless to say, any paths or picnic areas should be placed as far away as possible from these areas. • If trails are put through the Benjamin property, children, bikers, and hikers using the trails on this property will inevitably come into contact with mountain lions. The design of any areas of public access should minimize the opportunity for such contacts. These areas are best placed in the region between Four Mile Canyon and Betasso, as the other end of the Benjamin property is pitted with mine shafts and populated by mountain lions. • It (the Benjamin property) is very steep terrain that opens it to more injuries or incidents by its nature. • As an equestrian, there is no place to get a horse out of the way of a mountain biker speeding down hill on that narrow steep loop trail.
<p>Neighboring Properties</p>	<ul style="list-style-type: none"> • Establish private property boundaries with signs. • Allowing bikers on Benjamin will lead to conflicts between bikers & homeowners. • This is now public property and the neighbors should not have undue influence regarding the uses of the property. • If we allow the BP (Benjamin property) to be developed with biking and hiking trails, the residents of Weaver Rd. will be impacted greatly. • All private property easements should be purchased! No lawsuits or right of way claims! • We know that our neighborhood (Mountain Meadows/Mountain Pines) is an access to Betasso and the Benjamin property since as residents we have been using trails to access these properties for decades. We do not want people who do not live here to be using our neighborhood to access these properties because they have no respect or consideration for those of us who live here. • You will need to find ways to manage the private land that is adjacent to Benjamin and prevent bikers from choosing Weaver Dr. as an alternative trail to Sugarloaf. • An education plan must be in place to delineate public & private property with signage visible to mark the borders of properties. Maps need to be made clear about the borders. • Any complaints from local residents can be easily mitigated through educational programs and environmentally sound trail design. • The property owners adjacent to the Betasso and Benjamin properties oppose bike paths almost universally, but should Open Space nonetheless choose to build such paths, it would be best if the paths be designed in such a way that would make it impractical for mountain bikers to exit these paths and cross private property. • Those of us living in the Mountain Meadows/Mountain Pines subdivisions do not want mountain bikers to be parking their cars on our narrow neighborhood streets • The Interim Plan adopted 9/11/07 is flawed. On page 6 it says 2.2 Property Access Alaska Road...A proliferation of vehicles in this area could potentially complicate access to nearby residences." It <u>would</u> complicate access on Alaska which is a one and a half lane road in the best of times. • I hope that the plan takes care not to cause or invite any kind of damage to the Benjamin or neighboring properties, such as public invasion, soil erosion, trash, injury, or other damage • I would hope that any Open Space management plan would maintain a status that is at least as favorable to neighboring properties as the status they enjoyed under the Benjamin ownership. • Where the Benjamin and Betasso properties share boundaries with private property, the POS should post clear signs showing clearly where property is private. • If trails are set distant from private property lines, intrusions on the privacy of properties neighboring the Betasso and Benjamin open space will be minimized.

Table 1. Public Comments Received between February and March 2008 during the Initial Scoping for the Betasso Preserve (Including the Benjamin Property) Management Plan

PUBLIC COMMENTS	
COMMENT CATEGORY	PUBLIC COMMENTS
Neighboring Properties (continued)	<ul style="list-style-type: none"> • Should the neighbors on Weaver Road, in Four Mile Canyon and in Mountain Meadows have diminished use of their properties due to the removal of the Benjamin or Betasso areas as buffers against public invasion, owners in these areas may have to be compensated by Open Space and the County. Such arguments would surely be brought in court, and the County and POS should guard against such damages. • We need more signage right now to help these people (mountain bikers) to know where open space ends and private property begins. • What ever you decide to do, you need to make certain that you do not further increase the temptation for people to use private property to access the land.
Education and Outreach	<ul style="list-style-type: none"> • Classes on wildlife & vegetation for this area • Education – naturalist hikes / classes • I'm sure the various user groups in Boulder County would be more than willing to assist with construction of new routes. • The Boulder mountain bike community readily offers volunteer trail maintenance and bike patrols.
Facilities / Signs	<p>Parking Concerns</p> <ul style="list-style-type: none"> • Currently there is not enough parking for anyone who has to trailer their horse to the trails. • I would like to see consideration for equestrians – especially safe parking for limited number of trailers (horse trailers) • Adequate horse trailer parking please! (w/ turning radius sufficient for horse trailers) • Equestrians are currently a smaller user group since there isn't adequate horse trailer parking at Betasso. If you make more horse trailer access to Betasso, you will find much more equestrian use since it would become an easily accessible mountain trail area available to equestrians. • Adequate and safe parking for trailers • Safe parking for limited number of trailers (horse trailers) • Many (horseback) riders I know do not deem the parking adequate for trailers – and therefore do not utilize this beautiful area. • No additional parking lots – ok, maybe a horse trailer lot or expand Betasso lot for hikers • I also believe that trailer parking should remain at Betasso <p>Other Ideas</p> <ul style="list-style-type: none"> • What about permitted camping sites w/ permits? • Covered picnic areas? • Open firepits? • Would love to see a playground – especially even an all-natural one with climbing boulders. • Signage would be very helpful for all (user groups?) considered. • Restroom facilities at trail heads are nice • Does anyone realize that putting signs at “social trails” just draws tons of attention?

**E. Summary of the Betasso Preserve Stakeholder Group
(October 2008 – January 2009)**

SUMMARY
of the
**BETASSO PRESERVE
STAKEHOLDER GROUP**

October 2008 - January 2009



Boulder County Parks & Open Space



Introduction

Following the completion of vegetation, wildlife, and cultural resource surveys, as well as a trail feasibility study, at Betasso Preserve, including the Benjamin property, Boulder County Parks & Open Space (BCPOS) planning team for the Betasso Preserve Management Plan determined that convening a group of stakeholders would be beneficial for the management planning process. The Betasso Preserve Stakeholder Group (stakeholder group) was intended to be a short-term working group composed of representatives from a variety of user groups and environmental interests, as well as individual neighboring landowners. Members of the stakeholder group were selected by BCPOS staff based on staff's knowledge of individuals and organizations interest in the project. Appendix A lists the stakeholder group participants as well as other organizations that were invited to participate.

The primary purpose of the stakeholder group was to assist BCPOS with the evaluation of future public use of Betasso Preserve, particularly:

- Selection of a new conceptual trail alignment, if any
- Whether areas of the property without trails should be closed or open to public

BCPOS's desired outcome for the stakeholder group was for the members to reach a consensus on these two management concerns. Consensus was defined throughout the meeting as:

- All stakeholders in attendance have been given the opportunity to contribute to the discussion
- All stakeholders in attendance have some level of support for the alternative
- All stakeholders in attendance can live with the outcome, even if it is not their first choice
- There are no *major* objections from stakeholders in attendance

The following is a brief summary of the stakeholder process and the results of the stakeholder group.

Meetings and Site Visits

The first Betasso Preserve stakeholder meeting was held on October 13, 2008, from 6:00 to 8:00 pm at the Boulder County Recycling Center. Eighteen stakeholders attended this first meeting. The purpose of this meeting was to present the findings of the vegetation, wildlife, and cultural resource surveys and trail feasibility study and to get input from each group about their needs and expectations for the future management of the site. The minutes from this meeting can be found in Appendix B.

Following the first stakeholder meeting, two site visits were conducted on November 2 and 5, 2008, which allowed stakeholders the opportunity to get on the land and see at least portions of the potential new trail alignments. In total, eleven stakeholders went on the site visits.

The second meeting was held on December 4, 2008, from 6:00 – 8:00 pm at the Boulder County Clerk & Records office. Only ten stakeholders attended this meeting, partly due to snowfall throughout the day. However, the group moved forward with the meeting and discussed why each member supported or didn't support each draft trail option, what the lingering questions were about each option, and potential solutions to reach consensus (see meeting minutes for details). The minutes from the second stakeholder meeting can be found in Appendix B.

The third and final meeting was held on January 12, 2009. A total of fifteen stakeholders attended this meeting. Again, the pros and cons of each trail option, as well as whether to keep the remainder of the property open or closed to the public, were discussed (see meeting minutes for details). In addition, the stakeholders discussed alternative trail routes, which were not included as part of the trail options.

Results

During the second stakeholder meeting, a number of stakeholders voiced support for Draft Trail Option 2B and asked whether there was consensus in the room for this option. At least one stakeholder objected to this option and stated he would not support it. Others stated that they would not support Draft Trail Options 3 or 4. Therefore, consensus was not reached on a draft trail option, but the group decided to reconvene to allow others not in attendance to voice their thoughts.

By the end of the third meeting, no consensus was reached amongst stakeholders on any draft trail concept or whether the remainder of the property should be open or closed to the public. At least one stakeholder had a “major objection” to each of the five draft trail options and to either keeping the property open or closing portions of it to the public.

BCPOS staff concluded the stakeholder meeting by stating that even though the group couldn't reach consensus, BCPOS was grateful to all of those who participated over the past four months in the Betasso Preserve Stakeholder Group. Staff noted that they have gained a lot from sitting down and listening to the needs and concerns of each stakeholder and that it was staff's sincere hope that each stakeholder had also gained something from the process. BCPOS truly appreciates the time and effort each stakeholder put into the discussions.

Appendix A

Betasso Preserve Stakeholder Group Members

- Chris Abrahamson – Boulder County Audubon Society (A,B,C,D)
- George Oetzel – Boulder County Nature Association (A,B,C)
- Arleen Miller – Local Resident (A,B,C,D)
- Marcia Barber – Local Resident (A,B)
- Troy Mandery (Mike Barrow*) – Boulder Mountainbike Alliance (A,B,C*,D)
- Bob Manthy – Boulder Trail Runners (A,B,C)
- Deb and Jon Koepke – Local Resident (A,B,C,D)
- John Ringoen – Arkansas Mountain Resident (A,B)
- Kitty Stevenson – Sugar Loaf Community, Inc. (B,C,D)
- Raymond Bridge – PLAN Boulder and Friends of Boulder Open Space (B,C,D)
- Suzanne Webel – Boulder County Horse Association (A,C,D)
- Mike O'Brien (Chris Morrison) – Boulder Area Trails Coalition (A,C*,D)
- Patricia Jarvis – Mounted Search and Rescue (A)
- Paige Cofrin – Local Resident (A,C,D)
- Bonney Forbes – Local Resident (A,C,D)
- Tim Abrams – Local Resident (A)
- Michael Braitberg – Local Resident (A,C)
- Tony Hanks – Local Resident (A,C)
- Jan Chu – High Country Lepidopterists (A)
- Bret Gibson – Four Mile Fire Department (A)
- Miles La Hue – Sugar Loaf Fire Protection District (A)
- Christian Meyer (David Batts*) – POSAC (A,C*)

* = alternative representative

Meetings Attended

A = October 13, 2008

B = December 4, 2008

C = January 12, 2009

D = Site Visit (November 2 or November 5, 2008)

Appendix B
Betasso Preserve Stakeholder Group

Meeting Minutes
October 13, 2008
December 4, 2008
January 12, 2009

First Meeting of the Betasso Preserve Stakeholder Group

October 13, 2008

6:00 pm – 8:00 pm

Boulder County Recycling Center

Attendees

(I = invited stakeholder)

Nature Based Organizations

- Jan Chu – High Country Lepidopterists (I)
- Chris Abrahamson – Boulder County Audubon Society (I)
- George Oetzel – Boulder County Nature Association (I)

Recreational User Groups

- Troy Mandery – Boulder Mountainbike Alliance (I)
- Suzanne Webel – Boulder County Horse Association / Boulder Area Trails Coalition (I)
- Bob Manthy – Boulder Trail Runners (I)
- Patricia Jarvis – Mounted Search and Rescue (I)

Neighboring Residents

- Paige Cofrin – Sugarloaf Resident (I)
- Jon Koepke – Alaska Road Resident (I)
- Bonney Forbes – Sugarloaf Resident
- Tim Abrams – Alaska Hill Resident
- John Ringoen – Arkansas Mountain Resident (I)
- Michael Braitberg – Sugarloaf Resident
- Tony Hanks – Arkansas Mountain Resident (I)
- Arleen Miller – Sugarloaf Resident (I)
- Marcia Barber – Sugarloaf Resident (I)

Local Fire Chiefs

- Bret Gibson – Four Mile Fire Department (I)
- Miles La Hue – Sugar Loaf Fire Protection District (I)

POSAC Representative

- Christian Meyer – Parks & Open Space Advisory Committee (chair) (I)

Other

- John Fuhrman – CU Student

Boulder County Parks & Open Space Staff

- Ron Stewart, Director
- Rich Koopmann, Resource Planning Manager
- Brent Wheeler, Operations Manager
- Al Hardy, Trails Supervisor

- Dave Hoerath, Wildlife Specialist
- John Staight, GIS Specialist
- Ernst Streng, Natural Resource Planner

Stakeholders Invited But Did Not Attend Meeting

- Boulder Bird Club
- Colorado Mountain Club – Boulder
- Colorado Native Plant Society
- Friends Interested in Dogs on Open Space
- Friends of Boulder Open Space
- International Mountain Bicycling Association
- PLAN Boulder County
- Sierra Club

NOTES FROM MEETING

Purpose of Stakeholder Group: To assist BCPOS with the evaluation of future management options at Betasso Preserve, particularly where should any potential new trails be located based on the conceptual trail corridors presented to the stakeholders and how should the remainder of the property (areas without trails) be treated (i.e. closed to public vs. open to public)

Betasso Preserve Stakeholder Group will be a short-term (~1 month in duration) working group of a select group of stakeholders that will meet before completion of the draft *Betasso Preserve Management Plan* and before the public process. The anticipated schedule for this stakeholder group will be:

- Initial Meeting (October 13, 2008) – present findings / begin discussion
- Site Visit (November 2 and 5)
- Follow up Meeting – continue discussion / find consensus (mid-Nov.)

Desired Outcome for Stakeholder Group: To reach a consensus about the best future management direction (i.e. balance between trails and preservation) for Betasso Preserve, which would then be presented to the public, POSAC, and BOCC. Outcome of stakeholder group will be presented during public review of draft *Betasso Preserve Management Plan*

Final Product of Stakeholder Group: A memo summarizing the outcome of the stakeholders' decision, which will be included in the draft management plan

Issues / Needs / Expectations of Stakeholder Groups

The following questions were posed to the stakeholders throughout the meeting: *What are your expectations for the Betasso Preserve Stakeholder Group? What do you want to see at Betasso Preserve in the future? and What don't you want to see?* The group went around the room to allow each stakeholder a chance to express their issues, needs, and expectations. Below is a summary of the stakeholders' responses.

In addition, to help sort out who made each comment, the stakeholder groups were combined into one of four categories. If one or more person from a particular type of stakeholder group provided or agreed with a response, then that stakeholder group category is included in parentheses after the response. The four categories and their abbreviations are:

NBO: Nature Based Organizations

RUG: Recreational User Groups

NR: Neighboring Residents

LFC: Local Fire Chiefs

Summary of Stakeholders' Responses

- Historic protections / preservation (NR)
- Preservation of wildlife habitat (e.g. large predators) (NR, RUG, NBO)
- Plan trails around high value wildlife areas (RUG, NBO)
- Thoughtful laid out plan (NR, RUG)
- Enforcement of rules (NR, RUG)
- Sustainable multi-use trails (RUG)
- Connecting trails (RUG)
- Loop trail(s) (RUG)
- At least one large, meaningful loop on Benjamin (RUG)
- Regional trail connections (e.g. Bald Mountain and Switzerland Trail) (RUG)
- Multiple access points with zero parking (RUG)
- Stewardship / maintenance of trails (RUG)
- Wider trails (RUG)
- Narrower trails (NBO)
- Security of neighbors (NR)
- How do we provide for anticipated greater use (NR)
- Adequate parking for horse trailers (RUG, NR)
- Horse trails kept and preserved (NR)
- Work together and support each other (RUG)
- Access from Arkansas Mountain side (NR, RUG)
- Keep access to summit of Arkansas Mountain (NR)
- No access through private property (NR)
- Trespass on private property (NR)
- Alaska Road as access / concern (NR)
- Privacy of neighbors (NR)
- Fire danger / mitigation (NR, LFC)
- Access for all / equitable access (NR, RUG)
- Concern about locked gates / access issues (NR)
- Enforcement of alternative day use regulation (NR)
- Impacts of bikes on trails and vegetation (NR)
- At least one sustainable loop trail (RUG)
- Restore damaged trails (RUG)
- Conflict of users (between horses and bikers and amongst all users) (NR, RUG)

- Neighborhood traffic issues on local roads (NR)
- Increase vehicle traffic (NR)
- Access for emergency services (NR, LFC)
- Increase in mountain lion and bear sightings (NR)
- Boulder Canyon / Sugarloaf traffic (NR, LFC)
 - Volume / Speed
- Riparian area on north side of Benjamin property (NR)
- Continue forestry practices – thinning (NR, LFC)
- No exclusive access for neighboring properties (RUG)
- Keep historic access if permission was given by previous landowners (NR)
- No new structures (NR)
- Do not want to see fire districts getting busier (LFC)

**Betasso Preserve Stakeholder Group
Second Meeting - Minutes**

December 4, 2008

6:00 – 8:00 p.m.

Boulder County Clerk & Records Office
1750 33rd St, Boulder

Attendees

- Chris Abrahamson – Boulder County Audubon Society
- George Oetzel – Boulder County Nature Association
- Arleen Miller – Sugarloaf Resident
- Marcia Barber – Sugarloaf Resident
- Troy Mandery – Boulder Mountainbike Alliance
- Bob Manthy – Boulder Trail Runners
- Deb and Jon Koepke – Alaska Road Resident
- John Ringoen – Arkansas Mountain Resident
- Kitty Stevenson – Sugar Loaf Community, Inc.
- Raymond Bridge – PLAN Boulder and Friends of Boulder Open Space

Unable to Attend (Note: Many people did not attend because of snow throughout the day.)

- Suzanne Webel – Boulder County Horse Association
- Mike O'Brien – Boulder Area Trails Coalition
- Patricia Jarvis – Mounted Search and Rescue
- Paige Cofrin – Sugarloaf Resident
- Bonney Forbes – Sugarloaf Resident
- Tim Abrams – Alaska Hill Resident
- Michael Braitberg – Sugarloaf Resident
- Tony Hanks – Arkansas Mountain Resident
- Jan Chu – High Country Lepidopterists
- Bret Gibson – Four Mile Fire Department
- Miles La Hue – Sugar Loaf Fire Protection District
- Christian Meyer – Parks & Open Space Advisory Committee

Boulder County Parks & Open Space (POS) Staff

- Rich Koopmann, Resource Planning Manager
- Brent Wheeler, Operations Manager
- Al Hardy, Trails Supervisor
- Dave Hoerath, Wildlife Specialist
- Mary Olson, Landscape Architect
- Ron Stewart, Director
- Ernst Strenge, Natural Resource Planner

MINUTES

I. Introductions of Stakeholders and POS staff

II. Purpose and Goal of Stakeholder Group

Ernst Strenge reviewed the purpose and goal of the stakeholder group:

Purpose: To assist POS with the evaluation of future public use of Betasso Preserve, particularly:

- i. Potential new conceptual trail alignments, if any
- ii. Determining whether areas of the property without trails should be closed or open to public

Desired Outcome: To reach a consensus on a potential new trail alignment if any for Betasso Preserve and whether to close or keep open the remainder of the property.

Final Product of Stakeholder Group: A memo summarizing the outcome of the stakeholders' decision, which will be included in the draft *Betasso Preserve Management Plan* and be presented to the public, POSAC, and BOCC

III. Definition of Consensus

Ernst reviewed the definition of consensus:

Consensus is reached if:

1. All stakeholders in attendance have been given the opportunity to contribute to the discussion
2. All stakeholders in attendance have some level of support for the alternative
3. All stakeholders in attendance can live with the outcome, even if it is not their first choice
4. There are no *major* objections from stakeholders in attendance

Consensus is not reached if:

1. At least one stakeholder in attendance has not been given an opportunity to fully express themselves
2. At least one stakeholder in attendance has a *major* objection to the alternative

Consensus is not a vote whereby the majority wins and the minority loses. Instead, if one stakeholder has a major objection, there is no consensus.

Some key aspects of reaching consensus:

- Get everyone's input

- Allow everyone opportunity to speak
- There will be disagreement, but everyone should be respectful of other's opinions
- Encourage discussion
- Ok to express uncertainties or alternative approaches
- Find common solution, despite differences
- No pre-determined outcome
- Iterative process
- Deadlock is acceptable
- If necessary, we'll have a third meeting

It was also stated that, because part of reaching consensus is having a productive dialogue amongst stakeholders, consensus would be of the people in attendance at the stakeholder meeting.

IV. Stakeholders' Issues, Needs, and Expectations

Ernst reviewed the stakeholders' issues, needs, and expectations from first stakeholder meeting held on Oct. 13, 2008 sorted by topic:

Summary of Stakeholders' Issues, Needs, and Expectations

From October 13, 2008 Stakeholder Meeting

NBO: Nature Based Organizations

RUG: Recreational User Groups

NR: Neighboring Residents

LFC: Local Fire Chiefs

Good Planning

- Thoughtful laid out plan (NR, RUG)
- Plan trails around high value wildlife areas (RUG, NBO)
- Preservation of wildlife habitat (e.g. large predators) (NR, RUG, NBO)

Trail Design

- Sustainable multi-use trails (RUG)
- Connecting trails (RUG)
- Loop trail(s) (RUG)
- At least one sustainable loop trail (RUG)
- At least one large, meaningful loop on Benjamin (RUG)
- Stewardship / maintenance of trails (RUG)
- Wider trails (RUG)
- Narrower trails (NBO)

Rules & Regulations

- Enforcement of rules (NR, RUG)
- Enforcement of alternative day use regulation (NR)

Neighbor Concerns

- Security of neighbors (NR)
- Neighborhood traffic issues on local roads (NR)
- No access through private property (NR)
- Trespass on private property (NR)
- Privacy of neighbors (NR)

Public Health and Safety

- Access for emergency services (NR, LFC)
- Fire danger / mitigation (NR, LFC)
- Do not want to see fire districts getting busier (LFC)
- Increase vehicle traffic (NR)
- Boulder Canyon / Sugarloaf traffic (NR, LFC)
- Volume / Speed

Historic Preservation

- Historic protections / preservation (NR)
- No new structures (NR)

Equestrian Concerns

- Adequate parking for horse trailers (RUG, NR)
- Horse trails kept and preserved (NR)

Access

- Access for all / equitable access (NR, RUG)
- No exclusive access for neighboring properties (RUG)
- Keep historic access if permission was given by previous landowners (NR)
- Concern about locked gates / access issues (NR)

Visitor Numbers and Conflict

- Conflict of users (between horses and bikers and amongst all users) (NR, RUG)
- How do we provide for anticipated greater use (NR)
- Work together and support each other (RUG)

Access

- Multiple access points with zero parking (RUG)
- Access from Arkansas Mountain side (NR, RUG)
- Keep access to summit of Arkansas Mountain (NR)
- Alaska Road as access / concern (NR)
- Regional trail connections (e.g. Bald Mountain and Switzerland Trail) (RUG)

Impacts and Mitigation

- Impacts of bikes on trails and vegetation (NR)
- Increase in mountain lion and bear sightings (NR)
- Riparian area on north side of Benjamin property (NR)
- Restore damaged trails (RUG)
- Continue forestry practices – thinning (NR, LFC)

V. Draft Trail Options

Al Hardy reviewed the trail options

- **No New Trail Option:** keep existing trails, but no new trails
 - Canyon Loop Trail: 3.2 miles
 - Bummers Rock Trail: 0.25 miles
 - Boulder Canyon Link Trail: 1.25 miles
- **Draft Trail Concept 1:** ~ 2.2 miles - out and back route between Canyon Loop Trail and Fourmile Creek along eastern slope of Betasso Preserve
- **Draft Trail Concept 2A:** ~ 4.3 miles - loop trail including draft trail concept 1 and trail extending into Benjamin property past first drainage
- **Draft Trail Concept 2B:** ~ 4.2 miles - loop trail similar to 2A, but avoids first drainage in Benjamin
- **Draft Trail Concept 3:** ~ 5.3 miles - includes trail 2A, with additional trail extending across Benjamin property to Alaska Road
- **Draft Trail Concept 4:** ~ 6.6 miles - includes all of trail 3, with additional trail extending across the middle slope of Benjamin thus creating second loop
- **Draft Fourmile Trail Connection:** ~ 0.4 miles - potential trail connection to Fourmile Canyon Drive that could be included with Draft Trail Concepts 1-4

Closures versus Open: In addition, POS put forth the following question to stakeholders: should areas of the property without designated trails, or some portion of it, be closed to the public? Current POS rules and regulations allow all users except mountain bikers to go off trail unless an area has been specifically closed to the public. POS may close areas of open space properties to the public as necessary or desirable due to wildlife, vegetation management review, public safety concerns, and/or

other resource protection needs. Mountain bikers must stay on designated trails at all times.

VI. Stakeholders Site Visits

Stakeholders who went on one of the site visits held on November 2 and 5 with POS staff provided comments about their experiences. The following is a summary of those comments:

Most stakeholders agreed that the site was steep. Some expressed concern regarding the difficulty of constructing trails on steep slopes and the impacts of building and maintaining these trails on vegetation and wildlife habitat. Others said we could build trail on steep slopes as it has been done elsewhere, but may need to keep tread narrow to limit impacts.

Some adjectives stakeholders used to describe site:

- Steep
- Pristine
- Diverse
- Sacred
- Jewel

Other concerns expressed during this discussion included: trespass on private property, restoration of social trails, need for enforcement and education, cost and difficulty of building new trails on steep slopes, and concern about fire and emergency response.

VII. Finding Consensus

Ernst provided instructions for the *Five-Degree Consensus Scale* exercise for each draft trail option including the no trail option. The purpose of doing the exercise prior to the group discussion was to get an initial sense of where the group stands.

Instructions for Five-Degree Consensus Scale – For each draft trail option, each stakeholder member must select one of the following numbers depending on how they feel about that option:

- 1 – yes, let's do it
- 2 – ok, it's good enough
- 3 – maybe, still have questions
- 4 – not quite, can we change it
- 5 – no, let's do something else

The results from the first Five-Degree Consensus Scale exercise were:

Trail Options	1 <i>yes, let's do it</i>	2 <i>ok, it's good enough</i>	3 <i>maybe, still have questions</i>	4 <i>not quite, can we change it</i>	5 <i>no, let's do something else</i>
No New Trails	6	1	1		3
Trail Concept 1	1	2	6	1	1
Trail Concept 2A	1	2	4		4
Trail Concept 2B	1		3	1	6
Trail Concept 3	1		3		7
Trail Concept 4	1		3		7

Remainder of Property	1 <i>yes, let's do it</i>	2 <i>ok, it's good enough</i>	3 <i>maybe, still have questions</i>	4 <i>not quite, can we change it</i>	5 <i>no, let's do something else</i>
Open to the Public	1		6		3
Closed to the Public	3	1	4		2

These tables indicate that prior to the discussion amongst stakeholders about each option there was no consensus on any trail option or whether to keep the remainder of the property open or closed to the public (i.e. there was at least one “5 – no, let’s do something else” for each option).

Following completion of the first round of the *Five-Degree Consensus Scale* exercise, Rich Koopmann led a group discussion about each option. For each trail option, the group was asked:

- i. Why do you support this option?
- ii. Why do you not support this option?
- iii. What are the lingering questions about this option?
- iv. Are there potential solutions for concerns

No Trail Option

Those who supported this option provided the following reasons:

- Impact on wildlife habitat of additional trails
- Have more questions about wildlife / not enough wildlife study of area including results of DOW Front Range Cougar Study and surveys for owls, nesting raptors, turkeys, etc.
- Narrow trail loops have the greatest impact on wildlife because it excludes wildlife in center of loop
- We should be setting aside blocks of land for wildlife
- Few large areas dedicated to wildlife
- Habitat is the reason we buy open space

- Don't need to impact more land with additional trails
- Betasso currently has most amount of trail compared to other POS properties
- County can spend money better than on additional trails
- Erosion concerns
- More trails will increase number of social trails

Those who did not support this option provided the following reasons:

- Population is growing and wants access to public lands
- This option does not address social trails
- Social trails will form if we don't have designated trails
- Voting results and tax bonds show public support for access
- Well planned and managed trails are needed
- Enforcement of total closure would be difficult
- Property part of huge corridor of wild country in County
- People are changed from experience in nature
- Recreationists will help with reclaiming social trails

Those who still had questions provided the following responses:

- Questions on wildlife issues
- Should wait for more wildlife study

Trail Option 1

Those who supported this option provided the following reasons:

- Understands mountain bikers need for regional trail connections
- May be a way to reach consensus
- Least disruption of wildlife habitat of all trail options

Those who did not support this option provided the following reasons:

- Out and back trail is notorious for user conflict
- Loops are better for limiting user conflict

Those who still had questions provided the following responses:

- If you have a loop, more interesting for users, but more impact on wildlife because of the amount of space between trails

Trail Options 2A and 2B (Note: these trails were grouped together due to time constraints)

Those who supported these options provided the following reasons:

- 2B is better because it avoids multiple crossings of drainage
- Trail option 2B is a compromise – majority of property is left pristine
- Trail loop is important for trail traffic issues

- Connection to Fourmile allows people to bike from town and reduces car trips
- Better experience

Those who did not support these options provided the following reasons:

- Narrow trail loop will cut off wildlife use
- Trail option 2A goes too far into wildlife habitat
- Trail option 2B is too dense

Those who still had questions provided the following responses:

- Does 2A have to go so far to the west?
- Does 2B create more disruption to drainage?

Trail Options 3 and 4 (Note: these trails were grouped together due to time constraints)

Those who supported these options provided the following reasons:

- Provides trail corridor to upper portions of Boulder County
- Access without getting onto pavement
- Very few trail corridors to get up canyon

Those who did not support these options provided the following reasons:

- People will park on Alaska Road
- Alaska Road is privately maintained.
- Residents along Alaska Road have spent \$1,000's on maintenance to date.
- Alaska Road is not in good condition.
- Opposed to going through wildlife habitat
- Too intrusive

Other Ideas Brought Up During Discussion

- Make Trail 1 one-way for mountain bikers to discourage them from going up Fourmile Canyon Drive (safety concerns)
- Create spaces along trail to allow for passing, especially for mountain bikers and equestrians
- Continue alternate day use for mountain bikes
- Mountain bike community will help with reclaiming social trails and have already begun fund raising for work
- More wildlife studies

Consensus Discussion

Following the discussion of the trail options, the stakeholder group discussed whether they could reach consensus on one of the proposed trail options.

Some members thought it would be beneficial to send the Five-Degree Consensus Scale exercise to the stakeholder members who could not attend the second meeting. However, it was determined that this would not be worthwhile if the people in the room couldn't find consensus.

At this point in the meeting, a number of stakeholders voiced support for Draft Trail Option 2B and asked whether there was consensus in the room for this option. At least one stakeholder objected to this option and stated he would not support it. Others stated that they would not support Draft Trail Options 3 or 4. Therefore, consensus was not reached on a draft trail option.

VIII. Next Steps

It was decided by those present that a third meeting of the Betasso Preserve Stakeholder Group would be beneficial. It would allow those who were not able to attend this meeting a chance to be a part of the continuing discussion and to give their support or opposition to the various trail options and whether the remainder of the property should be open or closed to the public.

**Betasso Preserve Stakeholder Group
Third Meeting - Minutes**

January 12, 2009

6:00 – 8:00 p.m.

Boulder County Clerk & Records Office
1750 33rd St, Boulder

Meeting Minutes

I. Introductions of Stakeholders and BCPOS Staff

II. Review Outcome of Meeting #2

Ernst Strenge briefly reviewed the outcome of the Betasso Preserve Stakeholder Group's second meeting, held on December 4, 2008. Stakeholders received a copy of stakeholder comments from the second meeting on each trail option.

III. Purpose of Meeting

Ernst reiterated that the purpose of the meeting was to determine if there was consensus amongst stakeholders present at the meeting on a draft trail option and on any closure areas at Betasso Preserve. In addition, it was reiterated that the definition of "consensus" being used in the meeting was "unanimous consensus" (i.e. if one stakeholder has a major objection, there is no consensus) and was not majority rule.

IV. Five-Degree Consensus Scale

Ernst explained the instructions for the Five-Degree Consensus Scale exercise, which is a planning tool used when trying to gain consensus. The Five-Degree Consensus Scale provides a sense of where the group stands on an issue without giving an up or down vote. Members rank their stance on a proposal on a scale from 1 to 5, with 1 indicating strong support and 5 signifying strong opposition. A rank of 2, 3, or 4 indicates that a person does not fully support or oppose a project, but rather has some tentativeness towards it or additional questions about it. These ranking help to frame the subsequent discussion amongst stakeholders.

For each draft trail option and whether to keep the remainder of the property open or have portions closed, each member of the stakeholder group selected one of the following numbers:

- 1 – yes, let's do it
- 2 – ok, it's good enough
- 3 – maybe, still have questions
- 4 – not quite, can we change it
- 5 – no, let's do something else

From the initial exercise, it was found that the majority of stakeholders were on either end of the spectrum (i.e. 1 – *yes, let do it* or 5 – *no, let's do something else*). With at least 4 people showing a major objection to each option, no consensus was reached.

The results of the Five-Degree Consensus Scale were:

Management Option	1 <i>yes, let's do it</i>	2 <i>ok, it's good enough</i>	3 <i>maybe, still have questions</i>	4 <i>not quite, can we change it</i>	5 <i>no, let's do something else</i>
No New Trails	10	0	1	0	4
Trail Concept 1	2	2	1	3	8
Trail Concept 2A	0	1	3	2	9
Trail Concept 2B	3	3	0	3	7
Trail Concept 3	1	0	1	1	14
Trail Concept 4	1	1	1	1	13
Remainder of Property Open	7	0	2	1	7
Remainder of Property Closed	6	0	3	1	6

V. Property Open vs. Portions Closed to the Public

Following completion of the Five-Degree Consensus Scale, the Stakeholder Group began the discussion with the issue of whether portions of Betasso Preserve should be closed to the public or whether the entire site should remain open. Comments from stakeholders included:

Reasons for temporary or permanent closure:

- Concern about increased wildfire danger. Will more users on trails and on property increase fire danger?
- Temporary closure for additional wildlife surveys and restoration. Trails don't need to happen now.
- Need more wildlife study.
- Original intent of open space was for preservation. Therefore, no access for recreation
- Social trails were wildlife trails.
- Close property to repair existing social trails, more studies.
- Do not need to build trails just because County purchased it.
- Opposed to keeping it open until we know more

Reasons for opening remainder of property to public:

- People like to get to the east side of Arkansas Mountain along ridge.
- Allow people to wander by foot. Dispersed use.

- Property should remain open if impacts can be minimized
- Trails squashed together as proposed are not a good situation.
- Some segments of social trails are sustainable and therefore could be open to the public. If there are no problems with social trails, why close

Additional Questions

- If existing social trails were restored, would there need to be a short-term closure until revegetated? Most of the property would therefore need to be closed, at least temporarily.
- How effective will closure be for open space or for private property?
- Closure requires adequate enforcement. Will this be possible?
- Where will additional users park?

VI. Trail Options

The following are comments from stakeholders regarding each of the draft trail options.

A. No New Trails

(Not specifically discussed by stakeholders. Discussion went straight to discussing Trail Concept 1. Comments on the No New Trails option can be found in the minutes for meeting #2)

B. Draft Trail Concept 1

1. Reasons for support

- Would be ok with Option 1 if alternative day use and have turn outs for equestrians

2. Reasons you didn't support

- If you voted a 1 – *yes, let's do it* on “No New Trails”, then voted 5 - *no, let's do something else* on all others
- Too short, too boring
- Would result in too much traffic on trail.
- Two-way traffic is too dangerous.
- Recreation potential not maximized in space made available for it

C. Draft Trail Concept 2A

1. Reasons for support

(None discussed at this meeting)

2. Reasons you didn't support

- Invasive of wildlife and vegetation
- Recreation potential not maximized in space made available for it
- Crosses too many drainages
- Too short and boring

D. Draft Trail Concept 2B

1. Reasons for support

- Represents the best compromise between trails and preservation
- Creates longer loop
- Solves problem of conflict if one way loop

2. Reasons you didn't support

- Too artificial
- Switchbacks too tight, making it too easy to shortcut
- Does not get people to where they want to go.
- Recreation potential not maximized in space made available for it

E. Draft Trail Concept 3

1. Reasons for support

(None discussed at this meeting)

2. Reasons you didn't support

- Too invasive
- Alaska Road access is a no go
- Potential parking problems, private property issues
- Recreation potential not maximized in space made available for it

F. Draft Trail Concept 4

1. Reasons for support

(None discussed at this meeting)

2. Reasons you didn't support

- Destroys everything
- Concerns about wildlife. And emergency access
- The trail will invite Alaska Road use even without official access.

VII. Alternative Trail Routes Discussion

The following are comments made by stakeholders regarding alternative trail routes that are currently not on the table.

- Is there a hybrid trail that eliminates access to Alaska Road and creates one loop across Benjamin?
- Could draft trail options 3 and 4 be modified with access to Alaska Road taken out? Creates stacked loop.
 - BMA representative had previously said Alaska Road is important for mountain bikers
 - Mountain bikers were observed on Benjamin after stakeholder hike. If trail is close to Alaska Road, people will still use.
 - Could County maintain Alaska Road to provide access?
- BMA advocating for something not even on table

VIII. General Stakeholder Comments

The following are some general comments that were made by stakeholders throughout the meeting.

- Concern about trespass through private property*. POS needs to sign private property.
 - People ignore existing “no trespassing” signs.
 - If trail takes people to where they want to go, there would be less trespass
 - Homeowners have had a rough go of it with trespass issues. People have used property for 50 years. New owner – people of Boulder County. Bringing people together to find solutions. Landowners need to document trespass...take photos, etc. BMA promotes “no poaching”. BMA can put photos on web. We are all tax paying / registered voters. Want baseline of access that works on Benjamin. Heil example – slow people down through trail design. Come up with plan of managed trails. Otherwise, we all fail.
- Will formal horse trailer parking be included in the management plan?
- Would like all trails to have restricted use / alternative day use
- Keep one-way restriction for mountain bikers
 - Consider including everyone in one-way restriction
- Many in Sugarloaf community want to see it done slowly...take time to get there. Phase it in
- Alaska Road is a privately maintained road and shouldn't be used as an access.
 - Road is currently eroding and needs repairs. \$10,000 estimate
- Heil trail example – narrow, curvy, and tight to slow down bikers
- After walking property, feels like the property needs to be closed – steep and deep. Sugarloaf Fire Department is required to respond to emergencies, POS does not reimburse for services, creating danger for 2 canyons – residential and historic sites, no historical protection. Ernie Betasso's legacy – preservation, peace and quiet, can't morph preservation into recreation
- Would like to see what tradeoffs are for each draft trail option? (e.g. habitat vs. trail – what is gained and what is lost)
- Could we postpone a decision about trails or have a limited trail plan until the property is more fully surveyed and evaluated for resources including wildlife?
 - Additional studies will lead to “analysis paralysis”. Some people will never be satisfied.
 - Other counties (e.g. Larimer and Jefferson) open properties quickly without lengthy study on resources
 - Lets open it or not. POS has already done extensive study.

* **Note:** In response to concerns about trespass onto private property, Amanda Hatfield (Resource Protection) told the stakeholder group that Boulder County Parks & Open Space (BCPOS) boundaries are posted. Amanda noted that adjacent landowners should notify BCPOS if boundary signs have been removed or vandalized. If any violation is occurring on BCPOS properties, Amanda noted that the public should immediately

contact BCPOS Rangers at 303-441-4444 (ask for a County Parks Ranger). The public may also call Ranger Supervisor, David Bell, at 303-678-6210 to report violations.

Amanda also noted that BCPOS rangers are not commissioned and can only enforce rules and regulations on BCPOS lands. Because it is a criminal offense, landowners should contact the Boulder County Sheriff's Office if illegal trespass is occurring across private property (BCSO Non-emergency Dispatch 303-441-4444). If possible, the landowner should provide a description of the trespasser and any patterns of use, if known. Boulder County has five sheriff's office deputies specifically assigned to open space that can respond to these issues.

IX. Conclusion and Next Steps

By the end of the meeting, no consensus was reached amongst stakeholders on any draft trail concept or whether the remainder of the property should be open or closed to the public. At least one stakeholder had a "major objection" to each of the five draft trail options and to either keeping the property open or closing portions of it to the public.

BCPOS staff concluded the stakeholder meeting by stating that even though the group couldn't reach consensus, BCPOS was grateful to all of those who participated over the past four months in the Betasso Preserve Stakeholder Group. Staff noted that they have gained a lot from sitting down and listening to the needs and concerns of each stakeholder and that it was staff's sincere hope that each stakeholder had also gained something from the process. BCPOS truly appreciates the time and effort each stakeholder has put into the discussions.

BCPOS's next steps will be to prepare a final memo of the Betasso Preserve Stakeholder Group, which will be included in the draft management plan. At this point, BCPOS staff will move forward with completing the draft Betasso Preserve Management Plan including making a recommendation regarding a draft trail option. Public meetings and a public comment period will occur following completion of the draft management plan. Following a public comment period, staff will bring the draft management plan to the Parks and Open Space Advisory Committee (POSAC) for a recommendation to the Board of County Commissioners (BOCC) and then to the BOCC for final approval. The public will have additional opportunities to make comments at both of these meetings.

Attendees

- Suzanne Webel – Boulder County Horse Association
- Chris Abrahamson – Boulder County Audubon Society
- Paige Cofrin – Sugarloaf Resident
- Bonney Forbes – Sugarloaf Resident
- George Oetzel – Boulder County Nature Association
- Arleen Miller – Sugarloaf Resident
- Mike Barrow – Boulder Mountainbike Alliance (in place of Troy Mandery)
- Bob Manthy – Boulder Trail Runners
- Deb and Jon Koepke – Alaska Road Resident
- Michael Braitberg – Sugarloaf Resident
- Mitra Adams – Alaska Road Resident
- Tony Hanks – Arkansas Mountain Resident
- Kitty Stevenson – Sugar Loaf Community, Inc.
- Raymond Bridge – PLAN Boulder and Friends of Boulder Open Space
- Chris Morrison – Boulder Area Trails Coalition (in place of Mike O’Brien)
- David Batts – Parks & Open Space Advisory Committee (in place of Christian Meyer)

Not in Attendance

- John Ringoen – Arkansas Mountain Resident
- Marcia Barber – Sugarloaf Resident
- Patricia Jarvis – Mounted Search and Rescue
- Tim Abrams – Alaska Hill Resident
- Jan Chu – High Country Lepidopterists
- Bret Gibson – Four Mile Fire Department
- Miles La Hue – Sugar Loaf Fire Protection District

Boulder County Parks & Open Space (POS) Staff

- Rich Koopmann, Resource Planning Manager
- Al Hardy, Trails Supervisor
- Dave Hoerath, Wildlife Specialist
- Mary Olson, Landscape Architect
- Amanda Hatfield, Resource Protection
- Jesse Rounds, Resource Planner
- Ron Stewart, Director
- Ernst Strenge, Natural Resource Planner

F. U.S. National Vegetation Classification System

Appendix F U.S. National Vegetation Classification System

The U.S. National Vegetation Classification System (NVCS) is a standard vegetation classification and mapping system used by numerous federal, state, and local government agencies, as well as other non-governmental organizations (e.g. state Natural Heritage programs). Boulder County Parks & Open Space is utilizing this system to map, classify, and track long-term changes in vegetation across much of its non-agricultural open space properties. The following shows the hierarchy and an example of the NVCS and provides definitions for terms used in the classification system. BCPOS classifies vegetation down to the level of Alliance.

Hierarchy of U.S. National Vegetation Classification System

Class (vegetation structure, e.g. woodland) →

Subclass (leaf phenology, e.g. evergreen woodland) →

Group (leaf type, climate type, e.g. temperate or subpolar needle-leaved evergreen woodland) →

Subgroup (degree of naturalness, e.g. natural/semi-natural temperate or subpolar needle-leaved evergreen woodland) →

Formation (other physiognomic or environmental factors, e.g. rounded-crowned temperate or subpolar needle-leaved evergreen woodland) →

Alliance (dominant species in uppermost stratum, e.g. Ponderosa pine woodland alliance) →

Association (additional dominants from any stratum, e.g. Ponderosa pine / Ross's sedge / silver sage / hairy false golden aster / needle-and-thread)

Definition of Terms (from Maybury 1999, Appendix B, p. 26)

Forest: *Trees with their crowns overlapping (generally forming 60 percent to 100 percent cover).*

Woodland: *Open stands of trees with crowns not usually touching (generally forming 25 percent to 60 percent cover).*

Shrubland: *Shrubs generally greater than 0.5 meter tall with individuals or clumps overlapping to not touching (generally forming more than 25 percent cover, with trees generally forming less than 25 percent cover). Vegetation dominated by woody vines is generally treated in this class.*

Dwarf-Shrubland: *Low-growing shrubs usually under 0.5 meter tall with individuals or clumps overlapping to not touching (generally forming greater than 25 percent cover, with trees and tall shrubs generally forming less than 25 percent cover).*

Herbaceous: *Herbaceous plants dominant (generally forming at least 25 percent cover; with trees, shrubs, and dwarf-shrubs generally forming less than 25 percent cover).*

Maybury, K.P., editor. 1999. Seeing the Forest and the Trees: Ecological Classification for Conservation. The Nature Conservancy, Arlington, VA. 23 pp. plus appendices.

G. Betasso Preserve Plant Species List

Appendix G - Betasso Preserve Plant Species List
Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
yarrow	<i>Achillea lanulosa</i>	Forb	Native
whitestem blazingstar	<i>Acrolasia albicaulis</i>	Forb	Native
bushy blazingstar	<i>Acrolasia dispersa</i>	Forb	Native
red baneberry	<i>Actaea rubra</i>	Forb	Native
flax	<i>Adenolinum lewisii</i>	Forb	Native
yellow false dandelion, pale false dandelion	<i>Agoseris glauca</i>	Forb	Native
mountain caraway, stemless Indian parsley	<i>Aletes acaulis</i>	Forb	Native
nodding onion	<i>Allium cernuum</i>	Forb	Native
wild onion	<i>Allium textile</i>	Forb	Native
alyssum	<i>Alyssum desertorum</i>	Forb	Introduced
alyssum	<i>Alyssum parviflorum</i>	Forb	Introduced
ragweed	<i>Ambrosia psilostachya</i>	Forb	Native
yellow stoncrop	<i>Amerosedum lanceolatum</i>	Forb	Native
pearly everlasting	<i>Anaphalis margaritacea</i>	Forb	Native
candle anemone	<i>Anemone cylindrica</i>	Forb	Native
pink pussytoes, showy pussytoes	<i>Antennaria rosea</i>	Forb	Native
chamomile, stinking chamomile	<i>Anthemis cotula</i>	Forb	Introduced
broomrape	<i>Aphyllon fasciculatum</i>	Forb	Native
spreading dogbane	<i>Apocynum androsaemifolium</i>	Forb	Native
rockcress	<i>Arabis hirsuta</i>	Forb	Introduced
wild sarsaparilla	<i>Aralia nudicaulis</i>	Forb	Native
bur-dock	<i>Arctium minus</i>	Forb	Introduced
prickly poppy	<i>Argemone polyanthemos</i>	Forb	Native
heartleaf arnica	<i>Arnica cordifolia</i>	Forb	Native
white sage	<i>Artemisia ludoviciana</i>	Forb	Native
showy milkweed	<i>Asclepias speciosa</i>	Forb	Native
green-flowered milkweed	<i>Asclepias viridiflora</i>	Forb	Native
smooth aster	<i>Aster laevis</i>	Forb	Native
porter aster	<i>Aster porteri</i>	Forb	Native
Drummond's milk vetch	<i>Astragalus drummondii</i>	Forb	Native

Appendix G - Betasso Preserve Plant Species List
Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
wiry milk vetch, flexile milk vetch	<i>Astragalus flexuosus</i>	Forb	Native
prairie milk vetch	<i>Astragalus laxmannii</i>	Forb	Native
milkvetch	<i>Astragalus sp.</i>	Forb	unknown
Canada thistle	<i>Breia arvensis</i>	Forb	Introduced
brickellbrush	<i>Brickellia grandiflora</i>	Forb	Native
false boneset	<i>Brickellia rosmarinifolia</i>	Forb	Native
mariposa, sego lily	<i>Calochortus gunnisonii</i>	Forb	Native
false flax	<i>Camelina microcarpa</i>	Forb	Introduced
harebell	<i>Campanula rapunculoides</i>	Forb	Introduced
common harebell	<i>Campanula rotundifolia</i>	Forb	Native
whitetop	<i>Cardaria draba</i>	Forb	Introduced
musk thistle	<i>Carduus nutans</i>	Forb	Introduced
common mouse-ears	<i>Cerastium fontanum</i>	Forb	Introduced
chickweed	<i>Cerastium strictum</i>	Forb	Native
strawberry blite	<i>Chenopodium fremontii</i>	Forb	Native
narrowleaf goosefoot	<i>Chenopodium leptophyllum</i>	Forb	Native
white hawkweed	<i>Chlorocrepis albiflora</i>	Forb	Native
yellowspine thistle, wavyleaf thistle	<i>Cirsium ochrocentrum</i>	Forb	Native
native thistle	<i>Cirsium undulatum</i>	Forb	Native
bull thistle	<i>Cirsium vulgare</i>	Forb	Introduced
thistle	<i>Cirsium sp.</i>	Forb	unknown
blue-eyed Mary, hunchback flower	<i>Collinsia parviflora</i>	Forb	Native
bastard-toadflax	<i>Comandra umbellata</i>	Forb	Native
bindweed	<i>Convolvulus arvensis</i>	Forb	Introduced
spotted coralroot	<i>Corallorhiza maculata</i>	Forb	Native
sugarbowl, leatherflower	<i>Coriflora hirsutissima</i>	Forb	Native
hound's tongue	<i>Cynoglossum officinale</i>	Forb	Introduced
two lobe larkspur	<i>Delphinium nuttalianum</i>	Forb	Native
deptford pink	<i>Dianthus armeria</i>	Forb	Introduced
teasel	<i>Dipsacus fullonum</i>	Forb	Introduced

Appendix G - Betasso Preserve Plant Species List
Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
dragonhead	<i>Dracocephalum parviflorum</i>	Forb	Native
big flower cinquefoil	<i>Drymocallis fissa</i>	Forb	Native
hairy willow-herb	<i>Epilobium ciliatum</i>	Forb	Native
willow herb	<i>Epilobium sp.</i>	Forb	unknown
field horsetail	<i>Equisetum arvense</i>	Forb	Native
cutleaf fleabane	<i>Erigeron compositus</i>	Forb	Native
spreading fleabane	<i>Erigeron divergens</i>	Forb	Native
trailing fleabane	<i>Erigeron flagellaris</i>	Forb	Native
wild buckwheat	<i>Eriogonum flavum</i>	Forb	Native
sulphur flower	<i>Eriogonum umbellatum</i>	Forb	Native
wallflower	<i>Erysimum asperum</i>	Forb	Native
shaggy morningglory	<i>Evolvulus nuttallianus</i>	Forb	Native
fern	<i>Fern sp.</i>	Forb	unknown
wild strawberry	<i>Fragaria vesca</i>	Forb	Native
strawberry	<i>Fragaria virginiana</i>	Forb	Native
elkweed	<i>Frasera speciosa</i>	Forb	Native
blanketflower	<i>Gaillardia aristata</i>	Forb	Native
bedstraw	<i>Galium aparine</i>	Forb	Introduced
northern bedstraw	<i>Galium septentrionale</i>	Forb	Native
cleavers, goosegrass	<i>Galium spurium</i>	Forb	Introduced
fragrant bedstraw	<i>Galium triflorum</i>	Forb	Native
three petal bedstraw	<i>Galium trifidum</i>	Forb	Native
Drummond's campion	<i>Gastrolychnis drummondii</i>	Forb	Native
scarlet beeblossum	<i>Gaura coccinea</i>	Forb	Native
geranium	<i>Geranium caespitosum</i>	Forb	Native
yellow avens	<i>Geum aleppicum</i>	Forb	Native
large-leaved avens	<i>Geum macrophyllum</i>	Forb	Native
gumweed	<i>Grindelia squarrosa</i>	Forb	Native
whiskbroom parsley	<i>Harbouria trachypleura</i>	Forb	Native
little sunflower	<i>Helianthus pumilus</i>	Forb	Native

Appendix G - Betasso Preserve Plant Species List
Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
hairy false golden aster	<i>Heterotheca foliosa</i>	Forb	Native
common alumroot	<i>Heuchera parvifolia</i>	Forb	Native
scouring-rush	<i>Hippochaete hyemalis</i>	Forb	Native
scouring rush	<i>Hippochaete laevigata</i>	Forb	Native
Fendler's waterleaf	<i>Hydrophyllum fendleri</i>	Forb	Native
St. Johnswort	<i>Hypericum perforatum</i>	Forb	Introduced
prickly lettuce	<i>Lactuca serriola</i>	Forb	Introduced
blue lettuce	<i>Lactuca tatarica</i>	Forb	Native
beggar's tick, stickseed	<i>Lappula redowskii</i>	Forb	Native
motherwort	<i>Leonurus cardiaca</i>	Forb	Introduced
peppergrass	<i>Lepidium densiflorum</i>	Forb	Introduced
bladderpod	<i>Lesquerella montana</i>	Forb	Native
gayfeather	<i>Liatis punctata</i>	Forb	Native
dalmatian toadflax	<i>Linaria genistifolia</i>	Forb	Introduced
puccoon	<i>Lithospermum multiflorum</i>	Forb	Native
salt-and-pepper	<i>Lomatium orientale</i>	Forb	Native
lupine	<i>Lupinus sp.</i>	Forb	unknown
skeletonplant	<i>Lygodesmia juncea</i>	Forb	Native
false Solomon's seal	<i>Maianthemum amplexicaule</i>	Forb	Native
star false Solomon's seal	<i>Maianthemum stellatum</i>	Forb	Native
black medic	<i>Medicago lupulina</i>	Forb	Introduced
field mint	<i>Mentha arvensis</i>	Forb	Native
chiming bells	<i>Mertensia lanceolata</i>	Forb	Native
saxifrage	<i>Micranthes rhomboidea</i>	Forb	Native
nodding microceris	<i>Microseris nutans</i>	Forb	Native
slender phlox	<i>Microsteris gracilis</i>	Forb	Native
bee-balm	<i>Monarda fistulosa</i>	Forb	Native
watercress	<i>Nasturtium officinale</i>	Forb	Native
fieldcress	<i>Neolepia campestris</i>	Forb	Introduced
catnip	<i>Nepeta cataria</i>	Forb	Introduced

Appendix G - Betasso Preserve Plant Species List
 Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
wild candytuft	<i>Noccaea montana</i>	Forb	Native
blazingstar	<i>Nuttallia sp.</i>	Forb	unknown
false tarragon	<i>Oligosporus dracunculus</i>	Forb	Native
tarragon	<i>Oligosporus pacificus</i>	Forb	Native
marbleseed	<i>Onosmodium molle</i>	Forb	Native
miners candle	<i>Oreocarya virgata</i>	Forb	Native
sweet cicely	<i>Osmorhiza chilensis</i>	Forb	Native
sweet cicely, bluntseed sweetroot	<i>Osmorhiza depauperata</i>	Forb	Native
hairy four o'clock, umbrellawort	<i>Oxybaphus hirsutus</i>	Forb	Native
narrow leaf 4 o'clock, umbrellawort	<i>Oxybaphus linearis</i>	Forb	Native
Colorado loco	<i>Oxytropis lambertii</i>	Forb	Native
groundsel, Fendler's ragwort	<i>Packera fendleri</i>	Forb	Native
nailwort	<i>Paronychia jamesii</i>	Forb	Native
Rocky Mountain penstemon	<i>Penstemon strictus</i>	Forb	Native
Front Range beardtongue	<i>Penstemon virens</i>	Forb	Native
penstemon	<i>Penstemon sp.</i>	Forb	unknown
scorpionweed	<i>Phacelia heterophylla</i>	Forb	Native
flowery phlox	<i>Phlox multiflora</i>	Forb	Native
clammy groundcherry	<i>Physalis heterophylla</i>	Forb	Native
narrowleaf plantain	<i>Plantago lanceolata</i>	Forb	Introduced
common plantain	<i>Plantago major</i>	Forb	Introduced
woolly plantain	<i>Plantago patagonica</i>	Forb	Native
Douglas' knotweed	<i>Polygonum douglasii</i>	Forb	Native
woolly cinquefoil	<i>Potentilla hippiana</i>	Forb	Native
Parry's primrose	<i>Primula parryi</i>	Forb	Native
yellow mountain parsley	<i>Pseudocymopterus montanus</i>	Forb	Native
alfalfa	<i>Psoralidium tenuiflorum</i>	Forb	Native
bracken	<i>Pteridium aquilinum</i>	Forb	Native
winged buckwheat	<i>Pterogonum alatum</i>	Forb	Native
woodland pinedrops	<i>Pterospora andromedea</i>	Forb	Native

Appendix G - Betasso Preserve Plant Species List
Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
pasqueflower	<i>Pulsatilla ludoviciana</i>	Forb	Native
yellowcress	<i>Rorippa sinuata</i>	Forb	Native
black-eyed Susan	<i>Rudbeckia hirta</i>	Forb	Native
curly dock	<i>Rumex crispus</i>	Forb	Introduced
dock	<i>Rumex sp.</i>	Forb	unknown
black snakeroot	<i>Sanicula marilandica</i>	Forb	Native
soapwort, bouncingbet	<i>Saponaria officinalis</i>	Forb	Introduced
lanceleaf figwort	<i>Scrophularia lanceolata</i>	Forb	Native
Britton's skullcap	<i>Scutellaria brittonii</i>	Forb	Native
groundsel	<i>Senecio integerrimus</i>	Forb	Native
butterweed	<i>Senecio spartioides</i>	Forb	Native
ragwort	<i>Senecio sp.</i>	Forb	unknown
sleepy catchfly	<i>Silene antirrhina</i>	Forb	Introduced
tumble mustard	<i>Sisymbrium altissimum</i>	Forb	Introduced
Canada goldenrod	<i>Solidago canadensis</i>	Forb	Native
Missouri goldenrod	<i>Solidago missouriensis</i>	Forb	Native
goldenrod	<i>Solidago sp.</i>	Forb	unknown
dandelion	<i>Taraxacum officinale</i>	Forb	Introduced
Fendler's meadow rue	<i>Thalictrum fendleri</i>	Forb	Native
prairie thermopsis	<i>Thermopsis rhombifolia</i>	Forb	Native
pennycress	<i>Thlaspi arvense</i>	Forb	Introduced
spurge	<i>Tithymalus brachyceras</i>	Forb	Native
myrtle spurge	<i>Tithymalus myrsinites</i>	Forb	Introduced
leafy spurge	<i>Tithymalus uralensis</i>	Forb	Introduced
Easter daisy	<i>Townsendia grandiflora</i>	Forb	Native
spiderwort	<i>Tradescantia occidentalis</i>	Forb	Native
salsify	<i>Tragopogon dubius</i>	Forb	Introduced
red clover	<i>Trifolium pratense</i>	Forb	Introduced
clasping venus' looking-glass	<i>Triodanis perfoliata</i>	Forb	Introduced
tower mustard	<i>Turritis glabra</i>	Forb	Introduced

Appendix G - Betasso Preserve Plant Species List
Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
broad-leaved cattail	<i>Typha latifolia</i>	Forb	Native
stinging nettle	<i>Urtica gracilis</i>	Forb	Native
woolly mullein	<i>Verbascum thapsus</i>	Forb	Introduced
American speedwell	<i>Veronica americana</i>	Forb	Native
violet	<i>Viola scopulorum</i>	Forb	Native
common blue violet	<i>Viola sororia</i>	Forb	Native
violet	<i>Viola sp.</i>	Forb	unknown
western aster	<i>Virgularia ascendens</i>	Forb	Native
white prairie aster	<i>Virgulus falcatus</i>	Forb	Native
needlegrass	<i>Achnatherum lettermannii</i>	Graminoid	Native
sleepy grass	<i>Achnatherum robustum</i>	Graminoid	Native
Scribner needlegrass	<i>Achnatherum scribneri</i>	Graminoid	Native
crested wheatgrass	<i>Agropyron desertorum</i>	Graminoid	Introduced
bentgrass, spike bentgrass	<i>Agrostis exarata</i>	Graminoid	Introduced
creeping bentgrass	<i>Agrostis stolonifera</i>	Graminoid	Introduced
big bluestem	<i>Andropogon gerardii</i>	Graminoid	Native
cheatgrass	<i>Anisantha tectorum</i>	Graminoid	Introduced
purple three-awn	<i>Aristida purpurea</i>	Graminoid	Native
sideoats grama	<i>Bouteloua curtipendula</i>	Graminoid	Native
smooth brome	<i>Bromopsis inermis</i>	Graminoid	Introduced
woolly Brome	<i>Bromopsis lanatipes</i>	Graminoid	Native
rattlesnake grass	<i>Bromus briziformis</i>	Graminoid	Introduced
Japanese brome	<i>Bromus japonicus</i>	Graminoid	Introduced
Dewey's sedge	<i>Carex deweyana</i>	Graminoid	Native
Nebraska sedge	<i>Carex nebrascensis</i>	Graminoid	Native
clustered field sedge	<i>Carex praegracilis</i>	Graminoid	Native
Ross' sedge	<i>Carex rossii</i>	Graminoid	Native
white scaled sedge	<i>Carex xerantica</i>	Graminoid	Native
sedge	<i>Carex sp.</i>	Graminoid	unknown
blue grama	<i>Chondrosium gracile</i>	Graminoid	Native

Appendix G - Betasso Preserve Plant Species List
 Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
orchardgrass	<i>Dactylis glomerata</i>	Graminoid	Introduced
poverty oatgrass	<i>Danthonia spicata</i>	Graminoid	Native
Canada wildrye	<i>Elymus canadensis</i>	Graminoid	Native
squirreltail	<i>Elymus elymoides</i>	Graminoid	Native
blue wild rye	<i>Elymus glaucus</i>	Graminoid	Native
thickspike wheatgrass	<i>Elymus lanceolatus</i>	Graminoid	Native
meadow fescue	<i>Festuca pratensis</i>	Graminoid	Introduced
Rocky Mountain fescue	<i>Festuca saximontana</i>	Graminoid	Native
fescue	<i>Festuca sp.</i>	Graminoid	unknown
fowl mannagrass	<i>Glyceria striata</i>	Graminoid	Native
needle-and-thread grass	<i>Hesperostipa comata</i>	Graminoid	Native
baltic rush	<i>Juncus arcticus</i>	Graminoid	Native
June grass	<i>Koeleria macrantha</i>	Graminoid	Native
spike fescue	<i>Leucopoa kingii</i>	Graminoid	Native
mountain muhly	<i>Muhlenbergia montana</i>	Graminoid	Native
spike muhly	<i>Muhlenbergia wrightii</i>	Graminoid	Native
green needle grass	<i>Nassella viridula</i>	Graminoid	Native
switchgrass	<i>Panicum virgatum</i>	Graminoid	Native
western wheatgrass	<i>Pascopyrum smithii</i>	Graminoid	Native
timothy	<i>Phleum pratense</i>	Graminoid	Introduced
Kentucky bluegrass - native	<i>Poa agassizensis</i>	Graminoid	Native
Canada bluegrass - alien	<i>Poa compressa</i>	Graminoid	Introduced
muttongrass	<i>Poa fendleriana</i>	Graminoid	Native
Kentucky bluegrass - alien	<i>Poa pratensis</i>	Graminoid	Introduced
little bluestem	<i>Schizachyrium scoparium</i>	Graminoid	Native
sand dropseed	<i>Sporobolus cryptandrus</i>	Graminoid	Native
Rocky Mountain maple	<i>Acer glabrum</i>	Shrub	Native
alder	<i>Alnus incana</i>	Shrub	Native
river birch	<i>Betula fontinalis</i>	Shrub	Native
buckbrush	<i>Ceanothus fendleri</i>	Shrub	Native

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Common Name(s)	Scientific Name	Life Form	Native / Introduced
mountain mahogany	<i>Cercocarpus montanus</i>	Shrub	Native
beaked hazelnut	<i>Corylus cornuta</i>	Shrub	Native
yellow hawthorn	<i>Crataegus chrysoarpa</i>	Shrub	Native
hawthorn	<i>Crataegus macracantha</i>	Shrub	Native
waxflower	<i>Jamesia americana</i>	Shrub	Native
common juniper	<i>Juniperus communis</i>	Shrub	Introduced
matrimonyvine, wolfberry	<i>Lycium barbarum</i>	Shrub	Introduced
chokecherry	<i>Padus virginiana</i>	Shrub	Native
Virginia creeper	<i>Parthenocissus quinquefolia</i>	Shrub	Introduced
ball cactus, hedghog	<i>Pediocactus simpsonii</i>	Shrub	Native
ninebark	<i>Physocarpus monogynus</i>	Shrub	Native
plum	<i>Prunus americana</i>	Shrub	Native
skunkbush	<i>Rhus trilobata</i>	Shrub	Native
wax currant	<i>Ribes cereum</i>	Shrub	Native
whitestem gooseberry	<i>Ribes inerme</i>	Shrub	Native
wood rose	<i>Rosa woodsii</i>	Shrub	Native
red raspberry	<i>Rubus idaeus</i>	Shrub	unknown
beaked willow	<i>Salix bebbiana</i>	Shrub	Native
sandbar willow	<i>Salix exigua</i>	Shrub	Native
willow	<i>Salix sp.</i>	Shrub	unknown
Greene's mountain ash	<i>Sorbus scopulina</i>	Shrub	Native
red osier dogwood	<i>Swida sericea</i>	Shrub	Native
common snowberry	<i>Symphoricarpos albus</i>	Shrub	Native
western snowberry	<i>Symphoricarpos occidentalis</i>	Shrub	Native
roundleaf snowberry	<i>Symphoricarpos rotundifolia</i>	Shrub	Native
bush-cranberry	<i>Viburnum edule</i>	Shrub	Native
kinnikinnick	<i>Arctostaphylos uva-ursi</i>	Subshrub	Native
fringed sagewort, prairie sage	<i>Artemisia frigida</i>	Subshrub	Native
nipple cactus	<i>Coryphantha vivipara</i>	Subshrub	Native
hen-and-chickens	<i>Echinocereus viridiflorus</i>	Subshrub	Native

Appendix G - Betasso Preserve Plant Species List
 Based on 2008 Vegetation Survey (Patrick Murphy, Ecotone Corp., Boulder)

Common Name(s)	Scientific Name	Life Form	Native / Introduced
hairy false golden aster	<i>Heterotheca villosa</i>	Subshrub	Native
oregon grape	<i>Mahonia repens</i>	Subshrub	Native
twistspine prickly pear	<i>Opuntia macrorhiza</i>	Subshrub	Native
prickly pear	<i>Opuntia polyacantha</i>	Subshrub	Native
prairie rose	<i>Rosa arkansana</i>	Subshrub	Native
poison Ivy	<i>Toxicodendron rydbergii</i>	Subshrub	Native
yucca	<i>Yucca glauca</i>	Subshrub	Native
cultivated apple	<i>Malus domestica</i>	Tree	Introduced
boxelder	<i>Negundo aceroides</i>	Tree	Native
ponderosa pine	<i>Pinus ponderosa</i>	Tree	Native
lanceleaf cottonwood	<i>Populus x acuminata</i>	Tree	Native
eastern cottonwood, plains cottonwood	<i>Populus deltoides</i>	Tree	Native
aspen	<i>Populus tremuloides</i>	Tree	Native
Douglas fir	<i>Pseudotsuga menziesii</i>	Tree	Native
Rocky Mountain juniper	<i>Sabina scopulorum</i>	Tree	Native
crackwillow	<i>Salix fragilis</i>	Tree	Introduced
bluestem willow	<i>Salix irrorata</i>	Tree	Native
virgin's bower	<i>Clematis ligusticifolia</i>	Vine	Native
riverbank grape	<i>Vitis riparia</i>	Vine	Native

H. Summary of 2008 Wildlife Surveys



Parks and Open Space

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Memorandum

26 September 2008

To: Ernst Strenge, POS Resource Planner

From: Dave Hoerath, POS Wildlife Specialist
Susan Spaulding, POS Wildlife Technician
Mark Brennan, POS Wildlife Specialist

Subject: Wildlife baseline report results, discussion and recommendations for Betasso Management Planning

Benjamin Topography and Habitat Features

The geomorphology of the Benjamin property is characterized by several densely vegetated drainages running south to north, separated by well-defined ridges with rocky outcrops. On the north end of the property, Arkansas Gulch, which is intermittent, runs west to east and joins Fourmile creek, which is perennial.

These drainages provide variable habitat components. The west and north facing slopes of the drainages provide dense, forested stands with cool, moist conditions below the canopy. These stands are ideal for species such as pine squirrel and hermit thrush. Additionally, these stands provide both summer and winter thermal cover for mule deer, and winter thermal cover for elk. All of these species were detected during surveys, and of particular note was the high density/size of pine squirrel middens. The pine squirrel is an important prey species for several predators including American marten and Cooper's hawk, both of which are also present on the property.

Alternately, the east and south facing slopes of the drainages provide open stands of ponderosa pine interspersed with grassy areas. Due to this aspect, these areas remain snow free for much of the winter, and provide important forage for mule deer and elk, as well as nesting, foraging and travel areas for Abert's squirrels. Additionally, having an open flyway directly adjacent to a densely forested stand provides ideal habitat for nesting accipiter species. During surveys, Abert's squirrel nests were located, a Cooper's hawk nesting stand was identified, and sharp-shinned hawks were detected.

The topography of these drainages provides relatively distinct, isolated habitat areas. It is likely that this allows for easily defined and defended territories for species that utilize smaller areas of varied habitat types for breeding, such as the western tanager.

The densely vegetated riparian areas within the drainages provide habitat for riparian bird species such as MacGillivray's warbler, yellow warbler and Wilson's warbler. They also provide travel corridors and habitat for species such as mink. The multiple drainages within the Benjamin property provide water sources, although all are intermittent, including

Arkansas Gulch. However, there is a permanent spring located within one drainage on the western end of the property, which has high value for wildlife.

Along the ridgelines between drainages, rocky outcrops provide potential habitat for bat roosts or hibernacula. The potential for bat maternity roosts on the Benjamin property is increased due to the permanent water source mentioned above; female bats require easy access to water sources while lactating. Additionally, American marten utilize rocky formations for resting and natal dens. Marten were detected via remote camera, and snowtracking in an area close to rocky outcrops. Further, the ridges provide important travel corridors for wide-ranging mammal species, such as mountain lions.

Thus, the entire property contains a mosaic of important habitat types. This juxtaposition of various habitat types within Benjamin makes it valuable for a high diversity of wildlife species. With the exception of Reynolds Ranch, this attribute of steep north facing densely forested habitat with significant riparian value is found only on the Benjamin property among Boulder County Open Space properties. This large parcel of public land buffers the surrounding low-density exurban development and is the only substantial protected habitat in this area, as it does not connect with Forest Service land. These factors give it unique, intrinsic value as wildlife habitat.

Benjamin Survey Effort-2008

Introduction

Boulder County Parks and Open Space purchased the Benjamin property in May of 2007. Due to its historical use, and community interest, the County determined that creation of a master plan in a short timeframe was in the public's best interest. As a result, County resource specialists were tasked with conducting surveys with limited time.

In order to document current information on wildlife species present within the 391-acre Benjamin property, wildlife staff at Boulder County Parks and Open Space conducted a remote camera survey and avian point count surveys.

Remote Camera Surveys

Methods

The basic methodology for the use of remote cameras involves the deployment of units throughout an area to document the diversity of species. This survey technique was selected for the Benjamin property due to its noninvasive nature, as remote cameras surveys allow for detection of species with limited impact. Also, as our goal was to inventory Benjamin comprehensively, we selected this process due to the fact that the data is unambiguous and captures multiple species, including predators and prey. Further, the photographs provide a permanent record, and the images are often captivating which is valuable for public outreach.

Wildlife staff, with the assistance of resource protection staff, systematically placed remote cameras in areas of interest based on landscape features such as rocky outcrops, drainages,

travel corridors and the permanent spring. Additionally, we sampled areas of potential trail construction (i.e.: the narrow area connecting the Betasso property to the Benjamin property).

We utilized four remote cameras designed by Cam Trak South Incorporated. The unit model was the Digital Ranger W-50 RB, which is heat-motion triggered. All the units were new upon the commencement of the study. We operated the cameras with a twenty- second delay on continuous data collection with a 1 GB memory card. All cameras were installed between eighteen and thirty-five feet from the bait, and were situated either facing southeast or north. All vegetation was removed from the conical sensor area in front of the unit.

Each station was baited at the commencement of the survey with chicken and scent lure (Zielinski and Kucera 1995). We chose this bait type to attract forest carnivores such as weasels, small felines and foxes, as well as larger bodied carnivores such as mountain lions, coyotes and bears. From experience, we expected that this bait and lure combination would also attract rodent and avian species. Additionally, by choosing placements near travel corridors, we expected to detect large herbivores such as mule deer.

The bait was placed in a 12” by 12” mesh cage, which allowed for measurement of individual animals. Each station was conspicuously labeled with the station identification for ease of data organization. Bait cages were placed approximately 5 feet from the ground. This height was selected specifically with canine species in mind; the animals are attracted to the bait, but cannot remove it.

To obtain a temporal sampling across seasons, we targeted winter, spring and summer months for our survey time period. Each season holds unique challenges and benefits for this survey process; winter is typically excellent due to a lack of alternate food sources, and the fact that damage to the cameras by bears is a non-issue. The presence of snow in winter also allows for track identification. Spring and summer are challenging as bears are present, and wasps eat bait surprising quickly.

The duration of our survey periods varied, but we chose fourteen days as a minimum time, and thirty-four days for a maximum. Recent studies have shown that fourteen days yielded a detection probability above 50% and thirty days yielded a detection probability of 75% for most target species (Gompper et al. 2006, Campbell 2004). Our study thus generally concurred with the recommendations that surveys of approximately two weeks will detect most species present, but that approximately one month is required for exhaustive inventories (Moruzzi et al. 2002).

Results and Discussion

Species detected via the remote camera survey include: American marten, gray fox, red fox, black bear, pine squirrel, Abert’s squirrel, Steller’s jay (STJA), common raven (CORA), American crow (AMCR), black-billed magpie (BBMA), mule deer, and domestic dog.

Table 1- Remote Camera Survey Effort and Results

Round 1	Camera 1	Camera 2	Camera 3	Camera 4
Date Set	2/15/08	2/15/08	2/21/08	2/21/08
Date Retrieved	3/3/08	3/3/08	3/6/08	3/6/08
Total Days	17	17	14	14
Results	No detections	Red fox (2 individuals), pine squirrel	Pine squirrel	American marten

<u>Round 2</u>	Camera 1	Camera 2	Camera 3	Camera 4
Date Set	4/21/08	4/24/08	4/18/08	4/18/08
Date Retrieved	5/20/08	5/20/08	5/20/08	5/20/08
Total Days	31	28	34	34
Results	Black bear, mule deer	Black bear (2 individuals), pine squirrel	Gray fox, red fox, STJA, CORA, Abert's squirrel, dog	No detections, camera malfunction

Round 3	Camera 1	Camera 2	Camera 3	Camera 4
Date Set	6/16/08	6/16/08	6/17/08	6/17/08
Date Retrieved	7/15/08	7/15/08	7/15/08	7/15/08
Total Days	31	31	30	30
Results	AMCR, Black bear	Black bear, mule deer	CORA, BBMA	Red fox, pine squirrel

With habitat assessment, and general knowledge of species life histories, all species detected were expected to be present on the property with the exception of the American marten and gray fox. These species are discussed below:

American marten (*Martes americana*)

The marten is an inhabitant of subalpine spruce-fir and lodgepole pine forest, alpine tundra and occasionally montane forests (Yeager and Remington 1956). They utilize tree cavities, logs, rock piles, and scree slopes for resting and natal den sites (Kucera 1996). Marten occur from 5,500 ft to 10,000 ft in elevation, but more typically occur above 7,200 ft (Buskirk and Zielinski 1997, Cablk and Spaulding 2002). Marten select stands with 40 to 60 percent canopy closure for both resting and foraging and avoid stands with less than 30 percent canopy closure (Spencer et al. 1983). Martens generally avoid habitats that lack overhead cover, presumably because these areas do not provide protection from avian predators (Allen 1982, Bissonette et al. 1988, Buskirk and Powell 1994, Spencer et al. 1983).

Their prey consists of rodents, insects and vegetation (C. Gordon 1986). Of particular importance is the presence of pine squirrels and their middens with food storage. Pine

squirrels are captured in their arboreal retreats and their middens are used as resting and den sites, presumably because of the insulative properties of the woody material (Buskirk 1984, Spencer 1987, Martin and Barrett 1991, Bull and Heater 2000). Marten will eat the squirrels' food storage, and the additional small rodents attracted to the middens (Pearson and Ruggerio 2001).

An American marten was detected at an elevation of 7,080 feet during the winter round of the survey. This was in typical montane forest conditions near rocky outcrops. This detection occurred at the lower end of the typical elevation range of the species. The great abundance of pine squirrels and their associated middens, as well as many areas of rocky outcrops, likely explains this occurrence on the Benjamin property. Additionally, contiguous closed canopy exists throughout the property, providing travel corridors and foraging and resting opportunities for marten. These habitat properties are uncommon in general at this elevation, and are created by the north facing drainages that are cooler, with closed canopies dominated by Douglas fir. These facts further qualify that the habitat contained within this property has unique and intrinsic value to wildlife.

Gray fox (*Urocyon cinereoargenteus*)

In the west, gray fox populations range from northern Colorado south throughout the rest of the southern Rocky Mountains, thus Boulder County is at the northern end of their distribution. They do not occur at higher elevations, but are predominately found in the foothills within a narrow habitat niche. Competition with red foxes may influence gray fox distribution in many areas of the West where they seem to occupy habitats in between those preferred by other species.

Gray foxes prefer riparian habitat and their dens are usually located near water (Wood et al. 1958). The same den may be used for many generations (Stanley 1963), and are located in rocky outcrops, hollow trees or snags, or in heavy brush (Trapp and Hallberg 1975). Dens are less conspicuous than those of red fox (Failor 1969). In Western North America, gray foxes preferred brushy vegetation in association with rocky, broken terrain (Leopold, 1959). In California, Fuller (1978) noted that gray foxes used riparian and old field habitat margins near water.

Gray foxes are secretive and mostly nocturnal. They occupy relatively small home ranges. Trapp (1978) reported female home ranges of 279 acres and male home ranges of 252 acres while Yearsley and Samuel (1980) found home ranges to vary from 30 to 450 acres. Overlap of individual ranges was found in both studies.

Gray foxes are the only canine species with the ability to climb trees (Leopold, 1959). They utilize this ability for hunting, escape and to locate resting sites (Carr, 1945). Their diet includes voles, mice, insects, squirrels, rabbits, vegetation and berries. Of note, juniper berries have been found to be an important source of food for gray fox, especially in early spring and winter (Small 1971).

A gray fox was detected at an elevation of 7,280 feet in early spring. This location was in mixed conifer at the edge of an open saddle area on a north facing slope. There was only one detection of this individual, which differs from our detections of red fox. Red fox typically allowed several pictures to be taken while they investigated the bait, but the gray fox allowed

only one picture, and then was not detected again during the survey. Red fox are typically more adaptable and tolerant of disturbance, whereas grey fox are known for their secretive nature.

As gray fox home ranges do not usually exceed 450 acres, it is highly likely that the individual detected is a permanent resident of the area. The habitat within Benjamin is highly suitable for gray fox, with rocky outcrops, several riparian areas and the juniper tree component. As gray fox habitat is limited in general, maintaining this relatively undisturbed, highly suitable area would help ensure their continued existence on the Benjamin property.

Avian Point Count Surveys

For the 2008 avian breeding season, six point count stations were established on the Benjamin property. These survey stations were systematically placed to coincide with variable habitat including edge, closed canopy, riparian areas, and meadows. Also, stations were placed in an attempt to spatially sample the entire property.

The Rocky Mountain Bird Observatory Point Transect Protocol (Leukering et al. 2006) was followed for the avian inventory of the Benjamin property. Surveys were conducted beginning one half hour before sunrise. All points were surveyed for a five minute period and all bird species and number of individuals were recorded within three distance categories; 0-50m, 50-100m and >100m. Environmental conditions were recorded at the commencement of each survey and included wind speed, precipitation, cloud cover and temperature.

In addition to conducting scheduled protocol surveys, all avian species detected during general exploratory trips through the property were recorded. This allowed for a general census during the time period outside of the protocol season.

Results:

During protocol surveys and general observations, a total of 37 species were detected on the Benjamin property.

Species detected during point count surveys:

American crow, American robin, blue-gray gnatcatcher, black-headed grosbeak, broad-tailed hummingbird, chipping sparrow, common flicker, Cooper's hawk, common raven, dark-eyed junco, dusky flycatcher, Hammond's flycatcher, hermit thrush, MacGillivray's warbler, mountain bluebird, mountain chickadee, mourning dove, pine siskin, plumbeous vireo, pygmy nuthatch, red-breasted nuthatch, ruby-crowned kinglet, red crossbill, Steller's jay, Virginia's warbler, white-breasted nuthatch, Western tanager, Western wood peewee, yellow-rumped warbler.

Species detected during habitat assessment visits:

Northern goshawk, orange-crowned warbler, dusky grouse, golden eagle, Clark's nutcracker, Cordilleran flycatcher, lesser goldfinch, wild turkey.

Discussion:

A total of 37 species indicates high diversity, and is attributable to variable habitat components on the Benjamin property.

Species detected that are on the Boulder County Avian Species of Special Concern are discussed below:

The Boulder County Nature Association (BCNA) created the Boulder County Avian Species of Special Concern list. This list combines local (BCNA), state (Colorado Natural Heritage Program [CNHP], Division of Wildlife, Department of Natural Resources), regional (U.S. Forest Service) and national (Partners In Flight [PIF], U.S Fish and Wildlife Service) assessments of avian species, but focuses on their local status in Boulder County. Avian species are placed on the list due to factors influencing their populations such as general declines, rareness, and/or habitat restrictions. Other species on the list are “watch listed”. This generally indicates that these species may be fairly abundant in the County but, due to concerns in the state or region (population declines, threats or habitat restrictions), they should be monitored.

Northern goshawk:

The U.S Forest Service designates this species as a management indicator species and a sensitive species. Additionally, it is watch listed by the CNHP, and the BCNA categorizes it as having rare or restricted populations, and needing research.

Northern goshawk use of the Benjamin property was determined by finding physical evidence. A probable kill site and a goshawk feather were located on the property. It is unlikely that nesting by this species went undetected however, as general surveys were conducted, and habitat assessed for suitable nesting stands. In addition, a Cooper’s hawk nesting stand was located on the property, and these two accipiter species typically do not tolerate one another within nesting territories. It is likely however, that the Benjamin property is used for foraging by this species. This is not unexpected due to the fact that the property is isolated, has significant prey availability and is relatively undisturbed.

Pygmy nuthatch:

The U.S. Forest Service has designated this species as a management indicator species and a sensitive species. Additionally, it is categorized by the BCNA as having rare or restricted populations.

Pygmy nuthatches were detected on the Benjamin property by sight and sound during the avian point count surveys. This species is a year-round resident of Ponderosa pine dominated foothills areas, and thus occupies a limited habitat niche. Pygmy nuthatches are dependent on the existence of cavities that they use for nesting and thermal regulation. As snags of appropriate size are limited on the landscape in general, and this species must compete for secondary use of existing cavities, its presence on the property is significant. This species should be monitored for its continued existence on the property.

MacGillivray's Warbler:

Partners in Flight has designated this species as a Type 1D in their system. Type 1 signifies that this species merits on-the-ground conservation actions because of downward population trends (D). Partners in Flight evaluates 7 variables on a 1-5 priority scale using range maps, Breeding Bird Survey data and opinions of a Prioritization Technical Committee.

This uncommon species was detected on the Benjamin property during the avian point count surveys. MacGillivray's warblers are neotropical migrants and the significant loss of mature tropical forest wintering habitat has led to population declines. Presence of this species during the breeding season signifies intact riparian habitat, as MacGillivray's warblers nest in dense thickets along riparian areas, often at the edge of mixed conifer stands (Hutto 1981).

This species occurred on the Benjamin property in moist, closed canopy near an intermittent drainage. MacGillivray's warbler habitat is limited, and its presence on the property is significant. It should be monitored for its continued existence on the property.

Western tanager:

Partners in Flight has designated this species as a Type 1D in their system. Type 1 signifies that this species merits on-the-ground conservation actions because of downward population trends (D).

Western tanagers were detected on the Benjamin property during the avian point count surveys. This species is a neotropical migrant, and as with MacGillivray's warblers, loss of mature tropical forest wintering habitat, has led to population declines. Breeding habitat occurs on the Benjamin property, as the Western tanager prefers mixed conifer stands, often associated with drainages or canyons, in mountainous areas. This species should be monitored for its continued existence on the property, as its presence is significant.

Other significant observations:

An active Cooper's hawk nesting stand was located on the Benjamin property during the avian point count surveys. This species requires dense canopy stands with open flyways nearby for nesting. Often, Cooper's hawks prefer to nest near riparian areas. They are typically intolerant of disturbance close to their nests, and will react aggressively towards intruders. This raptor species is uncommon, and every effort should be made to maintain undisturbed, suitable habitat for their nesting on the Benjamin property.

The detections of ruby-crowned kinglets and hermit thrushes during the surveys were unexpected, as these species typically occur at higher elevation. Again, the presence of these species on the property signifies the cool conditions created by the north-facing, Douglas fir dominated slopes, coupled with riparian habitat.

Other Monitoring

The Colorado Division of Wildlife is conducting a study of Front Range cougar activity. In the period from June 2007-August 2008 four different adult cougar home ranges included the Betasso area. Three of these were adult females, which should then include offspring in some years. This corroborates local knowledge of cougars with kittens. All of the home ranges were significantly larger than the Betasso property. This monitoring did not pinpoint any special areas or den sites, nor did any of the POS staff field visits or random trail camera monitoring. However, the DOW study is a long-term effort that should reveal important areas via continuous monitoring.

In addition to the standardized trail camera monitoring protocol above, cameras were placed along trails/ridges and at Bear Claw Spring (which was later included in the standardized protocol). This monitoring revealed bear and cougar use at locations and along likely corridors. Bear Claw Spring is an important, permanent water source. The wetland area and railroad grade along Fourmile Creek also serves as a movement corridor for large mammals.

The POS Riparian Assessment will also classify the two primary riparian stretches on the property: Bummer's Gulch and Fourmile Creek. The goal of the assessment is to categorize the functionality of all POS riparian areas and to identify potential improvements. The assessment is a modification of the BLM Proper Functioning Condition system and should occur in 2009.

Management Recommendations:

The combined field efforts of wildlife staff and contractors, and those of the plant ecology staff and their contractors described several important habitat factors, key sites, and rare plant associations. The bulk of these are proscribed in four large polygons (see map), all contained in what was the newly-acquired Benjamin purchase. These four polygons range from 13-acre to 50-acres. Due to the juxtaposition of these polygons and the general topography it is best to consider these areas as a whole; one 202-acre block. The sum of the values contained in the block (polygon) recommends it for remaining undisturbed and closed to public access. These values include: riparian areas, rare or unique plant associations, springs, mines, densely-timbered north-facing Douglas fir dominated slopes, travel corridors, a skyline ridge, raptor nests, and rocky outcrops. Additionally, the large block is further-valued by its large, undisturbed, insular nature. This condition exists in very few locations in the county below 8000' in elevation.

Further, independent support for this recommendation comes ERO Resources, which was retained by Boulder County Parks and Open Space to conduct a rapid resource assessment of the Benjamin property and 54 acres in the northern portion of the Betasso Preserve. The purpose of this independent assessment was to summarize the physical and ecological characteristics of the property, as well as to document and record the existing conditions and open space values. Also, BCPOS requested that ERO Resources identify management needs and opportunities. ERO Resources submitted their assessment to BCPOS on August 1, 2007.

Results from this assessment, as far as recommendations for habitat protection were as follows: "From a regional perspective, this study area is one of the largest patches of

contiguous habitat in the Boulder foothills. Two of the existing trails and other disturbances are on the periphery of the study area, leaving a piece of central core habitat area that is unfragmented by roads and trails and sees little, if any, human disturbance. This area is known to support habitat for black bear and mountain lion, in addition to many other wildlife species. While the long-term conservation of the Benjamin Property will protect habitat values from development, the management of habitat, trails, and public use should seek to maintain the integrity and continuity of the core habitat area. In particular, any future trail planning should avoid Arkansas Gulch as much as possible to minimize longterm wildlife impacts.”

The assessment continues with: “The known natural resource values in Benjamin property warrant the need for natural resource surveys to be conducted in the future, so a more accurate picture of the wildlife and vegetation resources are known for responsible property management.” As stated in the above report, intensive surveys were subsequently conducted by BCPOS wildlife staff, and the results lead to the recommendation of a core area closure.

Also to note, the Colorado Division of Wildlife through its NDIS site (Natural Diversity Information Source) has assessed the Benjamin property to contain the following designations: Elk severe winter and winter range, mule deer winter range, black bear fall concentration area, mountain lion habitat, turkey winter range and Canada lynx potential habitat. These designations are based on landscape scale analysis of topography, vegetation type, riparian corridors, connectivity, and specific known habitat requirements for species. It is readily apparent that the Benjamin property contains highly important structural and temporal habitat value for several species.

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I. Betasso Preserve Wildlife Species List

Appendix I. Betasso Preserve Wildlife Species List

Table 1. Mammal Species Present on Betasso Preserve – Status and Documentation

Common Name	Scientific Name	US ESA	State / BOCO Status	Federal Sensitive Species (Agency)	CNHP	Armstrong	Occurrence on Property
Merriam's Shrew	<i>Sorex Merriami</i>					4,5	5
Dwarf Shrew	<i>Sorex nanus</i>				G4/S2	5	5
Water Shrew	<i>Sorex palustris</i>					4	5
Masked Shrew	<i>Sorex cinereus</i>						5
Montane Shrew	<i>Sorex monticolus</i>						5
Fringed Myotis	<i>Myotis thysanodes</i>		SC	BLM/USFS	G4G5/S3	5	5
Townsend's Big-eared Bat	<i>Plecotus townsendii</i>		SC	BLM/USFS	G4T4/S2		5
Long-legged myotis	<i>Myotis volans</i>						5
Long-eared myotis	<i>Myotis evotis</i>						5
Silver haired bat	<i>Lasionycteris noctivagans</i>						5
Hoary bat	<i>Lasiurus cinereus</i>						5
Big brown bat	<i>Eptesicus fuscus</i>						5
Little brown bat	<i>Myotis lucifugus</i>						5
Mountain Cottontail	<i>Sylvilagus nuttallii</i>						1,3,5
White-tailed Jackrabbit	<i>Lepus townsendii</i>					3,5	5
Colorado Chipmunk	<i>Tamias quadrivittatus</i>					5	5
Least Chipmunk	<i>Tamias minimus</i>						3,5
Uinta Chipmunk	<i>Tamias umbrinus</i>					5	5
Rock Squirrel	<i>Spermophilus variegatus</i>					4	1,5
Abert's Squirrel	<i>Sciurus aberti</i>		BOCC CompPlan	USFS		4	1,2,3,4,5
Wyoming Ground Squirrel	<i>Spermophilis elegans</i>						5
Golden mantled Ground Squirrel	<i>Spermophilis lateralis</i>						5
Pine Squirrel	<i>Tamiasciurus hudsonicus</i>						5
Northern Pocket Gopher	<i>Thomomys talpoides</i>						5
Olive-backed Pocket Mouse	<i>Perognathus fasciatus</i>		BOCC Comp Plan		G5TNR/S2	4,5	5
Heather Vole	<i>Phenacomys intermedius</i>					4,5	5
Long-tailed Vole	<i>Microtus longicaudus</i>						5
Meadow Vole	<i>Microtus pennsylvanicus</i>					4	5
Montane Vole	<i>Microtus montanus</i>						5
Common Porcupine	<i>Erethizon dorsatum</i>						1,5
American Beaver	<i>Castor canadensis</i>					4	5

Table 1. Mammal Species Present on Betasso Preserve–Status and Documentation (cont)

Common Name	Scientific Name	US ESA	State / BOCO Status	Federal Sensitive Species (Agency)	CNHP	Armstrong	Occurrence on Property
Northern Rock Mouse	<i>Peromyscus nasutus</i>					5	5
Deer Mouse	<i>Peromyscus maniculatus</i>						5
Southern Red-backed Vole	<i>Clethrionomys gapperi</i>						5
Mexican Woodrat	<i>Neotoma mexicana</i>						5
Bushy-tailed Woodrat	<i>Neotoma cinerea</i>						5
Common Muskrat	<i>Ondatra zibethicus</i>					4	5
Preble's Meadow Jumping Mouse	<i>Zapus hudsonicus prebleii</i>	LT	BOCC Comp Plan/ST		G5T2/S1	4,5	5
Western Jumping Mouse	<i>Zapus princeps</i>						5
Red Fox	<i>Vulpes vulpes</i>						1,4,5
Gray Fox	<i>Urocyon cinereoargenteus</i>					4	4,5
Black Bear	<i>Ursus Americanus</i>	LT	SE			1	1,2,3,4,5
American Marten	<i>Martes americana</i>			USFS		4	4,5
Short-tailed Weasel	<i>Mustela erminea</i>						5
Long-tailed Weasel	<i>Mustela frenata</i>						5
Mink	<i>Mustela vison</i>						5
Western Spotted Skunk	<i>Spilogale gracilis</i>						5
Striped Skunk	<i>Mephitis mephitis</i>						3,5
American Badger	<i>Taxidea taxus</i>						5
Raccoon	<i>Procyon lotor</i>						5
Lynx	<i>Lynx canadensis</i>	LT	SE		G5/S1	1*	5
Bobcat	<i>Felis rufus</i>					3	3,5
Mountain Lion	<i>Felis concolor</i>						1,3,5
American Elk	<i>Cervus elephus</i>			USFS MIS			1,2,3,5
Mule Deer	<i>Odocoileus hemionus</i>			USFS MIS			1,2,3,4,5
Coyote	<i>Canis latrans</i>						1,2,3,5

*CDOW reintroduced Lynx to Southwestern Colorado from Feb 1999 – Feb 2005 and have recorded VHF Aerial and Satellite locations within Boulder County, however no reproduction has been documented in the county.

TABLE 2. BIRD SPECIES PRESENT ON BETASSO PRESERVE AND STATUS

Common Name	Scientific Name	US ESA	CO Status	Federal Sensitive Species (Agency)	CNHP	PIF	BCNA	Occurrence on Property
Turkey Vulture	<i>Cathartes aura</i>							3,5
Sharp-shinned Hawk	<i>Accipiter striatus</i>							1,3,4,5
Cooper's Hawk	<i>Accipiter cooperii</i>							3,4,5,6
<u>Northern Goshawk</u>	<i>Accipiter gentilis</i>			BLM/USFS	G5/S3B		4,5	4,5
Red-tailed Hawk	<i>Buteo jamaicensis</i>							1,3,5
Swainson's Hawk	<i>Buteo swainsoni</i>							1,5
Golden Eagle	<i>Aquila chrysaetos</i>						4	1,4,5
American Kestrel	<i>Falco sparverius</i>							1,5,6
Prairie Falcon	<i>Falco mexicanus</i>				G5/S4B/	VII	4	3,5
Peregrine Falcon	<i>Falco peregrinus</i>		SC	USFS	G4T3/S2B	VII	3,4	5
Bald Eagle	<i>Haliaeetus leucocephalus</i>	LT	ST		G5/S1B/S3N	VI		3,5
Dusky Grouse	<i>Dendragapus obscurus</i>					VII		1,4,5
Wild Turkey	<i>Meleagris gallopavo</i>							3,5
Band-tailed Pigeon	<i>Patagioenas fasciata</i>					III		5
Mourning Dove	<i>Zenaidura macroura</i>							1,4,5,6
Rock Pigeon	<i>Columba livia</i>				S4N			5
Great Horned Owl	<i>Bubo virginianus</i>							5
Northern Pygmy Owl	<i>Glaucidium gnoma</i>				G5/S3B			3,5
Long-eared Owl	<i>Asio otus</i>						1	5
<u>Flammulated Owl</u>	<i>Otus flammeolus</i>			USFS		I	4	5
Common Nighthawk	<i>Chordeiles minor</i>							3,5,6
Common Poorwill	<i>Phalaenoptilus nuttallii</i>							5
Violet-green Swallow	<i>Tachycineta thalassina</i>					II		1,5,6
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>							5
White-throated Swift	<i>Aeronautes saxatalis</i>							5
Broad-tailed Hummingbird	<i>Selasphorus platycercus</i>					V		1,2,4,5,6
Rufous Hummingbird	<i>Selasphorus rufus</i>							5
Lewis' Woodpecker	<i>Melanerpes lewis</i>			USFS	G4/S4	I, III	1,4	5
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>						1,4	5
Williamson's Sapsucker	<i>Sphyrapicus thyroideus</i>					I		5
Hairy Woodpecker	<i>Picoides villosus</i>							5,6
<u>Three-toed Woodpecker</u>	<i>Picoides tridactylus</i>			USFS			4	5
Northern Flicker	<i>Colaptes auratus</i>							1,5,6
Downy Woodpecker	<i>Picoides pubescens</i>							1,5

Bolded Species = BCNA species of primary concern. Underlined Species = BCNA Watchlisted Species

TABLE 2. BIRD SPECIES OF SPECIAL CONCERN IN BOULDER COUNTY (continued)

Common Name	Scientific Name	US ESA	CO Status	Federal Sensitive Species (Agency)	CNHP	PIF	BCNA	Occurrence on Property
<u>Olive-sided Flycatcher</u>	<i>Contopus cooperi</i>			USFS		VII	4	5
Western Wood-peewee	<i>Contopus sordidulus</i>							1,4,5,6
Hammond's Flycatcher	<i>Empidonax hammondii</i>					VII		4,5,6
Dusky Flycatcher	<i>Empidonax oberholseri</i>							4,5
Cordilleran Flycatcher	<i>Empidonax occidentalis</i>					V		5,6
Say's Phoebe	<i>Sayornis saya</i>							5
Gray Jay	<i>Perisoreus canadensis</i>							5
Steller's Jay	<i>Cyanocitta stelleri</i>							1,4,5,6
<u>Western Scrub-Jay</u>	<i>Aphelocoma californica</i>						4	5
Clark's Nutcracker	<i>Nucifraga columbiana</i>							1,4,5,6
Black-billed Magpie	<i>Pica hudsonia</i>							1,5,6
American crow	<i>Corvus brachyrhynchos</i>							1,4,5,6
Common Raven	<i>Corvus corax</i>							1,4,5,6
Mountain Chickadee	<i>Poecile gambeli</i>							1,4,5,6
White-breasted Nuthatch	<i>Sitta carolinensis</i>							1,4,5,6
Red-breasted Nuthatch	<i>Sitta canadensis</i>							1,4,5,6
<u>Pygmy Nuthatch</u>	<i>Sitta pygmaea</i>						4	1,2,3,4,5,6
Brown Creeper	<i>Certhia americana</i>							1,5,6
Rock Wren	<i>Salpinctes obsoletus</i>							5
Canyon Wren	<i>Catherpes mexicanus</i>							1,3,5
House Wren	<i>Troglodytes aedon</i>							5,6
<u>Golden-crowned-Kinglet</u>	<i>Regulus satrapa</i>						4	1,5
Ruby-crowned Kinglet	<i>Regulus calendula</i>							4,5,6
<u>American Dipper</u>	<i>Cinclus mexicanus</i>					VII	4W	1,5
Western Bluebird	<i>Sialia mexicana</i>							1,3,5,6
Mountain Bluebird	<i>Sialia currucoides</i>							1,3,5,6
Townsend's Solitaire	<i>Myadestes townsendi</i>							1,3,5,6
Green-tailed Towhee	<i>Pipilo chlorurus</i>					V		3,5
Hermit Thrush	<i>Catharus guttatus</i>							4,5
American Robin	<i>Turdus migratorius</i>							1,2,4,6
<u>Cedar Waxwing</u>	<i>Bombycilla cedrorum</i>						4	5
Northern Shrike	<i>Lanius excubitor</i>							5
Warbling Vireo	<i>Vireo gilvus</i>							1,5
Plumbeous Vireo	<i>Vireo plumbeus</i>							1,4,5,6
Virginia's Warbler	<i>Vermivora virginiae</i>					I		1,4,5,6
<u>MacGillivray's Warbler</u>	<i>Oporornis tolmiei</i>					VII		4,5

Bolded Species = BCNA species of primary concern. Underlined Species = BCNA Watchlisted Species

TABLE 2. BIRD SPECIES OF SPECIAL CONCERN IN BOULDER COUNTY (continued)

Common Name	Scientific Name	US ESA	CO Status	Federal Sensitive Species (Agency)	CNHP	PIF	BCNA	Occurrence on Property
Wilson's Warbler	<i>Wilsonia pusilla</i>					II		1,5
Orange-crowned Warbler	<i>Vermivora celata</i>							3,5
Yellow Warbler	<i>Dendroica petechia</i>							1,5
Yellow-rumped Warbler	<i>Dendroica coronata</i>							1,4,5,6
Townsend's Warbler	<i>Dendroica townsendi</i>							5
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>							5
Western Meadowlark	<i>Sturnella neglecta</i>							1,5,6
<u>Western Tanager</u>	<i>Piranga ludoviciana</i>							1,2,4,5,6
Song Sparrow	<i>Melospiza melodia</i>							1,5
Chipping Sparrow	<i>Spizella passerina</i>							1,3,5,6
Lark Sparrow	<i>Chondestes grammacus</i>							5
White-throated Sparrow	<i>Zonotrichia albicollis</i>							5
Vesper Sparrow	<i>Pooecetes gramineus</i>							3,5,6
Lazuli Bunting	<i>Passerina amoena</i>					VII		5
Dark-eyed Junco	<i>Junco hyemalis</i>							1,2,3,4,5,6
Cassin's Finch	<i>Carpodacus cassinii</i>							5
Pine Grosbeak	<i>Pinicola enucleator</i>							5
Lesser Goldfinch	<i>Carduelis psaltria</i>							4,5,6
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>							1,4,5
Red Crossbill	<i>Loxia curvirostra</i>							4,5,6
Pine Siskin	<i>Carduelis pinus</i>							1,4,5,6
European Starling	<i>Sturnus vulgaris</i>							1,5
Blue-gray Gnatcatcher	<i>Polioptila caerulea</i>							4,5,6

Bolded Species = BCNA species of primary concern. Underlined Species = BCNA Watchlisted Species

TABLE 3. AMPHIBIAN & REPTILE SPECIES OF SPECIAL CONCERN IN BOULDER COUNTY

Common Name	Scientific Name	US ESA	CO Status	Federal Sensitive Species (Agency)	CNHP	Occurrence on Property
Eastern Fence Lizard	<i>Sceloporus undulatus erythrocheilus</i>					1,3,5
Western Milksnake	<i>Lampropeltis triangulum gentilis</i>					5
Northern Leopard Frog	<i>Rana pipiens</i>		SC	BLM(1,2,5)/USFS	G5/S3	5
Bullsnake	<i>Pituophis catenifer sayi</i>					3,5
Plains Blackhead Snake	<i>Tantilla nigriceps nigriceps</i>					5
W. Terrestrial Garter Snake	<i>Thamnophis elegans vagrans</i>					5
Plains Garter Snake	<i>Thamnophis radix haydenii</i>					5
Common Garter Snake	<i>Thamnophis sirtalis</i>		SC			5
Western Chorus Frog (Striped Chorus Frog)	<i>Psuedacris triseriata</i>					5
Bullfrog	<i>Rana catesbeiana</i>					5
Prairie rattlesnake	<i>Crotalus viridis viridis</i>					1,5

Sources of Documentation of Occurrence on Property:

1. Betasso Preserve Management Plan (BCPOS 1985)
2. Rapid Resource Assessment, Benjamin/Betasso Open Space (ERO Resources Corp. 2007)
3. BCPOS staff observations (field visits and incidental observations database)
4. BCPOS wildlife survey effort for Betasso Preserve / Benjamin property 2008
5. Potential habitat exists based on known habitat requirements of the species
6. BCPOS 2004-2006 bird point count survey effort on Betasso Preserve

Wildlife Status Categories

1. Endangered Species Act (US ESA) - U.S. Fish and Wildlife Service (USFWS), - Threatened and Endangered Species Database System. Report generated by the USFWS, Division of Endangered Species. An “endangered” species is one that is in danger of extinction throughout all or a significant portion of its range. A “threatened” species is one that is likely to become endangered in the foreseeable future. The Service also maintains a list of plant and animals native to the United States that are candidates of proposed for possible addition to the Federal list. List last updated 10/17/2005.

http://ecos.fws.gov/tess_public/pub/SpeciesReport.do?listingType=C&mapstatus=1

Categories:

- LE - Listed Endangered
- LT - Listed Threatened
- C - Candidate for Listing

2. Colorado Protection Status (CO Status) – Colorado Division of Wildlife -Colorado Listing of Endangered, Threatened and Wildlife Species of Special Concern.

A *State Endangered* species is any species or subspecies of native wildlife whose prospects for survival or recruitment within the state are in immediate jeopardy as determined by the commission.

A *State Threatened* species is any species or subspecies of native wildlife, which, as determined by the commission, is not in immediate jeopardy of extinction but is vulnerable because it exists in such small numbers, is so extremely restricted throughout all or a significant portion of its range in Colorado, or is experiencing such low recruitment or survival, that it may become endangered.

A *Special Concern* species is any species or subspecies of native wildlife which (1) has been removed from the State threatened or endangered list within the last five years, (2) is a Federal candidate or is Federally proposed for listing, and is not already state listed, (3) the best available data indicate a 5-year or more downward trend in numbers or distribution and this decline may lead to a threatened or endangered status, or (4) is otherwise determined to be vulnerable in Colorado.
<http://wildlife.state.co.us/WildlifeSpecies/SpeciesOfConcern/>

Categories:

SE – State Endangered

ST – State Threatened

SC - Special Concern

3. Federally Sensitive Species (Agency)

U.S. Bureau of Land Management (BLM) – The State Director's sensitive species were identified using criteria found in BLM Manual 6840-Special Status Species Management Sensitive Species, and from specific written review comments received and evaluated from BLM Field Offices, CDOW, U.S. Forest Service (Region 2), and the Colorado Natural Heritage Program. The following criteria were applied to only those species known to occur on BLM Colorado public lands:

1. Species under status review by the USFWS; or
2. Species with numbers declining so rapidly that federal listing may become necessary; or
3. Species with typically small and widely dispersed populations; or
4. Species inhabiting ecological refugia or other specialized or unique habitats.

List last updated 4/14/2000. <http://www.blm.gov/nhp/efoia/co/00ibs/ib00-014.html>

U.S. Forest Service Region 2 (USFS) - Species Conservation Project: Region 2 Regional Forester's Sensitive Species. Sensitive species are subject to; a) significant current or predicted downward trends in population numbers or density; or b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Lists last updated 2006. <http://www.fs.fed.us/r2/projects/scp/sensitivespecies>

Categories:

BLM – Listed as Bureau of Land Management Sensitive Species

USFS – Listed as U.S. Forest Service Sensitive Species

4. Colorado Natural Heritage Program (CNHP) – As a member of the international Natural Heritage Network governed by NatureServe, CNHP employs a standardized method for evaluating the relative imperilment of both species and ecological communities. The conservation status of a species or community is designated by a number from 1 to 5, preceded by a letter reflecting the appropriate geographic scale of the assessment. List last updated 7/27/2005. <http://www.cnhp.colostate.edu/list.html>

Categories:

G – Global

S – Subnational (State)

T – Intraspecific Taxon (subspecies)

1 – Critically Imperiled

2 – Imperiled

3 – Vulnerable to Extirpation or Extinction

4 – Apparently Secure

5 – Demonstrably Widespread, Abundant, and Secure

B – Breeding Range

N – Non-breeding Range

NR – Not Ranked

? – Inexact or Uncertain

5. Partners in Flight (PIF) - Colorado Partners in Flight 2000. Colorado Land Bird Conservation Plan. PIF evaluates 7 variables on a 1 (low priority) to 5 (high priority) scale using range maps, Breeding Bird Survey data and opinions of a Prioritization Technical Committee. Each species gets a score on each variable and a total score (ranging from 7 to 35). Referenced variables include; AI – Area of Importance, PT – Population Trend. List last updated 2000. <http://www.rmbo.org/pif/copif.html>

Categories:

I. *High overall (global) priority*—species scoring ≥ 22 in the PIF prioritization system. Indicates high vulnerability of populations throughout the species range, irrespective of specific status in the physiographic area. Peripheral species are omitted.

II. *High physiographic area priority*—species scoring 19–21 in the PIF system, with AI + PT ≥ 8 . Indicates a species of moderately high global vulnerability and with both relatively high abundance and a declining or uncertain population trend in the physiographic area.

III. *Additional Watch List*—species on PIF’s national Watch List that did not already meet criteria I or II. Watch List species score ≥ 20 (global scores only), or 18–19 with PT = 5.

IV. *Abundant yet declining*—any additional species for which the score for AI = 5 and the score for PT = 5. May identify species or a habitat type in need of monitoring.

V. *Area responsibility*—additional species with relatively high proportion of global population in the physiographic area [$>5\%$ for areas $< 200,000 \text{ km}^2$ (77,200 mi²); $\geq 10\%$ for areas $> 200,000 \text{ km}^2$]. Signifies that the area shares in responsibility for long-term conservation of species, even if not currently threatened.

VI. *Additional listed*—species on federal or state endangered, threatened or special concern lists that did not meet any of the above criteria. These are often rare or peripheral populations.

VII. *Local Concern*—species of justifiable local concern or interest. May represent geographically variable populations or be representative of specific habitat conservation concern.

6. Boulder County Nature Association (BCNA) - Boulder County Nature Association Avian Species of Special Concern (1999). BCNA maintains a list of species for the county, which are rare, appear to be declining and/or are restricted in distribution to a few locations or habitats. Rarity is defined as 3 or fewer known sites. The list generally focuses on breeding status. Bolded species are of primary concern. <http://www.bcna.org>

Categories:

- 1 - Rare and Declining
- 2 - Declining (but not yet rare)
- 3 - Rare
- 4 - Isolated or Restricted Populations (Species that are found only at certain locations and/or have narrow habitat niches)
- 5 - Needs Research
- 6 - Extirpated
- W - Winter

7. Dr. David Armstrong (Armstrong) - Mammalian Fauna of Boulder County and Species of Special Concern. Center for Interdisciplinary Studies, University of Colorado, Boulder. Unpublished report for Boulder County Parks and Open Space. List last updated 2003.

Categories:

- 1 - Extirpated
- 2 - Threatened & Endangered
- 3 - Declining
- 4 - Isolated/Restricted
- 5 - Undetermined Status

8. Boulder County Comprehensive Plan: Species with restricted habitat

**J. Historical Land Ownership of Betasso Preserve
(from BCPOS 1985)**

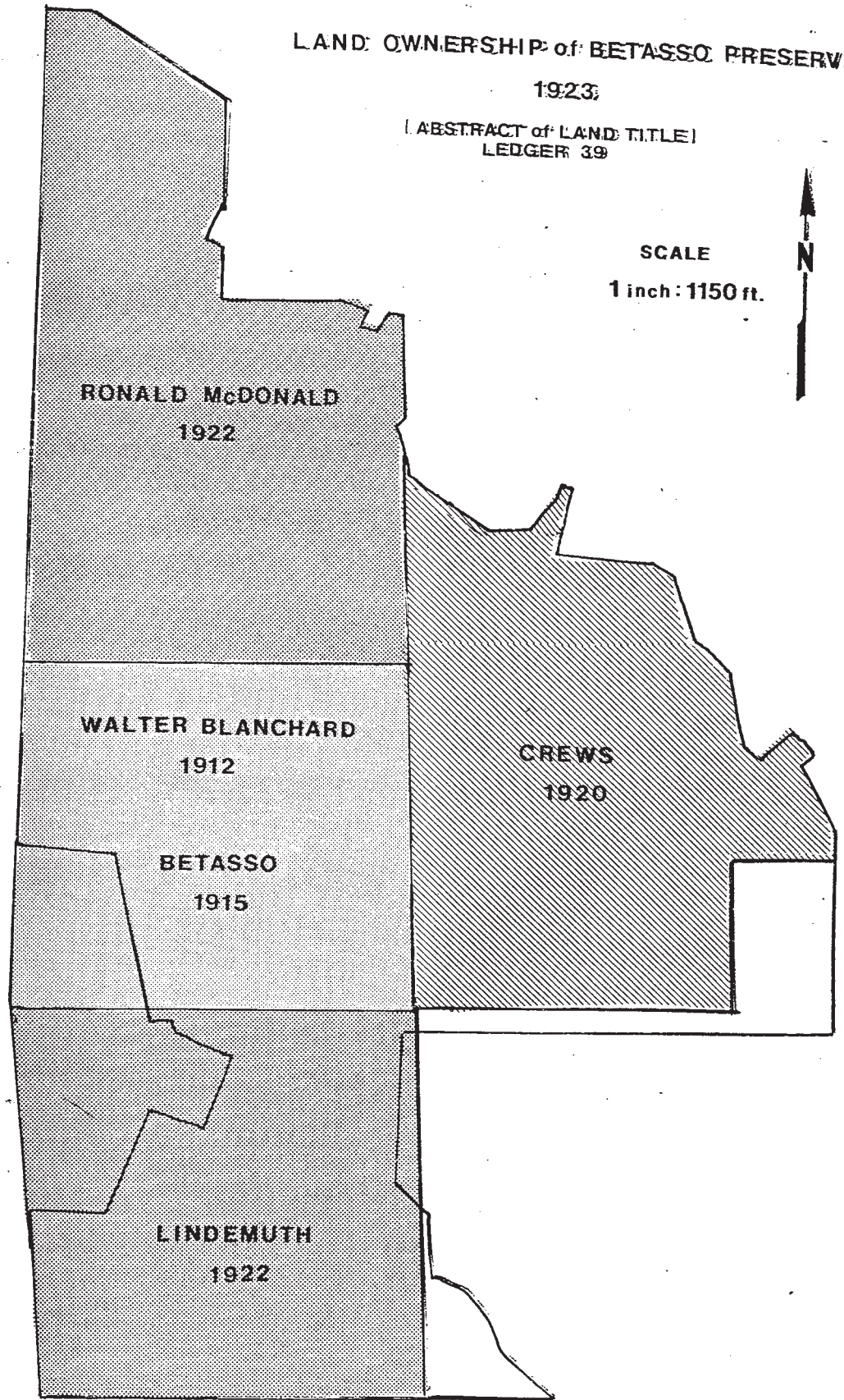
LAND OWNERSHIP of BETASSO PRESERVE

1923

(ABSTRACT of LAND TITLE)
LEDGER 39

SCALE

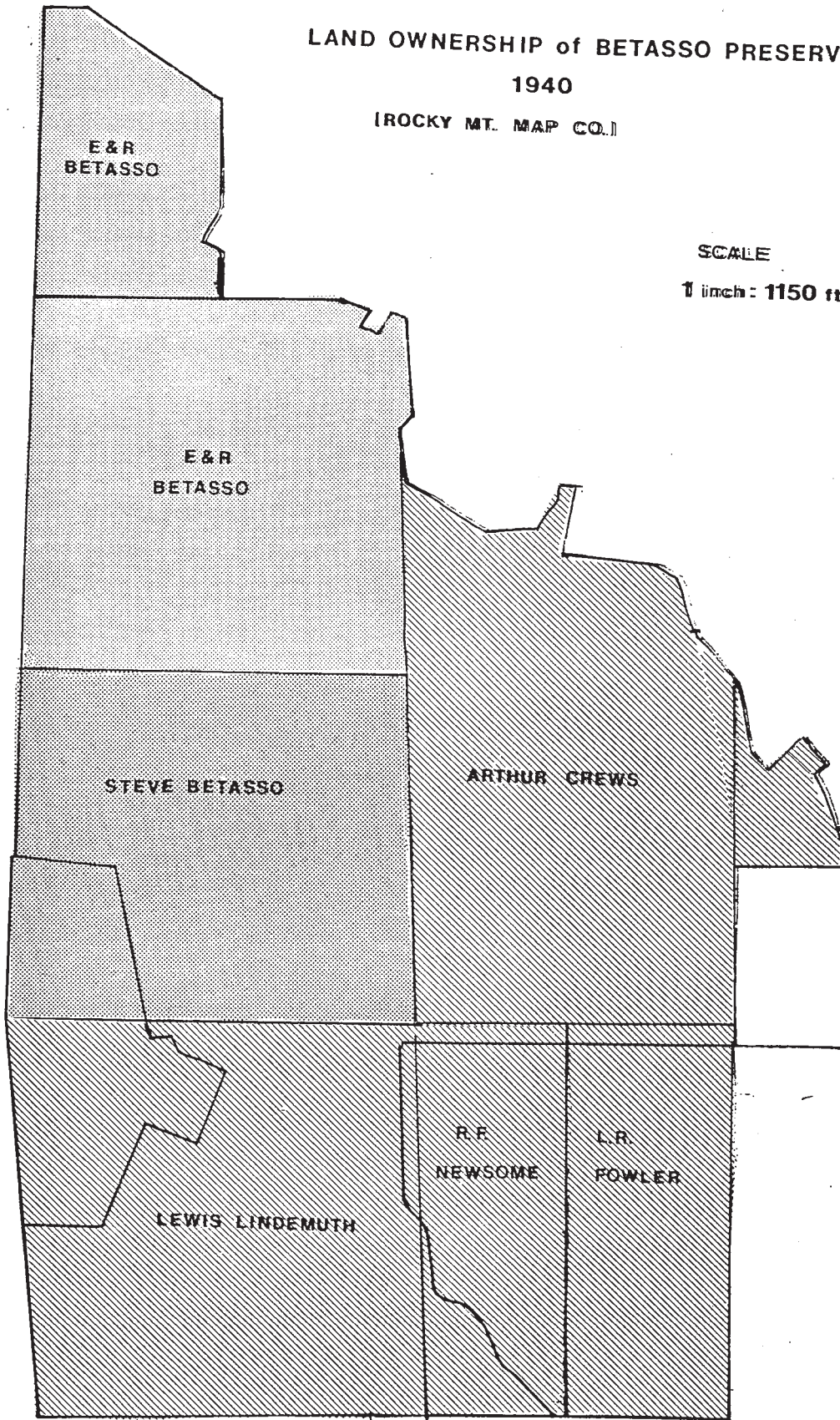
1 inch : 1150 ft.



LAND OWNERSHIP of BETASSO PRESERVE
1940

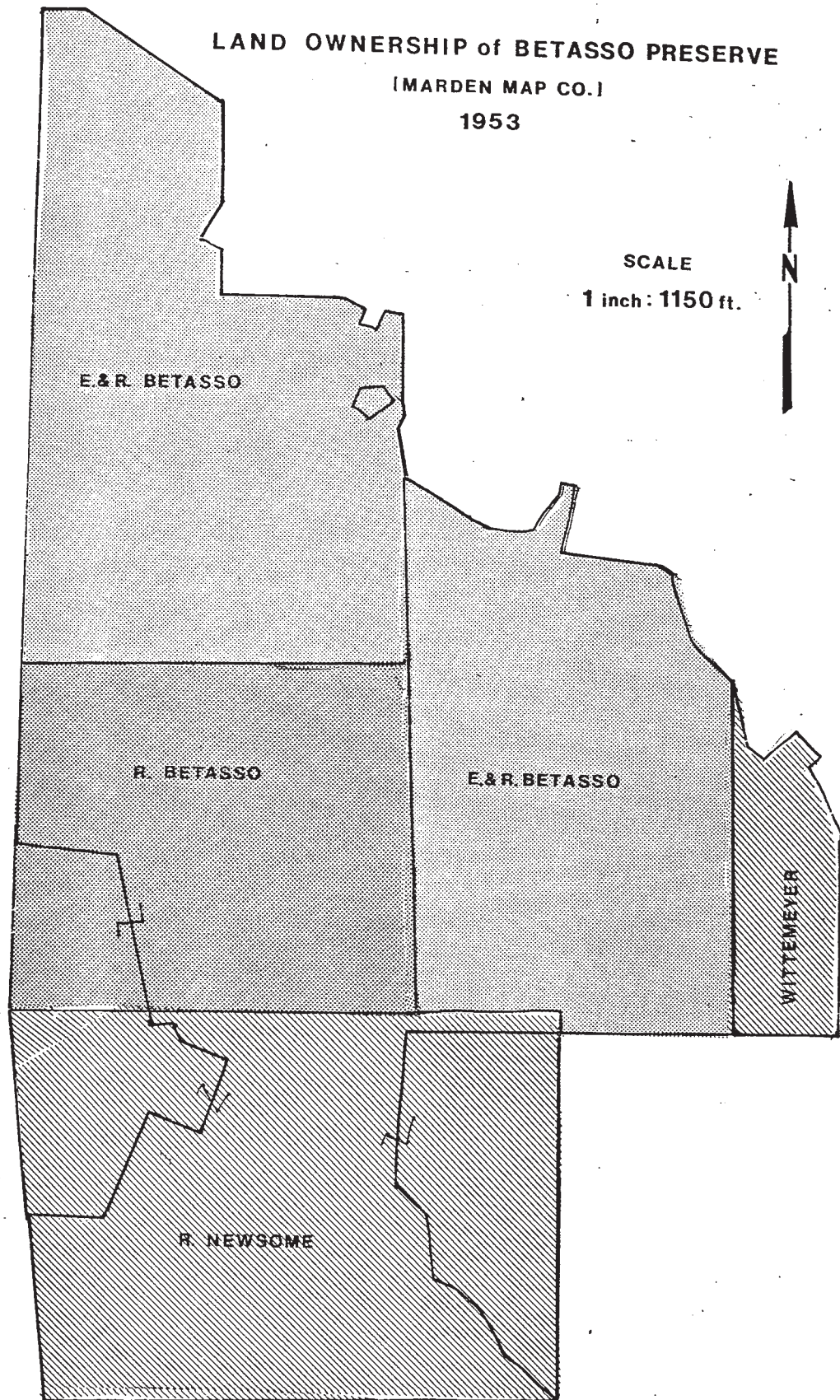
(ROCKY MT. MAP CO.)

SCALE
1 inch = 1150 ft.



LAND OWNERSHIP of BETASSO PRESERVE
(MARDEN MAP CO.)
1953

SCALE
1 inch : 1150 ft.



K. Betasso Ranch
Boulder County Historic Landmark Nomination Form

Draft Betasso Landmark

Boulder County Historic Landmark - Nomination Form 9/96

Instructions: Please fill in the following information as completely as possible. County staff will take this information and copy it into our official form. In order to expedite this process, please provide staff with a copy of this file on a diskette. Alternatively, this file can be E-mailed to crllu@boco.co.gov. Please use as much space as necessary to describe your property. Lastly, the instruction manual that accompanies this form explains each category and provides examples. Manuals are available on-line (<http://boco.co.gov/lu/hppage5.htm>) or by mail. If you've consulted the instruction manual, but still have questions, please feel free to contact our office at (303) 441-3930.

1. Name of Property

Historic Name: Betasso Ranch
Other Names: Betasso Preserve. Also Walter Blanchard Homestead/Ronald McDonald Ranch/Arthur Crews Ranch/Lewis Lindemuth Ranch

Historical Narrative:

Ranching on Betasso Preserve began when herdsmen drove small herds of cattle into the Sugarloaf Mountain area. They sold dairy products to local families and miners while the animals grazed on the grasses covering the valleys and hillsides.

Around 1907, Walter Blanchard paid a \$10 filing fee to the U.S. Government and filed a claim to homestead on the desired 160 acres. After making improvements to the ranch for five years, he patented the claim and received a deed to the land in 1912.

Blanchard's "quarter section" was known as a "ranch" rather than a "farm" because he specialized in stock raising. Stephen Betasso, a hard-rock miner from Crisman, purchased the small ranch from Blanchard in 1915 and continued the cattle operation.

Beginning in 1924, Betasso's two youngest sons, Richard and Ernest, began to consolidate adjoining ranches with Betasso (Blanchard) Ranch. As a result, the nominated portion of Betasso Ranch is comprised of four consolidated 160-acre ranches. They were settled by the following ranchers: Walter Blanchard in 1912, Arthur Crews in 1920, and Ronald McDonald and Lewis Lindemuth in 1922. Betasso Ranch needed to be large because acreage was required for winter grazing.

Betasso Ranch remained a working cattle ranch until Ernie Betasso sold portions of it to real estate developers to form the Mountain Meadows, Mountain Pines, and Pride of the West subdivisions. The remaining 773 acres, of Betasso Ranch, were sold to Boulder County as open space from 1976 to 1983.

The Betasso Family and Ranch

Stephen Betasso discovered the rancher's paradise in 1915. Bright green bunch grass carpeted the meadows—and surrounding ponderosa pine forest of the already "proved upon" homestead. Spring runoff filled the streams to their banks, and since the nearby mountain peaks were buried under deep snow in winter, there was plenty of water year-round. The area had yet another appealing feature: the mining activity created outside income opportunities for Betasso and his family.

Steve Betasso immigrated to America from Italy in 1883. After working in the coal mines of Pennsylvania, he opted for a change of scenery. Betasso left to work in the coal mines near Louisville and Marshall, Colorado. Tales of Western adventure prompted him to pack his belongings again and set out for the new mining camp of Crisman, Colorado, in Fourmile Canyon. He quickly found work as a timberman-blacksmith in the Logan No. 2 mine. However, during the Silver Crash of 1893 the mine closed down, and Steve decided to return to Italy.

During his absence, the community of Crisman was almost destroyed by the Flood of 1894. After the mines reopened, Steve returned to the area with his new bride, Mary Pastore Betasso. They made their first home in Packer Gulch. Mary gave birth to three children, Raymond, Julius, and Mabel in this house. Later, she gave birth to two more boys, Richard and Ernest, in their second Crisman home. The Betasso children all attended the Crisman school, District #32. Beginning in 1909, the family moved to Boulder for a short time while the three oldest children attended Boulder High School. Dick and Ernie attended the Silver Spruce School, District #33 (El Vado School), at the base of Magnolia Road, after the family moved to the ranch. During this time, there were about twenty-five kids who attended this school, due to a tungsten mining boom in the area.

Betasso continued to work at the Logan No. 2 mine, where there was an amalgamating mill. He also leased the Yellow Pine mine for a short time and worked at Salina at the Ingram mine for awhile. All three mines boasted high grade ore, and Steve made a lot of money leasing the Yellow Pine for royalties.

In 1915, Betasso had a new venture in mind. His initial interest in hard-rock mining was slowly being displaced by cattle ranching. He found an already "improved" homestead site that he liked. He purchased the Blanchard Homestead in February of that year and brought in about "thirteen head of cows." However, he and his two oldest sons, Ray and Julius, continued to work eight-hour shifts at the Dorothy mine in Millionaire Gulch to help supplement the family's income.

Steve and his family lived in the original Blanchard ranch house on weekends for three years while building a larger, more permanent dwelling and barns for livestock. The entire clan lived in the "homestead cabin" during the winter of 1917-18. Together, they gathered local fieldstone and excavated for the new home's

foundation. The bungalow's stone rubble foundation and red brick walls were laid up by a crew, and contractor Nick Fanti, a Boulder bricklayer, and his carpenters did the framing, roof, and finish carpentry. The handsome Craftsman Style bungalow was completed in 1918. An electric generator house, of matching red brick, was built behind the main house.

A study of the only surviving Betasso Ranch account journals, dating from 1901 to 1922, reveal that Steve Betasso purchased bull services and bought hay and cattle.

Steve and Mary were thrifty planners and literally "lived off the land." They had their own milk cows, and Mary would make cheese, butter, and other milk products for the family to eat. She baked her own bread and always had a big garden, where potatoes were the main crop. Mary kept a pig for sausage making and rendering lard. She did a lot of canning and she even canned beef, although the family had "a lot of meatless days." In the poultry houses, north of the main house, Steve and Mary kept 100-200 chickens for poultry and eggs.

Shopping was a major event. Through the year, Steve and Mary budgeted to buy the family's groceries, winter supplies, and clothing. Even though the Sugarloaf Store was barely two miles away and provided the area with everything from parasols to yard goods, the Betassos preferred to shop Boulder. They made a pilgrimage to the city two or three times a year for supplies. It was a family tradition. There, they purchased things like flour, salt, sausage, ax handles, kerosene, and 20-pound boxes of pasta. They bought "tomitische," pepperoni, and tomato sauce in large quantities. Since the family was Italian, they ate "lots of spaghetti." They bought three or four boxes of pasta at a time. They would also buy 400-500 pounds of flour and several hundred pounds of sugar at a time. They hauled the supplies up to the ranch by team and a wagon.

Dances were the favorite pastimes of the area's hard-working miners, ranchers, and mountain men. They would dance at Sugarloaf one Saturday night, and the next Saturday night they would dance at Wall Street or Salina. The Friday night dances were usually held at Magnolia. Dances were held on Thursday nights at the Templeton Dance Hall in Boulder.

The Sugarloaf dances, a social highlight, became a tradition. The neighbors came in buggies, spring wagons, bobsleds, and horses. The Sugarloaf Sunshine Club, a local women's club that sponsored the dances, crowded homemade pies, cakes, and sandwiches on the dance hall's tables in preparation for a midnight supper. A collection would be taken up to finance a big pot of coffee.

The all-night dance started as soon as somebody picked up an instrument. Sam Craig usually played the fiddle; he was a champion fiddle player. Esther Yates would play the piano, and, sometimes, Dick Betasso would "call a few squares." Square dancing, round dancing, fox trot, two step, and waltzes were the most popular dances.

The entertainment ended when it was light enough to saddle or harness the horses. The Betassos and other guests traveled home just in time to start their morning chores.

World War I had its impact on the Betasso family. After the War ended in 1919, the price of tungsten plummeted, causing the mines to close down. The Betassos now focused all of their energy on running the ranch. Unfortunately, cattle prices also plummeted after the war ended. Family members kept the ranch alive even though the market continued to crumble. They worked ten-hour days, racing through chore lists, as they squeaked out a living on their 160 acres. Their combined efforts added only a few dollars to the family coffers each day.

Dick and Ernie spent their childhood days feeding rabbits and sometimes calves, chopping wood, doing miscellaneous ranch chores, trimming trees with a two-man saw, and splitting wood with a hammer and a wedge. They both learned to harness, drive, and hook up horses at around age 10. For relaxation, the boys went horseback riding and "got into mischief." The two boys were often mistaken for twins.

Tragedy struck the family in 1919 when Julius died from influenza. He was working at the Victoria mine in Summerville when he came home sick on a Sunday. Dr. Farrington came to see him, but had no remedies to break the fever or treat the infection. He died on the next Friday at age 19.

In 1920, Ray, the eldest son, left home to work in the mines near the town of Caribou. Before his departure, Ray purchased a car for the ranch. But, according to Ernie, Ray was the only one who knew how to drive the car, so it sat in the garage for many years. The family used "horse and buggy" or "everyone walked," said Ernie.

The family's work force dwindled further when Mabel married the District U. S. Forest Ranger, Greg Hart, and left home to start a family of her own. Steve Betasso began grooming his two youngest boys to control the operation.

Both Dick and Ernie found it increasingly difficult to run the ranch from behind school desks. So, they both quit school after the eighth grade. They were convinced their time would be better spent on the ranch, because their father was giving them more responsibility. Dick, in particular, was fascinated by the cattle and liked being around the horses. He enthusiastically plunged into the range cattle business. Ernie, however, took on outside work at the Good Friday mine, where he worked as a mucker, helped in the shop, and operated the hoist. He also worked in the Poorman mine, in Fourmile Canyon, and other mines located around Salina, Gold Hill, Boulder Falls, and Sugarloaf.

As adults, Dick and Ernie never let expansion ideas drift far from their thoughts, and with the future in mind, they began purchasing other homesteads that adjoined Betasso Ranch. They bought the McDonald ranch in 1924 from Charlie Weaver for about \$5 per acre. They also purchased a 160-acre parcel from Lewis Lindemuth.

By the 1930s, the brothers had taken over the operation of the family mines and continued to buy ranches. They purchased the Crews ranch in 1944. They also bought out the Wittemeyer family. Through the years, the brothers continued to scrutinize and buy up neighboring parcels, and the ranch enjoyed steady growth from 1924

to 1966. Their final land purchase was the Newsome Ranch in 1966.

After years of shrewd dealing, persistence, and working other jobs, they controlled nearly 2,000 acres. Their range stretched to the base of Sugarloaf Mountain, where a tremendous gold boom had played out years before.

In 1933, Ernie married Mae J. Toots, who he had met at a Sugarloaf dance one night. Mae and her twin sister were the oldest daughters of a Black Hawk miner. She cheerfully relieved the family of all domestic burdens, although whenever possible she saddled her horse and helped with the riding. Mae was a good pupil and learned the cattle business inside and out.

Even though they had no children of their own, Mae and Ernie were involved with the Sugarloaf community's youth, including teaching younger kids how to dance. They also participated in the Sugarloaf community fairs sponsored by the Sunshine Club. In their free time the couple played cards with the neighbors, read books, did "little projects," listened to the radio, and went to bed early, since they were usually tired. The couple was married for forty-two years.

Ernie's advice for a successful marriage was simple, "When you live with someone it doesn't take long to learn what cuts to the bone. And when you learn what that is, go easy and avoid it. Sit back, rather than bite in."

Steve Betasso died in 1939 and Mary died in 1949. After that Dick, Ernie, and Mae, collectively, operated the ranch. They specialized in stock raising and nurtured approximately one hundred head of cattle at a time. Practically everything except building the herd and expanding the ranch ran on a shoestring budget. Together, the trio managed to keep the place together.

Dick and Ernie were hard workers. Since most of the ranch revenues were filtered back into the operation, Ernie took on another full-time job to make ends meet. He fed cattle morning and night and worked his second job during the day. Dick focused on running the cattle operations.

Dick, a bachelor, lived in the brick ranch house. Ernie built the small clapboard house across the road west from the brick house in 1948, which served as Mae's and his home for sixteen years.

Ernie did a lot of mining over a twenty-five year period, while ranching on the side. He dug for gold, silver, and tungsten in the Nederland and Sugarloaf area mines. He worked the Harold mine at Sugarloaf. During World War II, he was employed at the Hoosier and Phillips mines in Nederland. He worked as a hoist and machine man at the Forest Holmes mine on Hurricane Hill, near Nederland, and as a mill man at the April Fool, in Boulder. He was also employed as a blacksmith. Ernie mostly labored in tungsten mines, but the gold mines he worked in at Salina included the Bell mine and the New Britain. He also worked at the Star at Gold Hill.

From 1945 to 1963, Ernie worked for "Sandflats," a sand and gravel company, which was "a better job than underground mining," according to Ernie. The company later became known as Flatirons Company.

Ernie's attraction to the financial benefits of a full-time

job saddled Mae with a tremendous amount of responsibility. She was left with juggling most of the ranching chores and household tasks, while Dick handled the cattle operations. This allowed the Betassos to pump more money back into the herd. This pace did not slacken until Ernie had a heart attack in 1959. After his recovery, Ernie joined his wife and brother full-time in the ranching business. Ernie, particularly, enjoyed riding with the herd--riding after them, sorting them, and sending them away--and watching the cattle grow.

Mae showed a prodigy-like knack for the cattle business. She could ride fence and sort cattle as well as any cowboy. However, she enjoyed the calving season the most. She closely monitored the calving operations around the clock and organized the calves' first branding. This kept the newborn mortality rate down. Mae arranged for most of the calves to arrive in April, May, and June, so that they would all be about the same size in the fall.

She worked from dawn to dusk maintaining the ranch and their home, "cowboying," cooking, washing, cleaning, sewing, carrying water, and tending the chickens and family garden.

Hoping to ease the strain on their grazing land, the family grazed their 125 head of cattle on U. S. Forest summer range land. After paying a fee for a U. S. Forest Service grazing allotment, the Betassos "trailed" the cattle in July, up Magnolia Road, to open range at higher elevations, near Tolland (Boulder Park), with old-fashioned cattle drives. They also pastured cattle in the meadows near the Moffat Tunnel's East Portal and Mammoth Basin. They hired a "rider" to be with the cattle.

The animals grazed in "high range" for three months until late fall. Then, they were "rounded-up," "trail-herded" back to the fenced "home ranch" (Betasso Ranch), and fed all winter on the wild bunch grasses that had grown there all summer long. The Betassos also grew limited amounts of alfalfa and hay as winter feed.

It was always a challenge to get the "haying" done before winter. Sometimes, the Betassos would buy a whole field of hay, cut it, bale it, and haul it home in trucks to use as winter feed when there was not enough pasture. Additional hay was purchased from hay dealers as needed.

The spring calves and old cows were usually shipped in the fall, after a summer of grazing, and the rest of the cows were taken back to the ranch to winter. In the spring, the ranch's two-and-three-year-old steers were sold by the head. The railhead at Crisman provided the Betasso brothers with direct access to several cattle markets.

There were animals other than cattle on the ranch. Horses and mules shared pasture lands while chickens were raised for eggs and family consumption. Horses and mules were used for transportation, working the cattle, and pulling wagons and farm equipment. The cattle, sent to the Denver market, supplied the income to the ranch.

After Dick's death in 1964, Ernie sold three ranches on Sugarloaf that became Mountain Meadows subdivisions, Mountain Pines, and Pride of the West subdivisions. He and Mae moved into

the brick ranch house.

Shortly after Mae's death in 1976, Ernie decided to stop ranching and sell the rest of the land to Boulder County. However, he and a partner continued to keep 60 herefords in Coal Creek Canyon. In a 1977 interview, Ernie Betasso stated that everything he cared about was in the mountains overlooking Boulder. He couldn't leave because "when you live in the mountains, one leg gets shorter than the other." Ernie Betasso lived out his life on the ranch, with his dog "Boomer." He passed away in 1983 at age 75.

2. Location

Betasso Ranch is located on the Betasso Preserve open space property located on Betasso Road, 6 miles west of Boulder, off Sugarloaf Road in Boulder Canyon (Highway 119).

Address: 390 Betasso Road
Boulder, Colorado 80302

3. Classification

Property Ownership: Public

Category of Property: Site

Number of Resources Within Property:

20 contributing - Blanchard Homestead log house, root cellar, cistern, chicken coop, wood shed, and single-crib log barn; McDonald Ranch log cabin and outhouse; two cattle sheds with connecting calving room; fences and corral; cattle loading chute; 1918 brick house; two poultry houses; coal shed; brick generator house; blacksmith shop; horse barn; and Gordon-McHenry Trail

3 noncontributing - 1948, 60' x 30' house; 1978, 18' x 20' cinder-block garage; 13' x 21' poultry house/garage/storage shed ruin.

4. Function or Use

Historic Functions:

DOMESTIC - four single-family dwellings

AGRICULTURE/SUBSISTENCE - storage, grazing land, animal facilities, agricultural outbuildings

TRANSPORTATION - road-related (wagon)

Current Function:

VACANT/NOT IN USE - log house, root cellar, cistern, chicken coop, wood shed, log barn, two cattle sheds, log cabin, outhouse, two cattle sheds with calving room, corrals, two poultry houses, coal shed, generator house, blacksmith shop, horse barn, Gordon-McHenry Trail, 1948 house, 1978 cinder-block garage, and poultry house/garage/storage shed ruin

OCCUPIED/CARETAKER'S HOUSE - brick ranch house

RECREATION AND CULTURE - open space, hiking trails, picnic area

5. Description

The Betasso Ranch rests in a natural and beautiful place for a homestead complex. The homestead cabin is accessible to a natural spring that rarely freezes. The entire complex of ranch buildings is situated near a creek. The buildings are in a comfortable hollow or widening of a mountain meadow, a pastoral setting fringed by trees. The structures are built into the hillsides, a safe harbor from the mountain winds.

To the north of the building complex are tree-covered and prairie-cloaked valley walls; to the south, Bummer's Rock; to the west a picture window of Sugarloaf Mountain; and to the east, dramatic views of Boulder and the Boulder Valley, including the Boulder Reservoir and the Valmont area.

Betasso Ranch consisted of open pastures for winter grazing, surrounded by closely spaced barns, corrals, houses, and a variety of small buildings, such as a coal shed, several poultry houses, a generator house, and a blacksmith shop. The two barns were used for storing winter forage and sheltering horses and mules. Beef cattle were not brought into the barns when severe weather arrived. Instead, the ranch had two large loafing sheds for sheltering the cattle in the worse storms. An additional room was used for calving.

Ponderosa pine forests cover most of the 773-acre site. They are occasionally interspersed with a variety of shrubs and grasses, like skunk bush, native blue grama grass and cheatgrass. Douglas fir trees grow on steep north-facing slopes and ravines at Betasso. Wildflowers flourish on the site.

The property's trees are trimmed up because Ernie Betasso liked the "park" look. It also provided better sight lines for managing the cattle herd. By falling and thinning trees to encourage bunch grass growth for cattle forage, Ernie Betasso began his own forest management program. As a result, one of the best climax stands of Ponderosa pine in the County is found on Betasso Preserve. The farmyard also boasts apple and locust trees that were planted decades ago.

The property is situated in the Foothills Climax Region and is inhabited by Abert's squirrels, mule deer, cottontail rabbits and

yellow-bellied marmots, and a variety of birds, including woodpeckers and pygmy nuthatches. Several underground springs are located on the property, including one near the Blanchard Homestead house.

Betasso Preserve is underlain by one of the oldest igneous rock types in Boulder County--Boulder Creek granodiorite. According to geologists the rock was formed from molten material 1.7 billion years ago. Around 70 million years ago, the Rocky Mountains began uplifting, forming great peaks and creating most of the area's rich mineral deposits. Hot, mineralized solutions were intruded into the cracks of the Boulder Creek granodiorite, where they solidified into rich veins of gold, silver, tungsten, and other ores. As a result, Betasso Preserve lies within the northeast corner of the Colorado Mineral Belt and is surrounded by abandoned metal mines. A good place to examine Boulder Creek granodiorite is Bummer's Rock.

The property is also the home of Boulder's water treatment sewer plant, which is situated on the eastern boundary of the ranch. The city's pipeline for water shed traverses the property through Bummer's Gulch.

In 1989, Betasso Ranch served as the fire base camp for the Black Tiger Fire.

The Betasso Ranch Complex

The Betasso Ranch is an intact cattle ranch complex comprised of a log homestead house, brick ranch house and generator house, coal shed, blacksmith shop, a log barn, and related and stock- and poultry-raising outbuildings.

The Blanchard Ranch House

The 23' x 14' log house was built c. 1907 into a west-facing hillside. It served as the main dwelling for the Walter Blanchard Homestead until 1915. The primary walls of the building are constructed of squared-off, hand-hewn logs secured with half-dovetail joints. The exterior cracks between the logs on the building's front facade are daubed with a mixture of two parts lime to one part sand, while the remaining three walls are chinked with wood chips. The structure rests on a combination mortared granite, feldspar, and quartz rubble and concrete foundation. Sheets of corrugated metal line the east foundation wall. The 12' tall house was built nine logs high with a framed gabled roof supported with an additional plate log. The eaves of the cabin are 8.5 feet off of the ground, and the wood-framed loft area is clad with board-and-batten siding. The building's single-gabled roof is supported by 2" x 6" tie beams. The roof is made of 2" x 4" rafters, sheathed with corrugated sheet metal. There are two stove pipes, located in the center and the northeast corner of the roof. The central entry door is located on the building's west facade. An additional one-panel door, with divided window lights, is located on the home's north gable end. There is a double-hung window in the south gable end.

The interior of the one-room house has 5" pine woodwork and 2" x 6" tongue-and-groove pine floors, supported by 2" x 4" floor joists. The floor is "floating" or unattached to the log structure. This type of construction may indicate that the floor was added at a later date. The building was never electrified.

Boulder County has begun stabilizing the Blanchard house. The western wall of log timbers has been repaired or replaced. The log farmhouse is, generally, in good condition.

Cistern

A rock and mortar well stands near the ranch house.

Wood Shed

Located a few steps to the north of the log house is the remains of a tiny frame wood shed that faces south. It measures 7' x 6' and stands 72" high. The barn's shed roof is supported by 2" x 4" rafters sheathed with corrugated metal. Its two walls are clad with 1" x 12" vertical pine planking, supported on miscellaneous-sized posts. Its south and east walls are completely open. The shelter-like structure has a dirt floor and is in poor condition.

Chicken Coop

Lodged between a west-facing slope and a massive willow tree is a small makeshift chicken coop. The 4' x 5' pen is located to the northeast of the original ranch house. The walls of the coop are constructed of 1" x 8" and 1" x 9" full-dimension lumber and chicken wire nailed to four poles. The structure is accessed by a 2' x 5'8" doorway. The structure is in poor condition.

Hillside Root Cellar

Located directly behind the log house is a 9' x 7' root cave, with a 24" x 64" entry that faces west. The root cave has been built into the side of the rock gulch wall. Its other walls are a mix of rubble and board-formed concrete. The cellar's original wood plank door is off its hinges. The structure once boasted an earthen roof supported by railroad rails and pine boards. Now roofless, the structure is in poor condition.

The Single-Crib Log Barn

The c. 1907, 47' x 32' log barn is built into a slope of a south-facing hill. It boasts a central, single crib and two east and west wings. The wings are separated from the center crib by solid walls. The central loft area is lit and ventilated by a large mow opening in the north gable end. Harvested hay could easily be stacked in the barn by lowering it through the mow opening from the roadbed above.

All of the barn's walls are constructed from round logs that

are 6" to 8" in diameter. The walls rest securely on a stone rubble foundation. The building can be accessed through a large 15' x 8.5' wagon door opening in the center aisle and two human dutch doors located in each wing, which face south. There are two side-hinged wagon doors stored inside the barn that once covered the large central opening.

The barn's 6/12 gabled roof is supported by round log rafters that are 6" to 8" in diameter. The roof is sheathed with 1" x 8" pieces of wood, covered with rusted corrugated sheet metal. The log barn is in poor condition.

Stephen Betasso and his sons built the majority of the following buildings between 1915 and 1925:

Cattle Loafing and Calving Sheds

Two large, frame, metal clad loafing sheds flank the earlier log barn. The west shed measures 23' x 32' while the east loafing and calving shed measures 48' x 11'. The walls of the sheds are constructed of 1" x 8" framing covered with rusted corrugated sheet metal that is nailed to 9"-12" poles. The poles are secured vertically by cement piers and early Standard Oil cans filled with cement. The sheds have earthen floors. Several small openings in cattle sheds' north side provide light and a means for pitching hay down into the mangers from the roadbed above. The west shed has two small windows and a large door on its west facade. The separate calving room of the east shed is accessed by a large door on the south facade and a small human door on the east facade. Two small windows are also on the south facade. The loafing and calving sheds are in fair condition.

Corrals, Cattle Loading Chute, and Fences

The wooden corral fences are constructed of small, round tree trunks and tree trunks split into rails. They are 4-6 logs high. The best examples are located east of the cattle loafing sheds. One of the corrals has a stock gate while the other corral is equipped with a cattle loading chute.

The fencing to the south of the west cattle shed and the west of the horse barn is made of woven-wire and topped with small, round tree trunks. The fencing surrounding the poultry yards is also woven.

A third type of fence on the ranch is a combination of single and double-wire strands of wire stapled to wooden posts. An intact example of this type of fence can be seen directly to the south of the McDonald Ranch cabin.

1918 Brick House

The Craftsman Style house was built in 1918 for Steve Betasso by a Boulder contractor and bricklayer, Nick Fanti. The one-story bungalow, with pyramidal, hip pitch, roof, measures 31.5' x 44'.

The house foot print is "regular" like a square. There is a 12' x 6' covered porch on the south side of the building and an 18' x 7' enclosed (mud room) porch on the north side. Its first story is built of 2.75" x 7.75" red, pressed brick with 3/8" mortar joints. The bricks are in excellent condition. The bricks are arranged in a common bond pattern with every eighth course showing the headers of the bricks. The original first floor, double-hung window openings have been replaced with "modern" single-sash openings. The wall openings were bricked up and repointed with a dark gray mortar when the windows were altered to a smaller dimension. The original basement windows have been retained.

The structure's prominent foundation is constructed of vernacular fieldstone, rubble, and mortar. It is also in good condition, with only one small crack on the west side of the foundation.

The hip roof of the house has an 18' overhang around its entire perimeter that is open, not boxed. The roof has been finished with asphalt shingles. There are galvanized metal gutters around the roof's perimeter and galvanized metal downspouts on the southwest and northwest corners of the roof. The roof sags slightly in the middle of the north and south sides. A deteriorated, red brick chimney is located in the center of the north side of the roof, and a large, red brick fireplace chimney dominates the home's east wall. The fireplace chimney is in good condition.

The entrance door leads directly into the living room, which is comfortable in size and boasts an open, red flagstone fireplace that helps to warm the adjacent rooms. The fireplace was added in later years. Coal-burning stoves were once used to heat the entire house. There are windows on each side of the entrance door, and all of the interior rooms are well lighted and ventilated. The former dining room (now a modern kitchen) once boasted a built-in china closet on the west wall. A built-in linen closet is located near the bathroom.

The interior and exterior of the house were remodeled in 1966-67. The original fore-square form of the house has been retained.

The bungalow's interior has a combination living room and kitchen, utility room, and two bedrooms. The five-room house originally boasted six rooms. The interior walls and ceilings are finished with drywall over original plaster. They are in good shape with only minimal cracking in the west wall of the living room. Two interior walls have been removed. Most of the woodwork has been replaced, and a red Lyons sandstone fireplace and modern kitchen have been added. Some of the original wooden moldings, trim pieces, window casings, and doors have been retained throughout the house. The original hardwood floors are attached to 2" x 6" joists. They are covered with wall-to-wall carpeting. The kitchen floor is covered with several layers of linoleum.

The structure's large walkout basement is comprised of one unfinished room.

In 1978 a cinder block detached garage was built near the house. The house is structurally in good condition.

Generator House

The brick walls of the generator shed are built of the same red, pressed brick as the bungalow. It has a concrete floor and measures 10' x 20'. The mounts that once secured a 32-volt battery electric generator are visible on the building interior's cement floor. The shed is accessed by a wood, panel door and lit by a rectangular window located on the building's east facade.

Two Poultry Houses

The walls of both poultry house are constructed of vertical 2" x 4" boards covered with a mix of galvanized, flat and rusted 3" corrugated sheet metals that have acquired a rich patina from years of sun, wind, snow, and rain. Both of the roofs are a shed type and sheathed with 2" x 4" boards covered with the same corrugated sheet metal fabric. The buildings rest on stone rubble foundations and are terraced up the hillside, north of the main brick house. They both have dirt floors.

The poultry brood house, with fenced yard, measures 19' x 10', while the other poultry house, with fenced yard, measures 21' x 7'. Both have 2.5' x 6' entry doors that are oriented to the south. There is a 4.5' x 3' window opening on the south facade of the larger house. The smaller coop has a 4.5' x 3' window opening on the west facade and two stacked window openings, measuring 4.5' x 3' and 4.5' x 1.5', on the south facade.

The larger coop's interior is divided into two apartments by a partition wall made of one-half by one-inch pine strips. The roost's nesting boxes remain. The poultry houses are in fair condition.

Coal Shed

The 6' x 6' coal shed is constructed of vertical 2" x 4" uprights covered with 3" corrugated metal. The building is accessed by a central door that faces south. Coal was loaded into the shed through a 22" x 26" metal, hinged door. The roof is supported with 1" x 12" boards and covered with 3" corrugated metal. The shed is in fair condition.

Blacksmith/Workshop Shop

This one-story building measures 13' x 21' and features original blacksmith tools and shop equipment inside. The building has a concrete floor and corrugated metal exterior walls nailed to a mix of horizontal 1" x 12" and 1" x 6" wood members that are nailed to vertical wood posts. The building's roof is sheathed in the same corrugated metal. Natural light to the building is provided by two, 4-pane, 2' x 6' horizontal sliding windows on the west facade, and one, 6-pane horizontal sliding window on the south that measures 22" x 28." The building is in good condition.

Horse Barn/Stable

The 58' x 32' horse barn/stable is a modest, rectangular-shaped structure that is clad in 3" corrugated sheet metal nailed to 1" x 12" horizontal planks. The building is covered by a shed roof, with corrugated metal roofing material over a mix of hand-hewn timbers and 1" x 8" and 1" x 6" decking. A combination formed-concrete and stone rubble foundation supports the building. The floor of the barn is concrete and dirt.

Built into the hillside and situated with a view to the west, the barn's west exterior facade features are composed of six sets of four-paned, sliding, double-hung windows. The east exterior facade boasts three sets of 54" x 56" hay doors, one 34" x 56" human door, a 4-paned 27" x 36" window, and a 5' opening. The south facade sports a 26" x 33" window and a 34" x 56" human door. The north facade has a 34" x 56" door opening, which is covered with a wood plank door and secured with a wooden, doweled latch. The 58' x 11' interior space on the west side boasts four horse stalls with feed boxes and a 76" x 129" tack room, equipped with a 61" x 33" grain box. The 58' x 16' east room of the building has an open floor plan and was used for hay and feed storage. This room's floor is elevated four steps up from the west room to accommodate the pitching of forage into the lower livestock area. A 26" x 33" fixed-pane window is positioned on the building's south facade. The south end of the building also boasts a 34" x 56" human door.

The barn/stable structure is in good condition.

Sawmill Apparatus and Mining Equipment

Sawmill apparatus and mining equipment stand on a site located directly to the east of the poultry house/garage/storage shed ruin.

Gordon-McHenry Wagon Road

The Gordon-McHenry road was built in the 1860s and named after its two chief engineers. The early wagon road went to the top of Sunshine Hill and turned down Ritchie Gulch to Fourmile Creek near Orodell. At Orodell the road turned to the northwest, crossing what is now Betasso Preserve. The road continued to Sugarloaf, and then on to Caribou. The road was never completed past Caribou, although it was originally intended to cross Arapahoe Pass. The portion of the road crossing the boundary of Sections 27 and 28, on the Betasso Preserve, was not included in the land survey of 1875 (Kellogg, 1875). Because of this, it has been generally assumed that the road did not extend through the Betasso Preserve property at this date. However, by 1902 the road was completed past Sugarloaf, as indicated by the first U. S. Geologic Survey map of the area. The route was used as late as the 1950s as a major route to Sugarloaf and Caribou.

Remnants of the Gordon-McHenry road can be seen in Section 27 of the nominated property, and in portions of Section 28 the road still exists on its original grade.

Ronald McDonald Ranch Cabin and Outhouse

The c. 1919 cabin is a modest one-story, one-room timber home. It is a V-notched, rounded log structure that was built eight logs high. The cabin boasts a simple side-gable roof with a west-gabled-end entry. No windows remain in the structure. A large picture window opening looks out to the south.

The building rests on a rubble and pre-portland cement foundation that is built into a south-facing hillside. A makeshift woodshed addition has been added to the cabin's east side, which is constructed of old, wood, paneled doors. The cabin site boasts an 81' x 31' front yard area that is separated from an 84' x 31' corral or garden area by a perimeter fence, which is located directly to the south of the cabin. Plum trees and choke cherries grow in the drainage areas above and below the McDonald cabin. The hillside above the cabin is covered with fire-scarred Ponderosa Pine trees from a grass fire that started there in 1983-84. Bald Mountain is situated to the north of the cabin site.

The Ronald McDonald outhouse (privy) is situated a short distance up the hill to the northeast of the cabin. It is square and approximately seven feet high with a shed type roof. Its walls are constructed of rusted corrugated metal nailed to 2" x 4" or 2" x 6" vertical boards.

6. Statement of Significance

Boulder County Criteria for Designation

Betasso Ranch complex meets criteria (1) for its character, interest, or value as a part of the development, heritage, or cultural characteristics for the County; criteria (3) the proposed landmark is identified with a person or persons significantly contributing to the local, county, state, or national history; and criteria (4) it is the embodiment of the distinguishing characteristics of architectural styles valuable for the study of a period, type, method or construction, and the indigenous materials.

Areas of Significance: Agriculture, Ranching, Italian Ethnic Heritage, Mining

Period of Significance: 1889 - 1985

Significant Dates:

- 1912 - Blanchard patents homestead claim
- 1915 - Blanchard sells homestead to Steve Betasso
- 1920 - Arthur Crews acquires ranch and later, sells to the Betasso brothers
- 1922 - Ronald McDonald and Lewis Lindemuth acquire ranches and later, sell to the Betasso brothers

1924 - Betasso Brothers begin consolidating adjoining ranches
1953 - Betasso Ranch is approximately 2,000 acres
1977 to 1983 - Ernest S. Betasso sells the remaining acreage of
Betasso Ranch to Boulder County

Significant Persons:

Walter Blanchard
Stephen and Mary P. Betasso
Arthur Crews
Ronald McDonald
Lewis Lindemuth
Richard Betasso
Ernest S. and Mae J. Betasso

Statement of Significance:

Betasso Ranch is a unique property type categorized by the style and function of its early buildings. The buildings are significant as a grouping of agricultural structures into a collective resource type--a mountain cattle ranch. The ranch was approximately 2,000 acres at one time.

The ranch's story is important in a historical sense because it is a firsthand account of the open range cattle industry: the cattle drives, the roundups, and the range life associated with it.

The nominated range land, structures, and early wagon road represent the most significant income producing activities associated with the ranch. The ranch was large because of the many acres required to raise sufficient food for winter cattle feeding. Ranch houses were built to shelter the families, and barns were built for storing winter forage, blacksmithing, and sheltering herds, horses, and mules. Cattle were controlled and branded in fenced corrals. What could not be supplied locally was brought in by horse and wagon up Boulder Canyon or on the Gordon-McHenry wagon road.

The early history of the ranch is closely associated with the pioneer Blanchard family. This family was among the first to recognize that cheap, efficient transportation was necessary for the development of the mining and agricultural economies of Boulder County. Without it, ores, hay, timber or equipment would not be available for those needing it. The Blanchard family prospered by locating their stagecoach stop and hunting lodge on a major route to the mines. The Blanchard's Lodge is located at the mouth of Boulder Canyon where the Red Lion Inn stands today.

More important to this landmark application is Blanchard's son Walter who recognized, at the turn of the century, that the Fourmile Canyon area needed more than mining to create a permanent economic base. The area's gold discoveries and subsequent mineral development had begun as early as 1859, but the remote, rugged terrain had discouraged early farming. In 1912, Walter Blanchard promoted agriculture and broadened the area's economy by homesteading a ranch that specialized in range cattle that could be

sold for beef in the mining camps or the Denver market.

Stephen Betasso, an Italian-born immigrant, settled his family here, after 1915, and prospered in his mining and ranching enterprises.

Betasso has long been recognized as a major figure in the development of the mines in the Fourmile Canyon area and, particularly, for his construction of local mine buildings. Between the years of 1915 and 1925, Betasso and his sons erected most of the nominated site's contributing buildings, using similar construction methods and building materials to the corrugated metal mine buildings that he had built earlier.

He built these buildings near the existing c. 1907 log ranch house and log cattle barn on the original Blanchard Homestead. His two youngest sons, Dick and Ernie, began working on the ranch as youths and joined the family business as adults.

Beginning in 1924, the two brothers began consolidating their father's ranch (Blanchard Homestead) with the Crews, McDonald, Lindemuth ranches, and other parcels, eventually forming a large cattle ranch of over 2,000 acres with over one hundred twenty-five head of cattle. Their ownership of the nominated McDonald Ranch cabin and outhouse was acquired during this period.

Boulder County now owns much of the Betasso Ranch where two generations of the Betasso family lived for sixty-eight years. Because Ernie Betasso believed that Betasso Ranch should be preserved as a "unique historical natural resource," he sold its remaining 773 acres to Boulder County, in 1976, for \$975 per acre, \$425 under the appraised value. As a result, the Betasso Preserve became one of the County's first open space property acquisition.

The two generations who lived on the ranch made a solid contribution to Boulder County's mining and ranching history and the County's range cattle industry. Their story reveals that cattle ranching is arduous, solitary, lonesome work. If the Betassos were alive they could teach us all some valuable lessons about patience, perseverance, and character. They lived hard but happy lives.

Blanchard Log House and Ronald McDonald Cabin

The c. 1907 Walter Blanchard house and c. 1919 Ronald McDonald cabin are significant because they are excellent examples of the vernacular log homes built by Boulder County's twentieth-century homesteaders. Their architecture illustrates how the tradition of building with horizontal log walls persisted in Boulder County even after cut lumber was locally available. These second-generation log buildings can be distinguished by imprecise cutting and squaring of the logs, which results in relatively large, irregular gaps between timbers.

Settlers in the mountains built with logs because of the simple construction technology involved and the availability of native timber and other materials. Built from materials readily accessible--logs, stones, and full-dimension lumber from a local sawmill--a log structure was practical to build.

Both of the simple, rectangular-shaped structures have only a single unit or "pen." The buildings were built eight to nine logs high, just tall enough for a full-grown man to stand up inside. Their framed half-stories provided additional head-room and living space. The framed areas are sheathed with board-and-batten siding to make them weather-tight.

Here a distinction can be made between a "log house," such as the Blanchard house, which has walls of square-hewn logs joined by carefully hewn corner notching, as opposed to a "log cabin," like the McDonald cabin, in which timbers are left round and are joined at the corners by overlapping saddle notches. Typical of log houses of the era, a framed porch was added to the Blanchard house to make the house appear more up-to-date. The home also has traditional detailing in its window moldings and interior treatments, like a fancy tongue-and-groove floor. In contrast, the McDonald cabin probably once had a plain, wood-plank floor.

The Blanchard home's hand-hewn logs and half-dovetail notching are examples of several methods used in log building construction. The logs were first notched at each end so they would fit together better. Then the builder hand-flattened or hewed horizontal wall timbers with a broad axe and an adze. The spaces between the logs were then filled with "chinking" and "daubing." The structure's entrance is located on the pitch side of the roof rather than on the gable end. The home's original furnishings still exist and are owned by Boulder County. The initials "E. B." are driven into the northeast corner log joint with 22-caliber shotgun shells. The initials stand for Ernie Betasso.

Both of the ranch houses are perched on mortared rubble foundations that are built on the valley floor against the slope of a hill. Natural springs are located only a few steps from both of the structures' front doors. As a result, the one-story log buildings are protected from the winds by the slope of the land and situated near a fresh water supply. The Blanchard house has a stone and mortar cistern located nearby.

Ronald McDonald appears to have been a plum grower. A grove of plum trees is situated in the ravine, west of the cabin. As a producer of fruit, he reduced the risk of frost by putting the grove on sloping land, for good air and drainage, and near a small temperature-modifying body of water or creek. He selected trees that were small and short because they were easier to pick from.

McDonald Ranch Outhouse

A small building having a bench with holes that was used as a toilet.

Blanchard Homestead Woodshed

Chopped wood was stacked in the shed for home heating purposes. The shelter kept the wood dry and readily available for use.

Blanchard Homestead Chicken Coop

This poultry shelter was cheaply made, but boasted the basic essential requisites for raising chickens in a warm, protected, well-lighted, and ventilated environment.

Blanchard Homestead Root Cellar

Root crops of all kinds kept better when stored in cellars. The main features of this root cellar are cheapness and nearness to the place where the roots were consumed. A regular-sized door, located on the cellar's exposed side, provided light and ventilation and made it convenient for putting in and taking out roots. However, this feature probably made it less frost proof. The hillside made it handy to build the cellar without constructing a back wall. The back of the roof rested directly on the natural, rock wall. The front three walls of the cellar were then built up with rubble stone and board-formed concrete.

The Log Cattle Barn

One of the oldest structures on the ranch, the single-crib log barn was built around 1907. Barns with a core for hay and work stock and flanking sheds for other livestock and machinery were the norm in cattle country. The east and west wings of the barn were built lower to protect them from the sweeping winds. The barn's vernacular style is traditional and native down to the materials used. Its log construction is of particular interest and indicates an early date of construction. Other indicators of an early barn are the barn's simple gable roof form and the hinged, swinging wagon and human doors, which were used on the earlier barns before sliding doors became popular.

Cattle Loafing and Calving Sheds

The cattle loafing and calving sheds were built to make winter and inclement weather as comfortable as possible for the herds. The rectangular sheds face south and are located on the south side of a bank to break up the west, northwest, and east winds as much as possible. The southern exposure also provided the herd with maximum warmth to cut down on feeding costs. The shed accommodated the Betasso family's need to feed cattle during the winter months of the year, when they were not out grazing on the open range.

Since animal husbandry dominated the stock-raising activities, a calving room was constructed on the far east end of the cattle shed complex.

Corrals, Cattle Loading Chute, and Fences

The cattle corrals, east of the cattle loafing sheds, were used to round up cattle for veterinary treatment, branding, and loading. They are subdivided by cross fences into two pens where

groups of animals could be separated for special handling. Since cattle get nervous when they are penned up, the corrals are constructed of sturdy tree trunks, which were sized and cut at the sawmill on the ranch.

The cattle loading chute was built with the same rail method and functioned as a mechanism to load and unload cattle.

The fences on Betasso Ranch were generally made of steel wire, either single, double-wire, or woven. The fences that enclose the yards of the west cattle shed, horse barn, and poultry houses are constructed from even, woven wire. Most of these fences are topped with small, horizontal tree trunks or boards so that the horses could see the fence. That way high-spirited horses would not injure themselves by running heedlessly into a wire fence.

Single or double strands of wire stapled to wooden posts made a cheap and effective fence for keeping cattle and horses where they belonged.

1918 Brick Ranch House

The 1918 Craftsman Style house served as the main dwelling for the Betasso family, who were important to determining the character of the mountain ranch from 1915 to 1985. The house is a vernacular example of a "box bungalow," a regionally common style defined by one-story height, square plan, and pyramidal hip roof.

Typical of the Craftsman Style, the bungalow is planned and constructed on simple and practical lines. The bungalow's roof boasts wide overhanging eaves with exposed rafters. The home's front porch is supported by square upper columns that rest on a balustrade.

The walls and chimneys of the Betasso ranch house are constructed of red, pressed brick from the Boulder Pressed Brick Company in Boulder. This type of brick is harder and smoother than wood-mold brick. This major brickyard was located at 13th and High Streets, near the site of the Casey Middle School, in Boulder. A Boulder builder, Nick Fanti served as the contractor on the job, while Steve Betasso and his sons hauled the rubble fieldstone for the building's foundation from above the construction site. The brick for the walls was hauled up Boulder Canyon by horse and wagon.

The house was lit with candle and kerosene lamps and a 32-volt electrical system powered by a Delco home electric plant. Before the bungalow's major remodel, in 1966-67, the interior features included an abundant use of milled woodwork for decorative effect, including the built-in wall cupboards that formally graced the home's dining room and the home's hardwood flooring.

In many ways, the Betasso ranch house could have been considered the ideal Craftsman home at the time of its construction. A new form of American architecture, Craftsman Style homes were designed to be honest and beautiful buildings, well planned for efficient use of space and materials, built to last generations, and within the means of the average family. The Betasso's home met all of these criteria.

Generator House

This red brick structure housed the modern Delco home electric plant and 32-volt battery storage for the main house.

Two Poultry Houses

Although the rough, rock, and hilly terrain behind the brick ranch house was not suitable for crop cultivation, it was perfectly suited for hillside poultry houses. The agricultural activities were diversified on the ranch with the addition of several chicken coops. The Betasso family would raise 100-200 chickens at a time for poultry and egg production.

Coal Shed

Coal was used extensively on the ranch as a heating source and for blacksmithing. This shed was used for coal storage.

Blacksmith Shop

Metal tools and objects were forged and repaired in the blacksmith shop to keep the Betassos' mining and livestock operations running smoothly and efficiently. In the winter, for example, the blacksmith would fashion sharp shoes for the horses in the shop, so they could walk on the ice. Hardware stores were not readily accessible to the farmer or miner in the early days.

Horse Barn

The Betasso's cattle ranching operation required different types of horses, which were stabled and fed in this barn. They kept riding horses for round-ups and cattle drives and small teams for mowing hay and riding, too. Big work horses were used for plowing and heavy work.

Sawmill Apparatus and Mining Equipment

Felling the trees, sawing them into logs, and transporting them to the farmyard for firewood and construction of buildings, corrals, and fences was a common activity on the ranch. The sawmill apparatus, fueled by a gasoline engine, sawed the wood into desired dimensions and lengths. The miscellaneous mining equipment was hauled in from the hard-rock mines in the area.

Gordon-McHenry Wagon Road

In the early 1860s the U. S. Government financed the building of a military road to the top of Sunshine Hill. The road, originally intended to cross Arapahoe Pass, was called the Gordon-McHenry road after its two chief engineers. It is significant to Boulder County's history because it was one of the original routes

up Boulder Canyon and used as a major route to Sugarloaf and Caribou until the 1950s.

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7. Boulder County Parks and Open Space. "Betasso Preserve" brochure, Updated 1994.
8. Boulder County Parks and Open Space Department; Management Plan, 1984.
9. Hess, John. "Ernie Betasso Interview." Carnegie Branch Library for Local History, Boulder, Colorado, Oral History Tape #225, 1983.
10. "Ernest S. Betasso Obituary," Daily Camera, June 6, 1983.
11. "History of Ernie Betasso Family." Boulder County Parks and Open Space Department.
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13. "May I Have This Dance?" Public Bridge, Vol. 3, No. 6, Winter 1986-87.
14. Noble, Allen G. and Cleek, Richard K. The Old Barn Book: A Field Guide to North American Barns and Other Farm Structures, Rutgers University Press, New Brunswick, New Jersey, 1995.

15. "Open Space Grows By 3,216 Mountain Acres," Town and Country Review, June 22, 1977. Page 1.

16. "Ranch Preserved." Daily Camera, June-26,-1977.

17. "700" Acres to Launch County Open Space Program." Longmont Times-Call, December 28, 1976.

8. Geographical Data

Boundary Description: The nominated property of 773 acres includes the adjacent land parcels owned by the Betasso family from 1915 to 1983. The boundary line is indicated on the attached U. S. G. S. maps.

Boundary Justification: The boundary of the nominated property embraces the agricultural buildings and surrounding homestead parcels historically associated with the Betasso family's ownership and residence here. This includes the earlier 160-acre ranches of Walter Blanchard, Arthur Crews, Ronald McDonald, and Lewis Lindemuth (see attached ownership maps).

Legal Description of Property:

SE 1/4 of Section 28, T1, R71W - Blanchard Homestead
SW 1/4 of Section 27, T1, R71W - Crews Ranch
NE 1/4 of Section 28, T1, R71W and SE 1/4 of Section 21, T1, R71W - McDonald Ranch
NE 1/4 of Section 33, T1, R71W - Lindemuth Ranch

The Gordon-McHenry Road can be seen in Section 27 and in portions of Section 28.

9. Property Owners:

Name: Boulder County Parks and Open Space
Address: P. O. Box 471
Boulder, Colorado 80306

10. Form Prepared By:

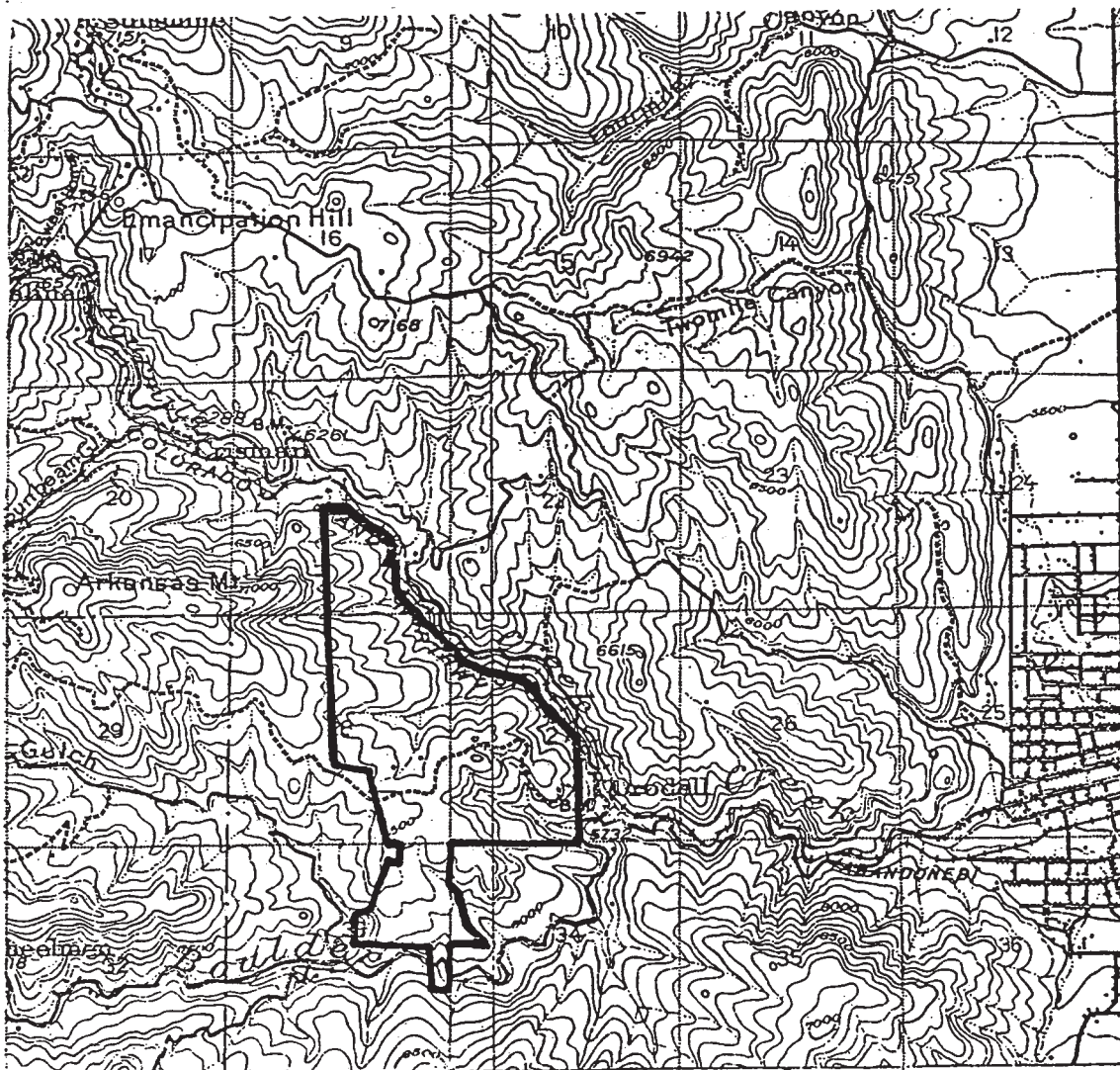
Name: Rebecca Waugh
Historic Boulder, Inc.
Address: 646 Pearl Street
Boulder, Colorado 80306

Phone Number: (303) 444-5192
E-mail Address: None

GORDON McHENRY TRAIL

BETASSO
PRESERVE

[MAIN ROAD CROSSING PROPERTY]



U.S.G.S. TOPOGRAPHIC MAP

1902

SCALE

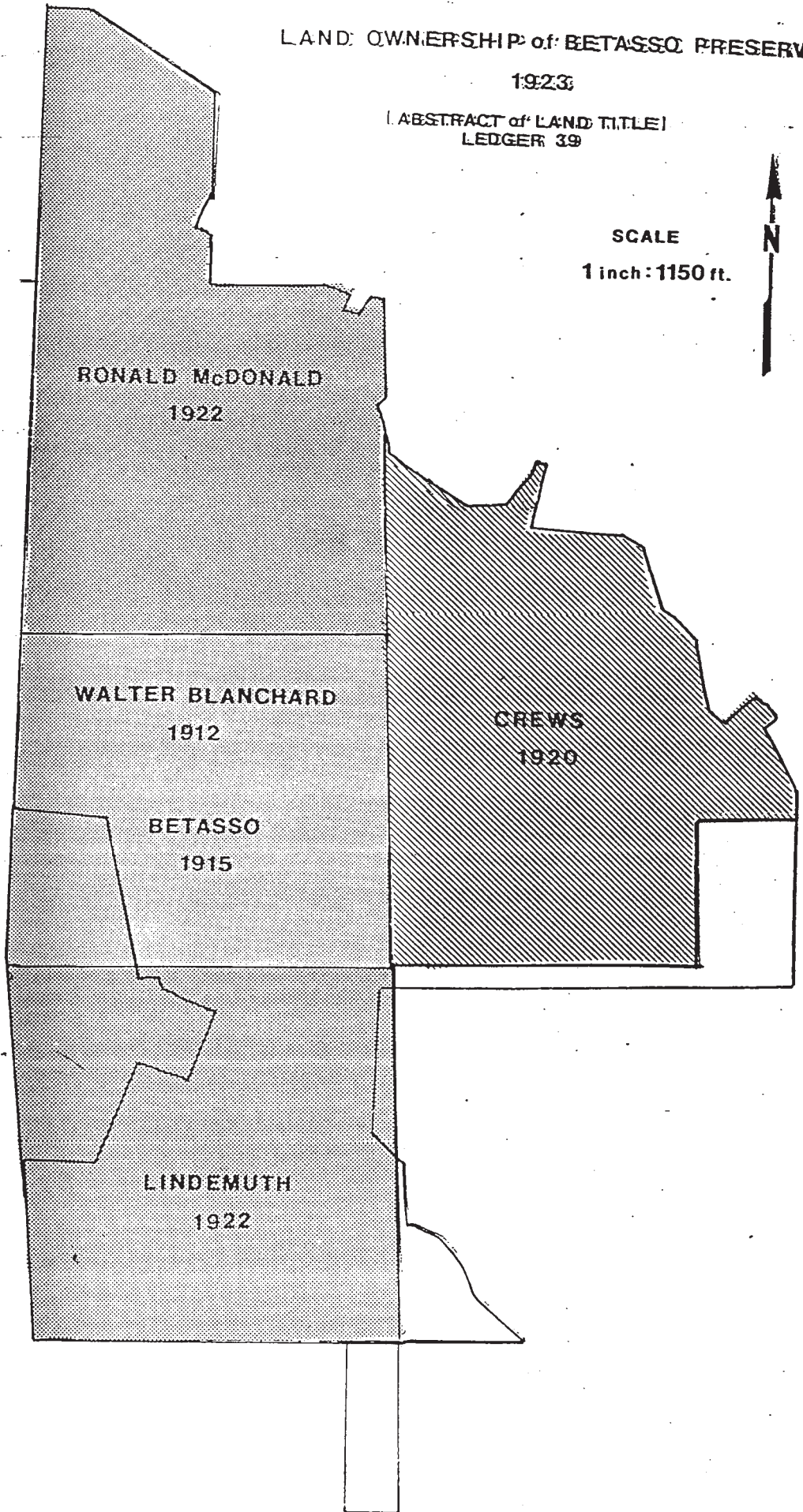
1 ft. : 62,500

LAND OWNERSHIP of BETASSO PRESERVE

1923

(ABSTRACT of LAND TITLE)
LEDGER 39

SCALE
1 inch : 1150 ft.

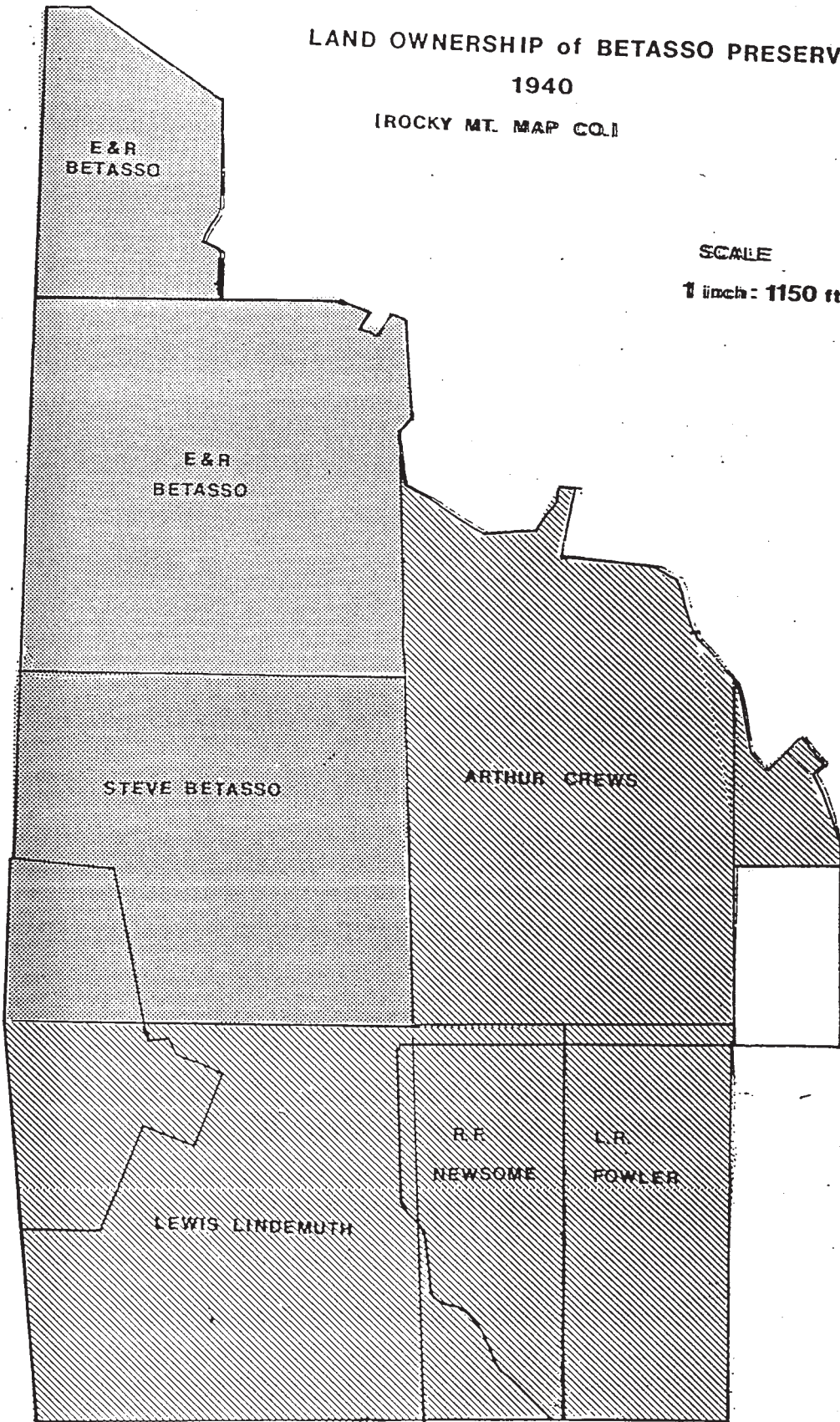


LAND OWNERSHIP of BETASSO PRESERVE 1940

[ROCKY MT. MAP CO.]

SCALE

1 inch = 1150 ft.



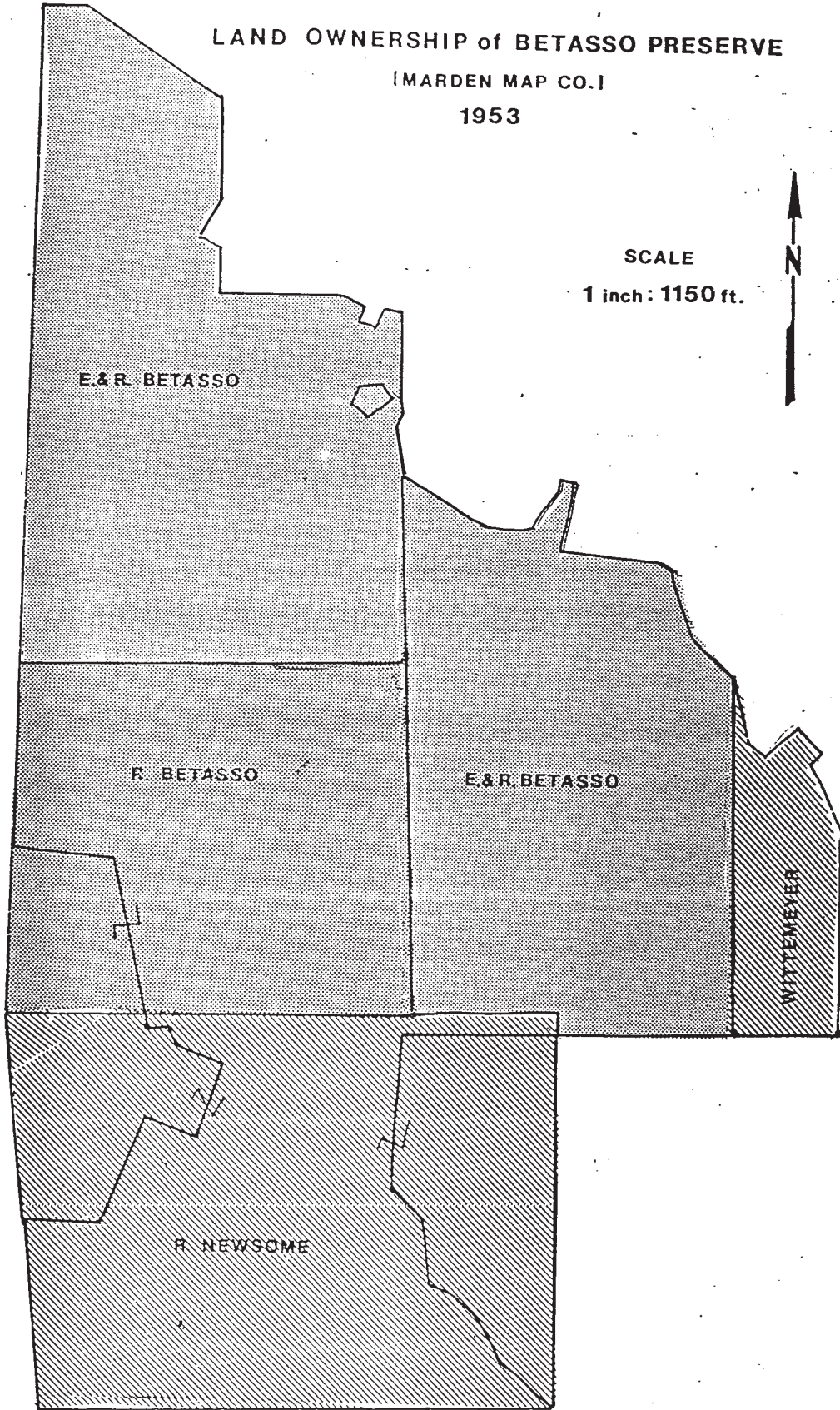
LAND OWNERSHIP of BETASSO PRESERVE

(MARDEN MAP CO.)

1953

SCALE

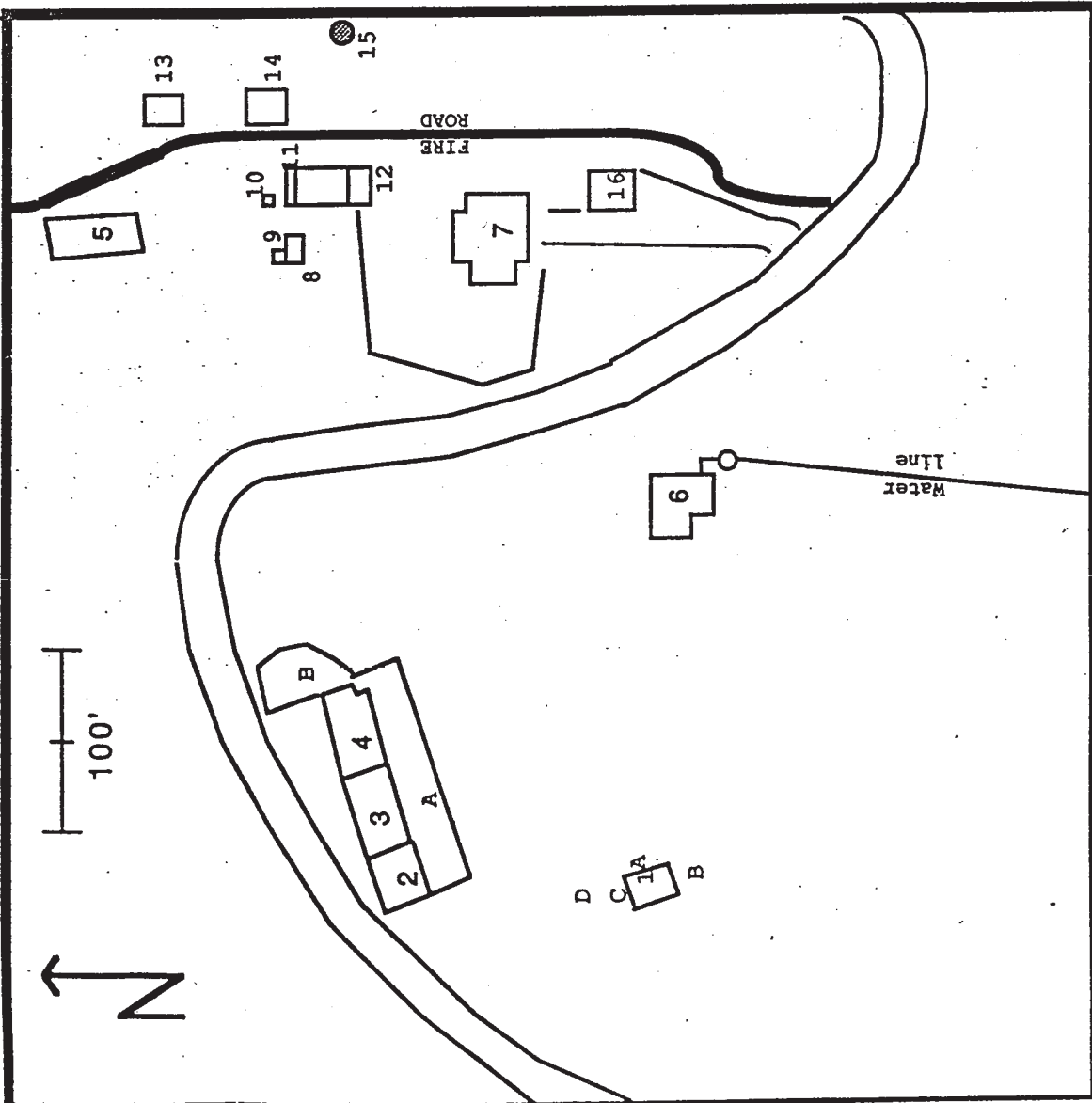
1 inch: 1150 ft.



Betasso Preserve

BUILDINGS

1. Rough hewn Log Cabin
 - a) Root cellar (built into hillside) 9x7'
 - b) Wooden shed 7'x6'
 - c) Chicken House 4'x5'
 - d) Sistrern (Rock and Mortar)
2. West Barn (tin roof and siding) 23'x32'
3. Log Barn with tin roof 47'x32'
4. East Barn (tin roof and siding) 48'x11'
- a) Corral with adjoining gate
- b) Log corral and loading chute
5. Animal Barn (tin roof and siding) 58'x32'
6. Cottage residence 60'x30'
7. Brick residence 30'x40'
8. Poultry brood house with fenced yard 19'x10'
9. Brick shed with concrete floor 10'x20'
10. Coal shed 6'x6'
11. Poultry house with fenced yard 21'x7'
12. Storage shed 13'x21'
13. Blacksmith/Workshop 13'x21'
14. Garage (modern construction) 18'x20'
15. Sawmill and mining equipment
16. Garage 20'x25'



**L. Rapid Resource Assessment, Benjamin/Betasso Open Space,
Boulder County, Colorado (ERO Resources Corporation 2007)**

RAPID RESOURCE ASSESSMENT

BENJAMIN/BETASSO OPEN SPACE
BOULDER COUNTY, COLORADO

PREPARED FOR—

BOULDER COUNTY
PARKS AND OPEN SPACE
5201 ST. VRAIN ROAD
LONGMONT, COLORADO 80503

PREPARED BY—

ERO RESOURCES CORPORATION
1842 CLARKSON STREET
DENVER, COLORADO 80218
(303) 830-1188

AUGUST 1, 2007

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APPENDICES

Appendix A: Photo Point Map and Photo Documentation
Appendix B: Plant Species
Appendix C: Report Preparers

SUMMARY

OWNERS/CONTACTS	
Boulder County Parks and Open Space 5201 St. Vrain Road Longmont, Colorado 80503 Telephone: (303) 678-6200 FAX: (303) 678-6180	
STUDY AREA LOCATION	
The study area is located about 4 miles west of the City of Boulder, Colorado on the northern slopes of Arkansas Mountain to the southwest of Fourmile Creek.	
APPROXIMATE ACREAGE	CURRENT ZONING
391 acres – Benjamin Property 54 acres – Northern Betasso Preserve Total acres: 445	Forestry

DIRECTIONS AND ACCESS TO THE STUDY AREA (NEAREST MUNICIPALITY)

Currently, no formal parking exists along the narrow mountain road access and vehicle access is discouraged. From Canyon Boulevard and Broadway Street in downtown Boulder, take Canyon Boulevard (Highway 119) west for about 3 miles to Fourmile Canyon Drive. Follow Fourmile Canyon Drive to the northwest for about 4 miles, turning left on Logan Mill Road. Climb Logan Mill Road and veer left onto Wendelyn Way and continue onto Alaska Road. Access to the study area is from the easternmost point on Alaska Road.

OPEN SPACE VALUES BASED ON RESOURCE ASSESSMENT

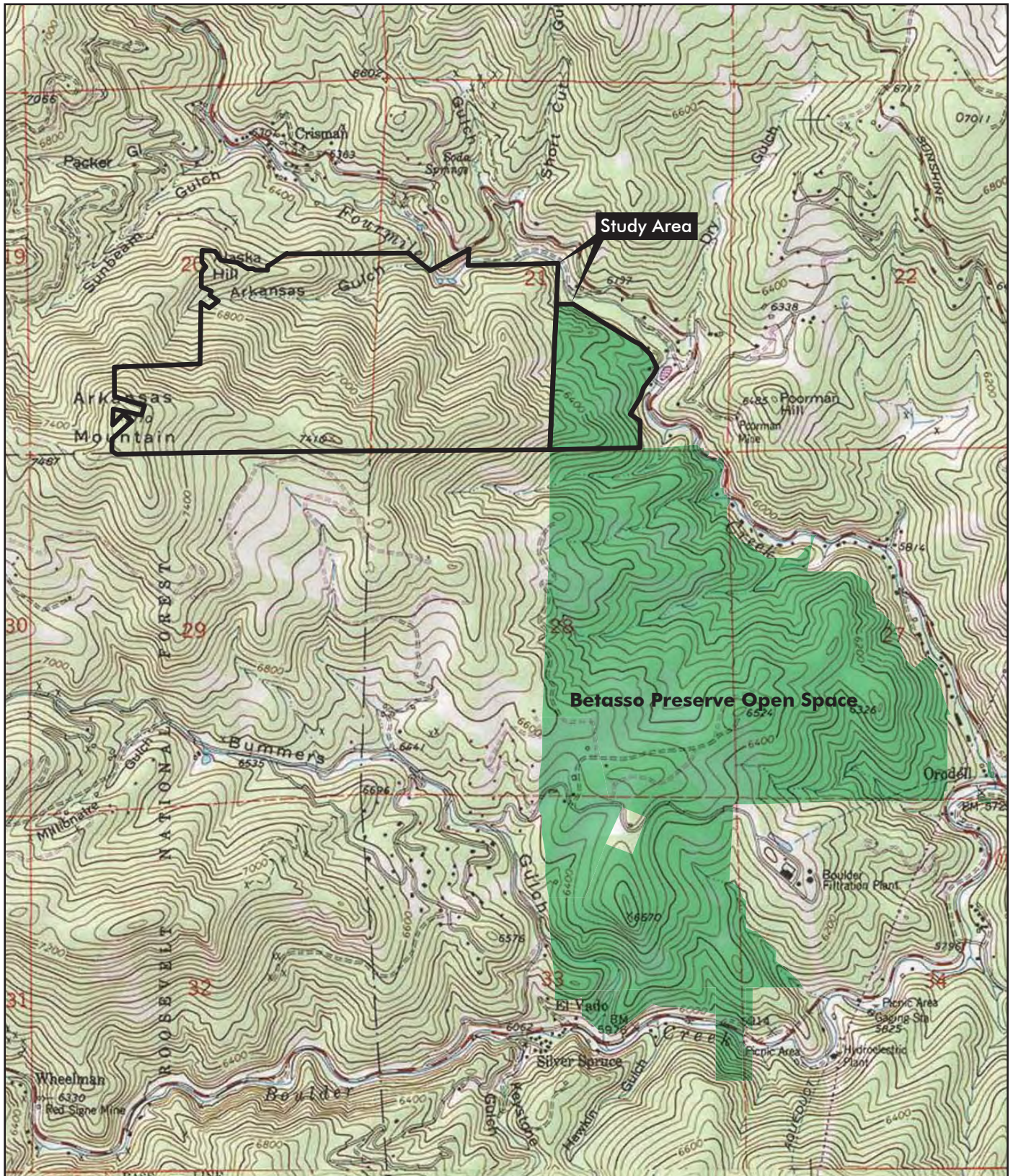
The study area is important for open space because it maintains—

- A large area of undisturbed forested habitat
- A reach of riparian habitat along Fourmile Creek
- Contiguity to adjacent Boulder County Open Space lands (Betasso Preserve)
- Potential for public access and recreation
- Open space and scenic views

MANAGEMENT ISSUES BASED ON RESOURCE ASSESSMENT

Some management issues that could adversely affect the open space values in the study area include—

- Potential increased degradation of habitat and increased wildlife conflicts, should public access be permitted
- Limited safe and legal public access points
- Noxious weeds, especially downy brome along the upper ridgeline on the south side and lower ridgeline in the eastern half of the study area
- Public safety issues related to mining areas should public access be permitted



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Benjamin/Betasso RRA

Sections 20 and 21, T1N, R71W
 UTM Coordinates: Zone 13; 469585mE, 4431356mN
 USGS Gold Hill and Boulder, CO Quadrangles
 Boulder County, Colorado



Figure 1 Location

Prepared for: Boulder County Parks
 and Open Space
 File: 3920 Figure 1.pdf
 August 2007

INTRODUCTION

PURPOSE

Boulder County Parks and Open Space retained ERO Resources to conduct a rapid resource assessment for the 391-acre Benjamin Property and 54 acres in the northern portion of the Betasso Preserve (collectively referred to as the “study area”) near the City of Boulder in Boulder County, Colorado (Figure 2). Boulder County purchased the Benjamin Property for \$4,750,000 on May 30, 2007. The Betasso Preserve has been in County ownership since 1975. The conditions in the study area have generally been documented through photo points (Appendix A). The purpose of this rapid resource assessment for the study area is to—

- Summarize the physical/ecological characteristics and conditions
- Document and record existing conditions and open space values
- Identify management needs and opportunities

METHODS

Boulder County Parks and Open Space supplied records, documents, and GIS data applicable to the study area. On May 30 and June 7, 2007, a team of natural resource planners and ecologists from ERO walked the extent of the study area documenting ecological and physical characteristics and collecting GPS data on existing trails.

ERO consulted several organizations, agencies, and databases including the Colorado Natural Heritage Program (CNHP), Colorado Office of Archeology and Historic Preservation (OAHP), the Colorado Natural Diversity Information Source (NDIS), and Boulder County pertaining to resources in the study area. Published information, such as U.S. Geological Survey (USGS) and Natural Resources Conservation Service (NRCS) maps, also was used to prepare the inventory.

REPORT ORGANIZATION

This report presents a summary of the information gathered for the rapid resource assessment and describes the results of ERO's evaluation of the resources and open space values in the study area. The report is organized into five narrative sections and three appendices. Following the *Summary* and *Introduction*, the *General Description* section provides information on the setting. The *Site Resources* section summarizes the ecological and cultural resources; existing trails and access; land use and management; and improvements and legal considerations in the study area. The *Management Considerations* describes short-term management needs and long-term needs or opportunities where appropriate.

Appendix A contains photographs of the study area with narrative descriptions and a corresponding photo point map. Appendix B presents plant species identified during the site visit and Appendix C presents the qualifications of the report preparers.

GENERAL DESCRIPTION

The study area is located near the eastern edge of the Southern Rocky Mountains physiographic province. The study area is characterized by steep, forested slopes interspersed with grassy meadows and rock outcrops, which is typical of the Front Range foothills area. The upper limits of the study area are defined by Arkansas Mountain and its associated ridgeline that descends to the east towards Fourmile Canyon. The lower slopes are characterized by Arkansas Gulch, an intermittent drainage with dense vegetation that reaches Fourmile Creek in the northeast corner of the Benjamin Property.

GEOGRAPHICAL SETTING

The study area is located in central Boulder County about 4 miles west of downtown Boulder. Specifically, the study area is located in Sections 20 and 21 in Township 1 North, Range 71 West of the 6th P.M. The study area encompasses about 445 acres made up of a steep, forested mountainside interrupted by several intermittent drainages, open meadows, and about ½ mile of Fourmile Creek. Elevations in the study area range from about 7,710 feet in the southwest corner (summit of Arkansas Mountain) to about 6,100 feet in the northeast corner (adjacent to Fourmile Creek). Based on Boulder Station weather data for 1948-2005, average annual precipitation in the area is about 19 inches and area temperatures vary from an average maximum of 88°F in July to an average low of 21°F in January (WRCC 2007).

SITE RESOURCES

This section documents in more detail the basic physical and ecological characteristics and conditions that directly support the open space values of the study area.

GEOLOGY

The study area is near the eastern margin of the Front Range of north-central Colorado, and consists of primarily of igneous rocks of Precambrian age. Generally the area is dominated by Granitic Rocks of 1,700-M.Y. Age Group, including Boulder Creek granites (Tweto 1979). The mining activity that characterizes some of the early history of the Boulder Canyon/Sugarloaf area is due to the exploitation of gold and other mineral deposits.

A prominent series of rock outcrops follows the upper ridgeline, running parallel to the southern boundary of the study area from Arkansas Mountain down to Fourmile Creek.

SOILS

The Natural Resources Conservation Service (NRCS) has mapped two soil types in the study area. Each mapping unit is described below and Figure 3 shows the NRCS soil mapping. All soil information was gathered from the NRCS soil survey (NRCS 1975).

Mapping Unit JrF. Juget-Rock Outcrop Complex (9 to 55 percent slopes). This complex is made up of about 50 percent Juget very gravelly sandy loam, and about 30 percent Rock outcrop. The Juget series is made up of shallow, somewhat excessively drained soils. The soils formed on mountain slopes and ridges in sandy residuum

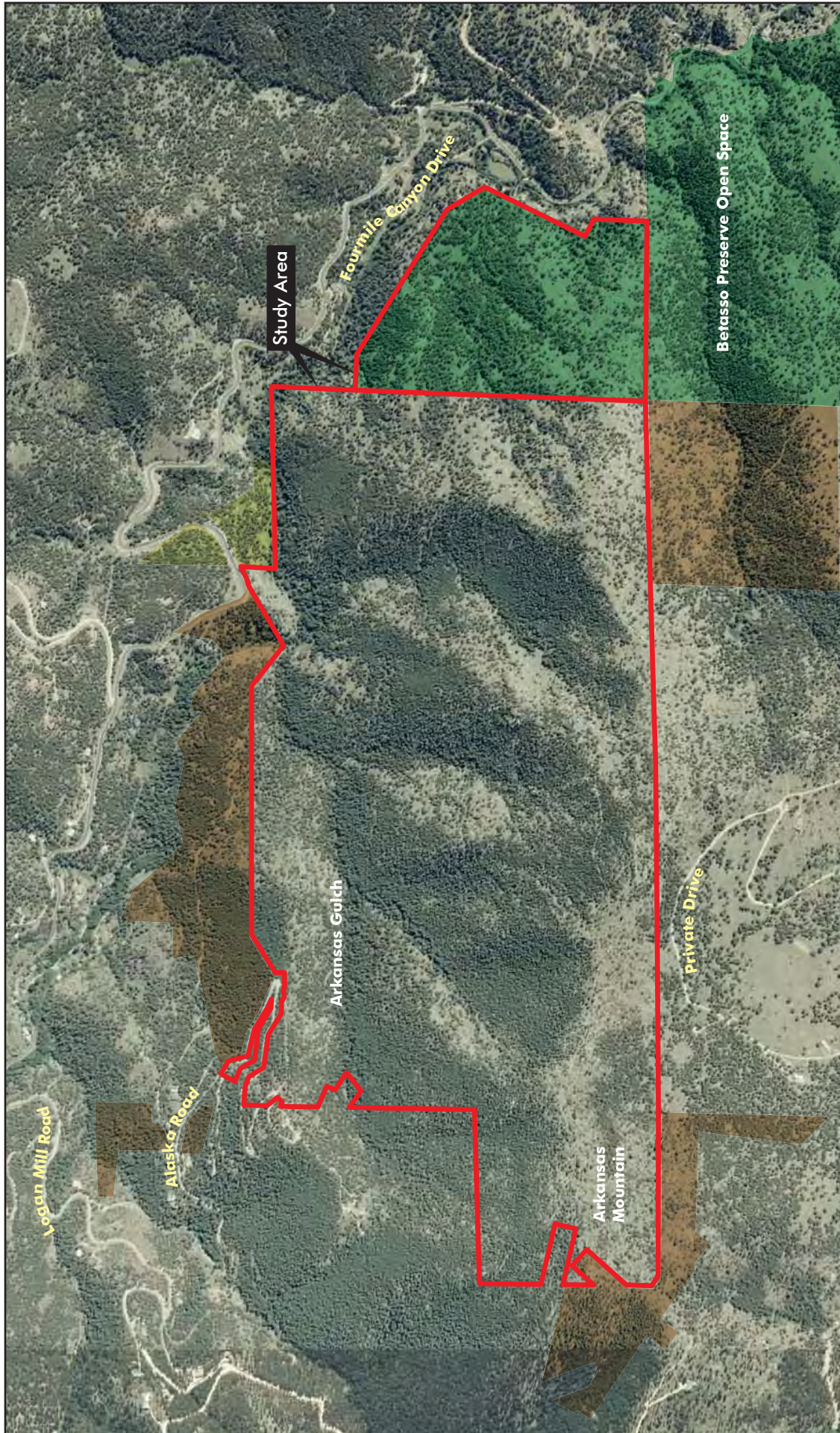


Figure 2
Benjamin/Betasso RRA
Study Area

Prepared for: Boulder County Parks
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Benjamin/Betasso RRA

- Boulder County Open Space
- Boulder County Conservation Easement
- Bureau of Land Management



1 Inch = 1,000 feet



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weathered from granite. Native vegetation is mainly ponderosa pine with and understory of grass, and Englemann spruce and Douglas fir at higher elevations. Runoff is rapid and the erosion hazard is high. This soil type is considered to have moderate to severe limitations for paths and trails due to slope.

Mapping Unit FcF. Fern Cliff – Allens Park Rock Outcrop Complex (15 to 60 percent slopes). This complex is made up of about 30 percent Fern Cliff stony sandy loam, about 30 percent Allens Park gravelly sandy loam, and about 20 percent Rock outcrop. The Fern Cliff series is made up of deep, well-drained soils. The soils formed in loamy mixed alluvium on short fans and mountain valley side slopes. Native vegetation is mainly ponderosa pine and Douglas fir forests with a sparse understory of grass. Runoff is medium to rapid and the erosion hazard is high. This soil type is considered to have moderate to severe limitations for paths and trails due to slope.

HYDROLOGY

SURFACE WATER

According to topographic information from the USGS 7.5 minute quadrangle map, surface water on and in the vicinity of the study area flows to the northeast and east toward Fourmile Creek, the most significant surface drainage in the area. Arkansas Gulch, a small intermittent drainage, traverses the northern portion of the study area, draining into Fourmile Creek in the northeast corner (USGS 1966; photorevised 1979).

GROUND HYDROGEOLOGY

Based on a review of the USGS Boulder quadrangle, shallow ground water would flow in a northeasterly direction towards Fourmile Creek (USGS 1966; photorevised 1979). There are no permitted water wells in the study area. Fourmile Creek has an instream flow recommendation of 1.5cfs (April 1 – September 15) and 0.5cfs (September 16 – March 31) (CDWR 2007).

WETLANDS

Wetlands in the study area are associated with Arkansas Gulch and Fourmile Creek.

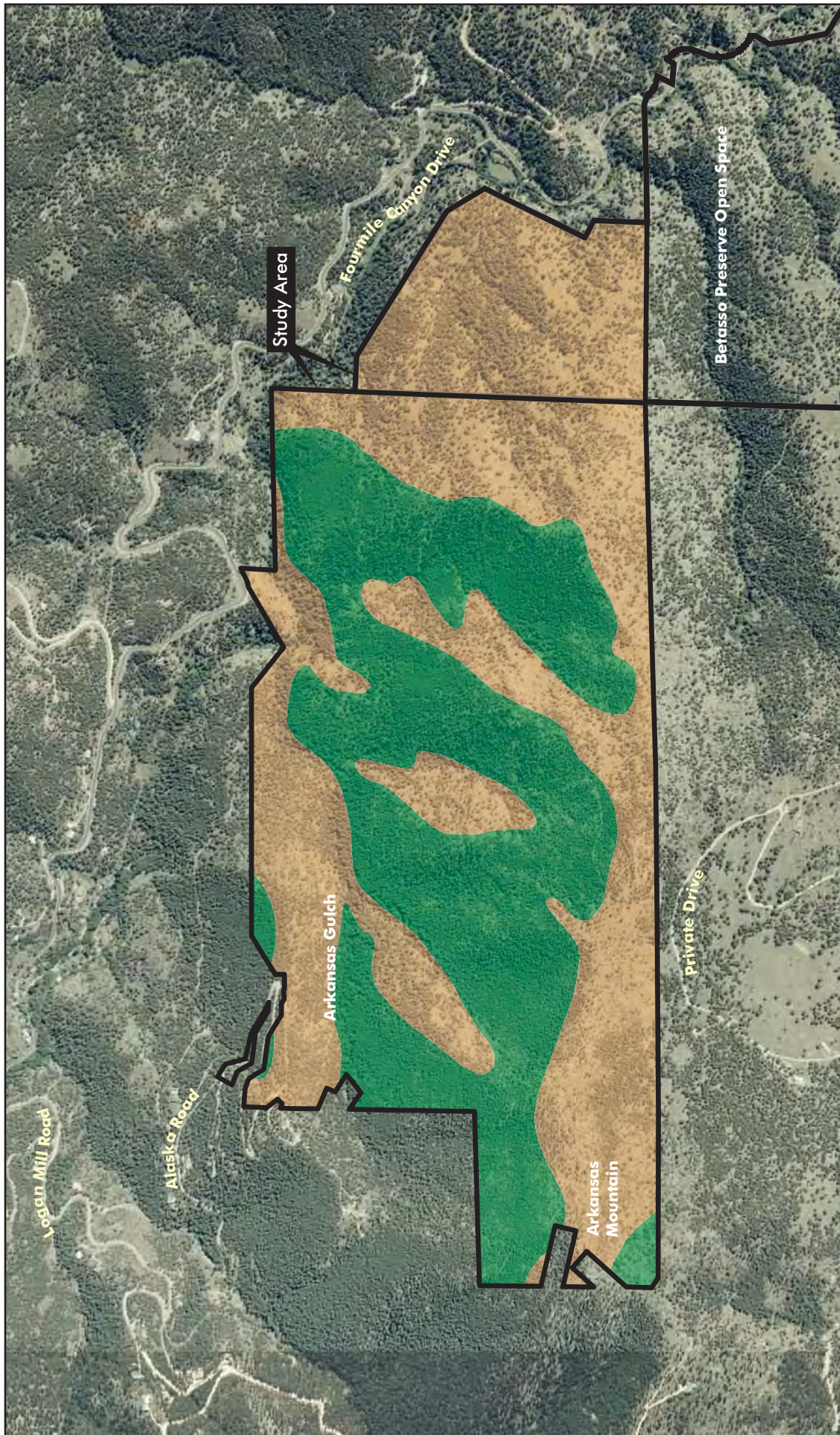
VEGETATION

GENERAL VEGETATION DESCRIPTION

The study area is dominated by ponderosa pine – Douglas fir forests interspersed with grassy meadows and rocky outcrops. Foothills riparian communities are found along portions of Arkansas Gulch and Fourmile Creek. Vegetation communities are described below and shown in Figure 4. A list of plant species identified during the field visit appears in Appendix B.

PONDEROSA PINE FOREST (PP)

Within the study area the ponderosa pine forest community dominates south and east facing slopes, and areas with direct sunlight. The ponderosa pine community merges with the foothill grass community and the Douglas fir community (discussed below). Ponderosa pine is the dominant tree species in this community type but Rocky Mountain juniper is also common. The density of ponderosa pine ranges from thicker stands with



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- Juguet - Rock Outcrop Complex
- Fern Cliff - Allens Park Rock Outcrop Complex



**Figure 3
 Soils**

Prepared for: Boulder County Parks
 and Open Space
 File: 3920 Figure 3.pdf
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**Benjamin/Betasso Open Space
Rapid Resource Assessment**

little understory diversity to scattered populations with a diverse understory. The dominant understory vegetation in this community type includes native forb species such as pasture sage, Rocky Mountain penstemon, hairy false goldenaster, and wallflower; native shrub/subshrub species such as common juniper, fringed sage, and creeping barberry; and native perennial cool season graminoids such as blue wildrye and threadleaf sedge.

DOUGLAS FIR FOREST (DF)

The Douglas fir forest community dominates north and western slopes, and areas with more shade or indirect sunlight. Douglas fir is the most dominant tree species and is found in thick stands where little sunlight reaches the understory. Lodgepole pine also occurs within this community. The understory is dominated by native shrubby species such as common juniper, Wood's rose, Boulder raspberry, creeping barberry, and whitestem gooseberry.

FOOTHILLS GRASSLAND (FG)

The foothills grassland community is intermixed with a few scattered trees and shrubby species but is dominated by herbaceous plant species. The grassland community occurs in areas with direct sunlight such as ridge tops or south facing slopes. Dominant species in the foothills grassland community include native perennial cool season graminoids such as blue wildrye, green needlegrass, Sandberg bluegrass, and threadleaf sedge; native perennial warm season grasses such as blue grama grass, big bluestem, and little bluestem; native perennial forb species such as pasture sage, hairy false goldenaster, western yarrow, and Rocky Mountain penstemon; fringed sage, a native subshrub is also common.

FOOTHILLS RIPARIAN (R)

The corridors of the Arkansas Gulch drainage and Fourmile Creek are characterized by a foothills riparian community type that is dominated by shade tolerant plant species that require moist soils. Dominant plant species occurring along the riparian corridors include shrubby species such as Rocky Mountain maple, water birch, and black chokecherry; native perennial forb species such as ballhead waterleaf, Fendler's waterleaf, and spreading dogbane; and native perennial cool season grasses such as slender wheatgrass, and Canada wildrye.

WEEDY GRASSLAND (WG)

A weedy grassland community dominated by downy brome (a.k.a. "cheatgrass") is present in the eastern section of the study area (Figure 4). The Colorado Noxious Weed Act (CRS 35-5.5-101-119 (2003)) designates downy brome as a List C noxious weed (see below).

RARE PLANTS AND PLANT COMMUNITIES

No rare plants or plant communities have been identified by CNHP in the study area (CNHP 2006) and none were observed during the site visits. CNHP is considering a rare plant survey of the property in 2007 or 2008.

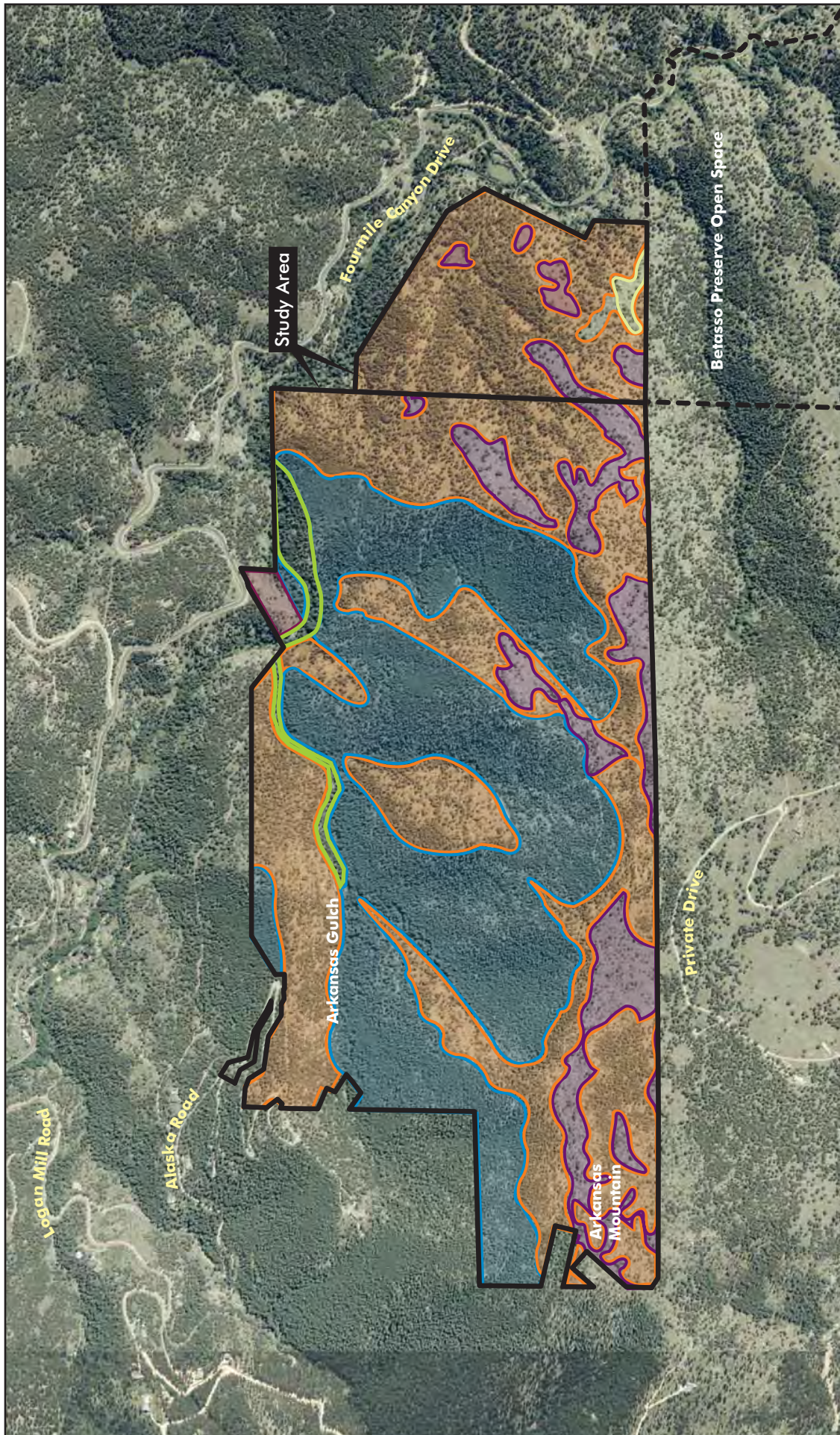






Figure 4
Vegetation Communities
 Prepared for: Boulder County Parks
 and Open Space
 File: 3920 Figure 4.pdf
 August 2007

Benjamin/Betasso RRA

-  Ponderosa pine forest
-  Douglas fir forest
-  Foothills grassland
-  Foothills riparian
-  Weedy grassland

0 1,000 2,000 feet

1 Inch = 1,000 feet

N 

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STATE NOXIOUS WEEDS

The authority and responsibility to formulate and implement a Noxious Weed Management Plan comes from Colorado Revised Statutes 35-5.5-101 et. seq., and the Colorado Weed Management Act (Act). The Act identifies both statewide and countywide noxious weeds and obligates all Colorado counties to use Integrated Weed Management (IWM) techniques to control them. Based on the site visits, two noxious weeds listed by the State occur in the study area.

- Downy brome is found scattered throughout the study area and dominates some grassland areas along the eastern ridgeline (Figure 4).
- Canada thistle occurs in small patches in the eastern section of the study area.

Table 1. Noxious weeds present in the study area.

Common Name	Scientific Name	Boulder County Weed List	State of Colorado Noxious Weed List
Downy brome	<i>Bromus tectorum</i>		C**
Canada thistle	<i>Cirsium arvense</i>	x	B*

* List B Species: The Colorado Department of Agriculture recommends that List B noxious weed species be managed by property owners and local governing bodies, though they are not required to do so (although other state or local jurisdictions may require such action).

** List C Species: The Colorado Department of Agriculture recommends that property owners and local governing bodies develop and implement noxious weed management plans. The goal of such plans will not be to stop the continued spread of these species, but to provide additional educational, research, and biological control resources to jurisdictions that choose to require management of List C species.

FOREST HEALTH

The three most common conifer forest types in the study area are ponderosa pine, Douglas-fir, and lodgepole pine. Each of these forest types has different characteristics for management consideration summarized in Table 2. During the site visits no significant damage from disease and insects was noted.

OLD GROWTH

An initial assessment of tree size and structural stage indicate old growth forest characteristics may be present in portions of the study area.

Old growth is a forest development stage that includes mature forest stands with a variety of attributes. Stands of old growth forest generally include both forests dominated by fire dependent species and forests dominated by shade tolerant species (Mehl 1992). Old growth forest characteristics are a function of several elements including age, size, density, structural condition, and ground cover. Old growth characteristics also vary with forest type (Mehl 1992).

Stands of old growth ponderosa pine are now relatively rare in the Front Range because of past logging and wildfire. However, individual old trees are not uncommon, and in many locations stands of trees that were too small to be cut during the settlement period are now around 200 years old, poised to become the old growth of the future (Huckaby et al. 2003).

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Table 2. Common characteristics of forested types in the study area.

Characteristic	Ponderosa Pine	Lodgepole Pine	Douglas-fir
Drought tolerance	High	Moderate	Moderate
Reaction to competition	Intolerant of shade	Very intolerant of shade and competition from other plant species	Ability to tolerate shade in the seedling stage, intermediate in overall shade tolerance
Susceptibility to windthrow	Low	Moderate — thinning can contribute to snow breakage, particularly if previously dense stands are opened suddenly	Low to moderate
Resistance to fire	High for mature trees in open woodlands due to thick bark	Low with entire stands replaced and 100 percent mortality at times	Crown fires, when they occur, destroy stands of all ages; the thick bark of older Douglas-firs, however, makes them fairly resistant to ground fires
Fire interval (presettlement)	1 to 47 years apart with most at 5- to 20-year intervals	100 or more years	Intermediate between ponderosa pine and lodgepole pine based on stand structure and composition
Typical fire intensity (presettlement)	Low intensity ground fires	High intensity crown fires	Variable, low intensity ground fires in association with ponderosa pine, higher intensities elsewhere
Primary insect pathogens	Mountain pine beetle (<i>Dendroctonus ponderosa</i>)	Mountain pine beetle (<i>Dendroctonus ponderosa</i>)	Douglas-fir beetle (<i>Dendroctonus pseudotsugae</i>) and western spruce budworm (<i>Choristoneura occidentalis</i>)
Dwarf mistletoe	<i>Arceuthobium vaginatum</i> subsp. <i>cryptopodum</i> in the Southwest	<i>Arceuthobium americanum</i> is the most widespread and serious parasite affecting lodgepole pine	<i>Arceuthobium douglassii</i> occurs throughout most of the range of Douglas-fir

Based on: Burns, Russell M., and Barbara H. Honkala (tech. cords.). 1990. Silvics of North America: 1. Conifers. Agriculture Handbook 654. U.S. Department.

WILDLIFE

The study area provides habitat for a variety of wildlife species that are typical of the Front Range foothills in Boulder County. Notable mammal species that have been observed in the study area or are likely to occur include black bear, mountain lion, elk, mule deer, fox, bobcat, and coyote (Barber and Forbes, pers. comm., 2007). During site visits, sign (i.e., scat and tracks) from bear, elk, mule deer, and coyote was observed. Other common mammals include mountain cottontail rabbit, western spotted skunk, raccoon, Abert's squirrel, least chipmunk, and a variety of mice and shrews.

The dense forests and open meadows in the study area provides habitat for a variety of migratory songbirds such as mountain bluebird, Stellar's jay, and evening grosbeak. Common raptors include red-tailed hawk, sharp-shinned hawk and flammulated owl. The rocky outcrops and cliffs provide potential habitat for peregrine falcon, which have been spotted in the area but are not known to be nesting in the study area (Barber and Forbes, pers. comm., 2007). The study area also supports potential habitat for the Northern goshawk, which characteristically nests in coniferous forests including those dominated by ponderosa pine or lodgepole pine or in mixed forests dominated by various coniferous species. Bird species observed during the site visits include pygmy nuthatch, western tanager, American robin, broad-tailed hummingbird, and gray-headed junco.

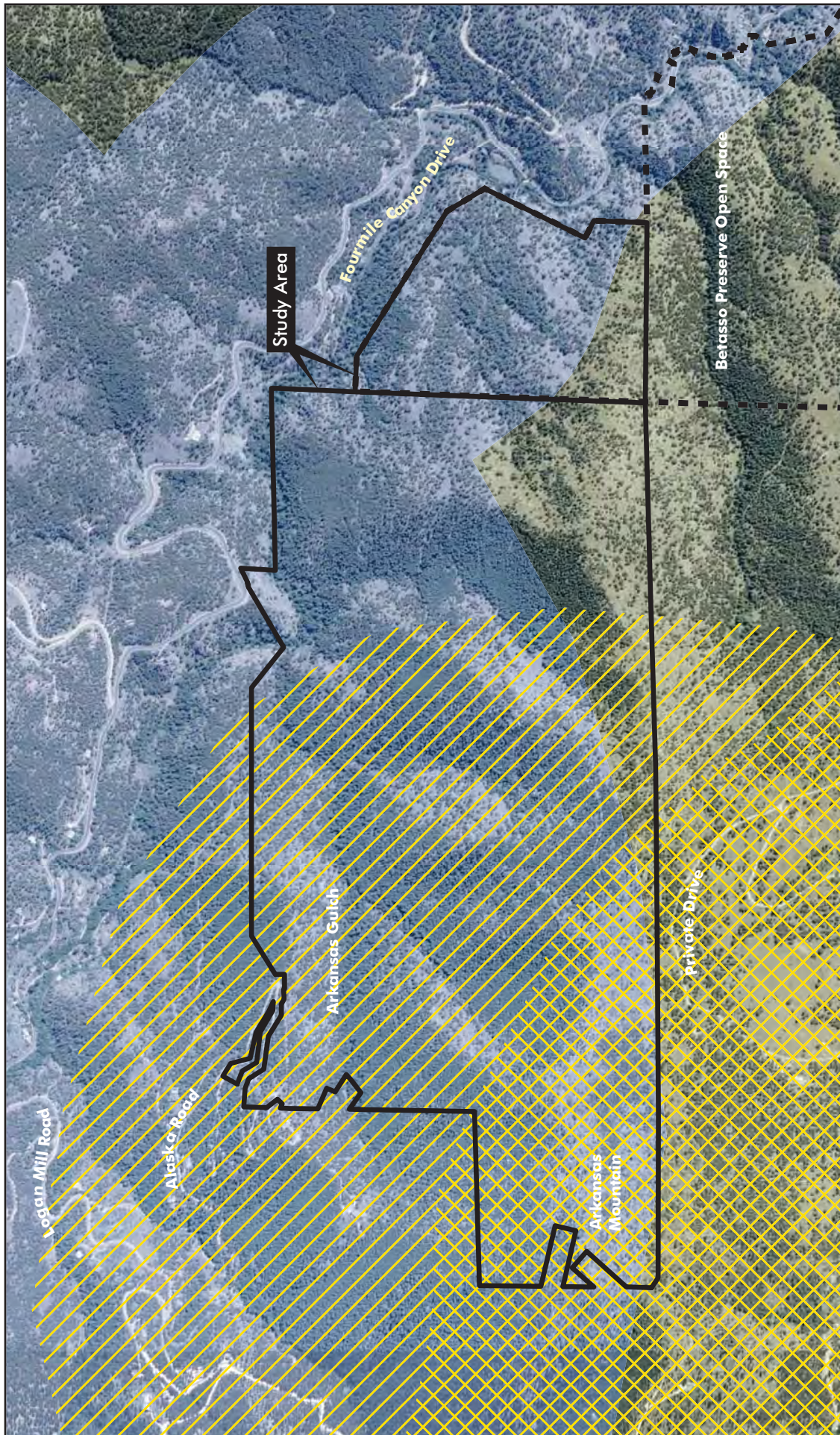
BLACK BEAR AND MOUNTAIN LION HABITAT

Acquisition of the Benjamin Property has raised particular concerns about the conservation of black bear and mountain lion habitat and the potential for human-wildlife conflicts. The study area provides habitat for both large mammals.

Black bear. Black bears are generalists, occupying a broad range of habitat types and persisting on seasonally available food sources (including grasses, forbs, berries, insects, small mammals, and carrion). They are reclusive animals, preferring rough topography and dense vegetation that provides escape cover. The number of bears in any particular area is usually low. Bears usually prefer rock cavities for den sites, but also use excavations under shrubs and trees (Armstrong et al. 1994). Bears commonly visit human areas in close proximity to their habitat, and have been observed in the residential subdivisions that surround the study area.




The study area contains habitat elements for black bear, including dense forest cover, berry-producing shrubs, riparian habitat, and rock bands and outcrops that provide potential denning sites. The Fourmile Creek and Aransas Gulch corridors, in particular, are likely concentration points and movement corridors for bears in the study area. It is likely that most of the property is widely traversed by bears. One potential bear sign (i.e., scat.) was observed on a game trail near the center of the study area. The study area is likely to support one or more bears. Indeed, most of the study area is designated by CDOW as a fall concentration area (see below and Figure 5).

Mountain lion. Mountain lions are found throughout Colorado, but are most common in rough foothill areas that include the study area. They primarily prey on deer, and most kills occur in brushy or wooded areas. They may also eat small mammals and occasional birds, fish, and insects. Mountain lions are solitary animals, and do not associate with other adult lions except for breeding. Mountain lions range widely and may cover over 20 miles in a day in search of food, and do not appear to be encumbered by physical



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-  Mountain Lion Human Conflict Area
-  Elk Severe Winter Range
-  Black Bear Fall Concentration Area



1 Inch = 1,000 feet



Note: Other CDOW wildlife designations within the study area, but not mapped are: elk winter range, mule deer winter range, black bear human conflict area, turkey winter range, and Canada lynx potential habitat.

**Figure 5
 CDOW Wildlife
 Designations**

Prepared for: Boulder County Parks
 and Open Space
 File: 3920 Figure 5.pdf
 August 2007

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barriers (Armstrong et al. 1994). However, in Boulder County, less available habitat and concentrated food sources (i.e., mule deer) may reduce territory size considerably (City of Boulder 2007).

Mountain lions have been seen and heard by neighboring residents throughout the Fourmile Creek corridor and on the upper ridge of Arkansas Mountain (Barber and Forbes, pers. comm., 2007). There is also significant evidence of mule deer movement and concentration (primarily scat and game trails) in clearings along the lower ridgelines and the open, upper ridgeline of Arkansas Mountain. Mule deer is the primary prey species of mountain lion. This evidence of mule deer concentrations is even more apparent on the east facing slopes between the Arkansas Mountain ridgeline and the Fourmile Creek corridor. It is likely that these open slopes on the east side of the study area, the Fourmile Creek riparian corridor, and the main east-west ridgeline (and associated departure ridges) serve as a movement corridors for both deer and mountain lion movements between Fourmile Creek and the large meadows and south-facing slopes outside of the study area to the south and southwest (Sugarloaf/Mountain Meadows area). In addition, the steep, dense forests and rock outcrops in the central portion of the study area provides potential denning habitat for mountain lion.

During the site visits, several old deer kills (consisting only of bones) were observed. No other physical evidence of mountain lions was observed.

Mountain lions are known to use the study area for hunting, movement, and possibly denning. These and other habitat elements in the study area are just as significant as other undeveloped areas in the greater Boulder foothills region (Solohub, pers. comm. 2007).

COLORADO DIVISION OF WILDLIFE DESIGNATIONS

According to the Colorado Division of Wildlife Natural Diversity Information Source (NDIS) database, the study area has the following wildlife habitat designations:

- *Elk* – Winter range, severe winter range
- *Mule Deer* – Winter range
- *Black Bear* – Fall concentration area, human conflict area
- *Mountain Lion* – Human conflict area
- *Turkey* – Winter range
- *Canada Lynx* – Potential habitat

THREATENED, ENDANGERED AND CANDIDATE SPECIES

According to the NDIS and CNHP databases for the area, there are no threatened or endangered species in the study area (NDIS 2007).

The study area contains potential habitat for the Canada lynx, which is federally-listed as Threatened and state-listed as Endangered. While portions the study area have been mapped as potential lynx habitat (based on regional, coarse-scale habitat mapping), it is very far from what is considered to be “core” habitat for Colorado populations (CDOW 2006), is on the periphery of potential habitat, and does not support the types of mixed montane to subalpine forests that are favored by the species and its prey (Armstrong et. al 1994). For these reasons, it is highly unlikely that any lynx occur in the study area, or that the study area could support a sustainable lynx population in the future.

CULTURAL RESOURCES

OAHP FILE SEARCH

The Colorado Historical Society Office of Archaeology and Historic Preservation (OAHP) conducted a search of the Colorado Inventory of Cultural Resources database for the study area (OAHP 2007). This database contains information on documented federal or state studies or findings regarding any cultural resources. According to the search, one cultural or historic site occurs in the study area. This site, the Little Ginny mine site (OAHP ID 5BL.2400), is located on or near the eastern boundary of the Betasso Preserve, just west of Fourmile Creek.

OTHER RESOURCES AND DESIGNATIONS

Several mine shafts, adits, prospect holes, and mine access roads, probably from the late 1800s and early 1900s, were observed in the study area. Most of these sites have not been inventoried and their historical significance is not known. An old railroad grade, part of the Switzerland Trail rail line, follows the south bank of Fourmile Creek through the northeast corner of the study area. This was most likely used by the Colorado and Northwestern Railroad Company (which later became the Denver, Boulder & Western Railroad). Other potential unidentified cultural resources may exist within the study area.

The Fourmile Creek corridor area, which includes the northeast portions of the study area, is designated an Archaeologically Sensitive Area in the Boulder County Comprehensive Plan (Boulder County 2007a).

EXISTING SOCIAL TRAILS AND SOCIAL ACCESS

Under the private ownership of the Benjamin property, the study area had been used for years by mountain bikers, equestrians, and hikers, mostly without the previous landowner's knowledge or permission. These trails were not designed or constructed by professionals. Consequently, a network of existing social trails are present and are used by neighbors and the general public. Active trail construction by these users is also evident within the study area. The study area has the potential to provide trail connections between the Benjamin Property and the existing designated trails in the Betasso Preserve to the south.

Known social trails in the study area, and their potential impacts, are described below. Trail locations are shown in Figure 6. (Trail names are for descriptive purposes only).

SOCIAL TRAIL A

From the access point on Alaska Road, a well-used social trail heads west to the property boundary, briefly crosses onto private property, and then follows Arkansas Gulch east to Fourmile Creek. At that point, it follows the Switzerland Trail railroad grade for about ¼ mile to where it exits the study area near the location of a rudimentary footbridge across Fourmile Creek. This social trail eventually leads to Fourmile Canyon Drive, by climbing to the north across a Bureau of Land Management-owned parcel, or continuing east across private land.

- **Access and Use:** Use of this trail appears to be dominated by mountain bikers, and access appears to primarily be from Alaska Road.

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- **Trail Condition:** This trail appears to be in fair to poor condition.¹ Several steep sections show signs of erosion, vegetation trampling, downcutting, and braiding.
- **Potential Impacts:** Soil erosion from some of the steep sections, combined with numerous crossings of the intermittent Arkansas Gulch drainage, could impact the quality and function of the natural resources in gulch over the long term. While no noxious weeds were observed along this trail, increased trail use could introduce weed species to this corridor. The location of this social trail along the densely-vegetated valley bottom may also fragment this habitat and diminish its value to wildlife. Such habitat fragmentation and wildlife disturbance would increase with increased use of the trail.

SOCIAL TRAIL B

From access points at the western edge of the study area, a well-used social trail traverses the open meadows and forests along the western half of the main Arkansas Mountain ridgeline, and then follows an old mining road around a large rock outcrop. Midway across the study area, on the east side of the rock outcrop, the social trail begins to descend steeply along the ridgeline towards Fourmile Canyon and the Betasso Preserve. Before reaching Fourmile Canyon, this social trail cuts back to the west (and out of this study area), descends along a small drainage to the east, and then splits with one fork climbing back to connect with the designated Canyon Loop Trail in Betasso Preserve Open Space. The other fork descends steeply to reach Fourmile Canyon Drive.

- **Access and Use:** Use of this social trail appears to be dominated by mountain bikers, though some evidence of horse use in the western half was observed. Access to this social trail appears to primarily be from the Sugarloaf Road/Mountain Meadows Road areas to the southwest.
- **Trail Condition:** This trail is in mostly poor condition. Most of the western half of this social trail appears to be in fair condition, though there are some instances of erosion, downcutting, and braiding. East of the rock outcrop, the trail takes on a different character as it descends rapidly. Most of this long, steep, and technical trail is in poor condition, goes directly down the fall line and resulting in severe erosion and downcutting in some places. The lower portion of this social trail, where it bends to the south towards the Betasso trails (and out of the study area), is in fair to poor condition.

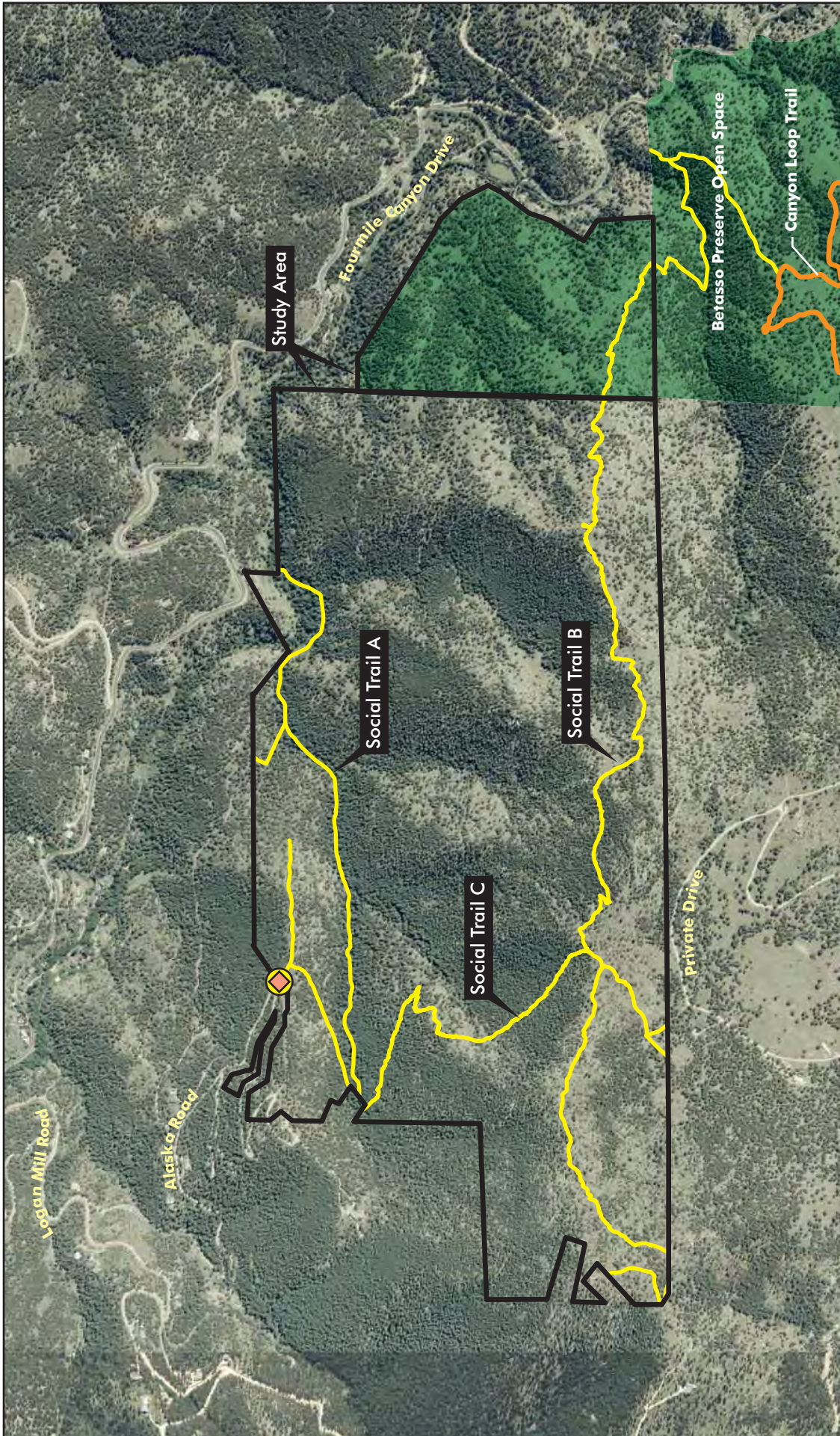
¹ Social trail condition descriptions generally meet the following general criteria, based on field observations:

“fair condition”



- 1) does not follow the vertical fall-line, but instead cuts across the slope
- 2) shows few signs of erosion or downcutting (gullies)
- 3) follows a single consistent tread, rather than a braided pattern
- 4) shows little indication of skidding, washouts, or vegetation trampling

“poor condition”

- 1) follows fall line
- 2) severe erosion and gullies are evident
- 3) trails are braided or widened
- 4) washouts and vegetation trampling are evident
- 5) slopes exceed 15%.



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-  Social trail
-  Legal access point



1 Inch = 1,000 feet



**Figure 6
Existing Social Trails**

Prepared for: Boulder County Parks
and Open Space

File: 3920 Figure 6.pdf

August 2007

Note: Social trails outside of the Benjamin Property and Betasso Preserve are on private property. Unless an individual has permission from the private landowner, using the said social trail constitutes trespass.

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Potential Impacts: Trail braiding and downcutting on this trail could contribute to increased soil erosion and an increased risk of noxious weed dispersal. The more severe conditions along the eastern half of this trail (as it descends the east ridge of Arkansas Mountain) could contribute to additional trail braiding, vegetation trampling, and more exposed soil, potentially spreading downy brome and other weed species along this and other trail corridors. These impacts would be exacerbated by increased public use of this social trail. As it descends the ridge, this social trail crosses the open meadows that are likely to serve as a wildlife corridor between Fourmile Creek and areas to the south and southwest (see *Wildlife* section). Human presence in this area could reduce its value for wildlife.

SOCIAL TRAIL C

From the westernmost point along “Social Trail A” below the Alaska Road access point, this social trail climbs steeply through the forest towards the upper ridgeline, meeting “Social Trail B” in the western portion of the ridgeline. The northwest portion of this social trail most likely crosses onto private property.

- **Access and Use:** Use of this social trail appears to be dominated by mountain bikers and hikers. Access is from both Alaska Road and “Social Trail B” along the Arkansas Mountain ridgeline.
- **Trail Condition:** As it climbs through the forest, most of this social trail appears to be in fair condition. However, one section of trail where it climbs through an open clearing is very steep and shows significant erosion, trampling, and braiding. A short, steep section near the top of this trail also shows signs of erosion and downcutting. These sections are in poor condition.
- **Potential Impacts:** The erosion and braiding along the steep sections of this trail could further degrade the surrounding landscape by expanding over time, and by increasing the potential for noxious weed infestations. While this social trail is reasonably close to the western edge of the study area, it is the only trail that crosses the central core of habitat. This potential habitat fragmentation is particularly apparent when viewed in context with the undeveloped private land to the west.

LOWER BETASSO AREA

Several faint trails traverse the lower contour of the study area, running parallel to Fourmile Creek. While one faint route is identified by blue tape on trees, the various routes are poorly defined and do not show signs of frequent use.

- **Access and Use:** Use of these trails appears to be dominated by hikers and equestrians, though no consistent use between any particular access points is readily apparent.
- **Trail Condition:** Social trails in this area are generally faint and inconsistent. In many areas a defined trail tread disappears into grassy vegetation. No erosion or other issues were observed.
- **Potential Impacts:** Current levels of use on these faint trails does not pose any risk of physical impacts. However, given the importance of this habitat

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area for wildlife movement, increased human presence and use in this area could lead to increased wildlife disturbance and habitat fragmentation.

PUBLIC ACCESS

While several points of access to the social trails in the study area were observed, there is only one that does not cross private property. This one legal access point is from Alaska Road (Figure 6). This legal access point is located on a switchback along a narrow, mountain road and provides very limited and unsafe parking opportunities (limited to 2 or 3 vehicles). A proliferation of vehicles in this area could potentially complicate access to nearby residences and compromise emergency and fire access to those areas. Other access points are across private property and should not be encouraged or relied upon.

Future management of the study area should consider legal and safe public access.

ADDITIONAL RESOURCES

RECREATION VALUES

As described previously, social trails are currently used within the study area. Mountain cyclists value the ability to ride a combination of roads and trails that allow longer rides and connections between canyons in Boulder County. Equestrians and hikers value the serene landscape and solitude of the Benjamin property. The study area could provide an opportunity to provide both recreation experiences to the public.

OPEN SPACE AND SCENIC VALUES

Several prominent viewpoints along the upper ridgeline provide views of Fourmile Canyon to the north, the Betasso/Boulder Canyon area to the south, and the City of Boulder and the Flatirons to the east. The highpoint of the study area on Arkansas Mountain provides a panoramic view of Sugarloaf Mountain and the Indian Peaks/Continental Divide to the west.

The study area provides scenic enjoyment for the general public and will yield a significant public benefit. The study area adds to the scenic character of the local rural landscape in which it lies, and provides a degree of openness, contrast, and variety to the overall landscape. Significant portions of the study area are visually accessible to the general public from Fourmile Canyon Drive, which is open to and actively utilized by residents of Boulder County and the State of Colorado.

LOCAL PLANNING DESIGNATIONS

The entire study area is currently zoned Forestry (Boulder County 2007b).

Boulder County Comprehensive Plan designations (Boulder County 1999) in the study area include:

- Open Corridor, Roadside and Streamside
- Stream Habitat Connector
- Archaeologically Sensitive Area

The Boulder County Land Use Department has designated most of the study area to have a Very High Wildfire Hazard rating, based on the characteristics of slope, aspect, and vegetative fuel types (Boulder County 2000).

STATE BYWAY/SPECIAL DESIGNATIONS

The study area is not included in any Colorado Scenic and Historic Byway.

LAND USE AND MANAGEMENT

HISTORICAL LAND USE AND MANAGEMENT

The study area has been historically used for mining, limited forestry, and grazing.

CURRENT LAND USE AND MANAGEMENT

No evidence of any resource management activity is apparent in the study area. Under private ownership, the area had been used for recreational access, including mountain biking, hiking, and equestrian use, mostly without the landowner's permission.

PROPERTY IMPROVEMENTS AND LEGAL CONSIDERATIONS

STRUCTURES

No structures were observed in the study area.

INFRASTRUCTURE

An old barbed-wire fence follows most of the south boundary. In most places, the fence is lying on the ground and few upright fence posts remain. Several old mining roads were observed in the study area.

A USGS Survey marker and associated signs were identified along the southern boundary near the western edge of the study area (South 1/2 Section 20). Two other survey posts were observed along the southern boundary farther east (presumably delineating the corners of the adjacent County conservation easement).²

WATER AND MINERAL RIGHTS

Purchase of the Benjamin Property did not include any water rights. However, the County received a quitclaim deed for all surface and subsurface water and water rights, ditches and ditch rights, ponds and pond rights, springs and spring rights, wells and well rights, whether decreed or not, if any, owned by Seller and attached or appurtenant to or used in connection with the property purchased in fee, and all of Seller's interest in any and all minerals appurtenant to the property purchased in fee

Several mineral rights have been severed, leased, or otherwise conveyed from the surface estate over time and it is possible that a third party holds some or all mineral interests. The Title to the property contains exceptions for several rights to minerals, ores, and metals of any kind and character, as well as the right of ingress and egress (without the owner's permission) for the purpose of mining, together with enough of the surface land that is necessary for the proper and convenient working of such minerals and substances.

² The GPS locations of these posts do not match the known property boundary. The reason for this disparity is not known.

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EASEMENTS AND RIGHTS-OF-WAY INFORMATION

Surface grazing rights on the Benjamin Property were reserved in 1934 and are not included in the deed. Additional severed rights include potential rights-of-way for ditches and canals, as well as any rights that may exist in and to Arkansas Gulch and Four Mile Creek.

MUNICIPAL/COUNTY REGULATIONS

The study area is currently zoned Forestry (Boulder County 2007b).

GOVERNMENT POLICIES IN SUPPORT OF THE PRESERVATION OF THE OPEN SPACE

Acquisition of the Benjamin Property and management of lands within the study area is consistent with the mission of Boulder County Parks and Open Space “to conserve natural, cultural, and agricultural resources and provide public uses that reflect sound resource management and community values.”

NEIGHBORING LAND USE AND OWNERSHIP

Land use and ownership surrounding the study area is dominated by private residences, private conservation land, and other publicly-owned lands.

- Private residential areas consist of both large- and small-lot parcels. Most of these are associated with existing subdivisions, while others are large-lot rural residences, and some are located on former mining claims.
- Three neighboring parcels are privately-owned lands that are protected by conservation easements owned by Boulder County.
- Publicly-owned lands include the greater Betasso Preserve to the south, and a small tract of land owned by the Bureau of Land Management which lies between the northern boundary of the study area and a portion of Fourmile Canyon Drive.

MANAGEMENT CONSIDERATIONS

HABITAT PROTECTION

From a regional perspective, this study area is one of the largest patches of contiguous habitat in the Boulder foothills. Two of the existing trails and other disturbances are on the periphery of the study area, leaving a piece of central core habitat area that is unfragmented by roads and trails and sees little, if any, human disturbance. This area is known to support habitat for black bear and mountain lion, in addition to many other wildlife species. While the long-term conservation of the Benjamin Property will protect habitat values from development, the management of habitat, trails, and public use should seek to maintain the integrity and continuity of the core habitat area. In particular, any future trail planning should avoid Arkansas Gulch as much as possible to minimize long-term wildlife impacts. The known natural resource values in Benjamin property warrant the need for natural resource surveys to be conducted in the future, so a more accurate picture of the wildlife and vegetation resources are known for responsible property management.

FUTURE PUBLIC USE AND TRAILS

In general, social trails have the potential to adversely impact natural resources due to a variety of factors including increased erosion, noxious weed dispersal, vegetation trampling, habitat fragmentation, and wildlife disturbance. While well-planned, designated trails can minimize these impacts, no trails or public uses in the natural environment are free of these or other impacts. Planning for potential future public use and trails in the study area should carefully consider the physical (erosion, weeds, vegetation) and ecological (wildlife disturbance and habitat fragmentation) impacts of existing or future trails, and ways to accommodate an appropriate level of public use while minimizing those impacts.

All of the existing social trails in the study area have some areas in poor condition (with erosion, downcutting, and other limitations) that are not sustainable. Both Social Trails A and C include sections that are in fair condition, and others that are in poor condition. The eastern half of Social Trail B almost entirely consists of a steep, erosive, and unsustainable trail. These issues are apparent within the current context of limited and sporadic use and would only become worse as the number of trail users increases.

If public use to the study area is accommodated for the short- or long-term, many of the existing social trails would need to be improved, re-constructed, or entirely re-routed to minimize impacts and maintenance problems. If public use is not permitted in the future on any or all of the trails, many of the existing social trail sections that are steep, erosive, and generally not sustainable should be closed, revegetated, and monitored to ensure long-term restoration.

As shown in Figure 6 and described previously, most of the existing access points cross private land, while the only legal access point has its own limitations (parking capacity and emergency access). Any future planning for public use of the study area should also carefully consider safe and legal access points.

FOREST HEALTH

Maintaining a healthy, open forest through some initial thinning, a prescribed burning program, and disease inspection is the best way to maintain a healthy forest and reduce potential infestation from disease and insects. Treatments should be site-specific and depend on a number of factors including slope, aspect, soils, fuel loads, understory vegetation, and forest stand structure. Forest management should be in accordance with the Boulder County Comprehensive Plan and include—

- An assessment of overall forest conditions through forest inventories and surveys.
- Implementation of prescriptions based on the results of these inventories and surveys.
- Action to change or increase tree health and vigor.
- A reduction of fire danger.
- Maintenance or improvement of wildlife habitat.
- Maintenance and preservation of the aesthetic and ecological value of the forest.

WEED MANAGEMENT

Weed management should focus on efforts to control downy brome on the eastern ridgeline through the study area. While it is very difficult to successfully eradicate this species from an area, special consideration should be taken to contain it and minimize its spread. The potential spread of downy brome and other noxious weeds should be

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considered as part of an overall strategy for resource management, trails, and public access in the study area.

MINE SAFETY

Several open mine shafts, pits and addits have been identified in the study area. Century-old mine tunnels present severe safety risks to the public due to unstable slopes and tunnels, drop-offs, toxic fumes, wildlife conflicts, and other dangers. While no such hazards were observed within view of the existing social trails, they do occur in the study area and can become a danger to those who wander off trail. Should continued public use be allowed on the property, certain measures should be taken to minimize risks, including:

- Permanently close (with a metal grate that allows continued bat movement) open tunnels and shafts within close proximity of trails or designated public use corridors
- Cover or otherwise close any known vertical shafts or other exceptional hazards (even outside of public use area)
- Monitor and manage off-trail use in areas of the property that are not designated for public use

ENCROACHMENT

A small (roughly 2”) plastic pipe was observed in a drainage on the eastern edge of the study area, adjacent to residences along Fourmile Creek Drive. The pipe appeared to run several hundred feet between a seep/spring on open space property and an aboveground cistern on private land. This and other types of encroachment on open space land should be monitored and managed.

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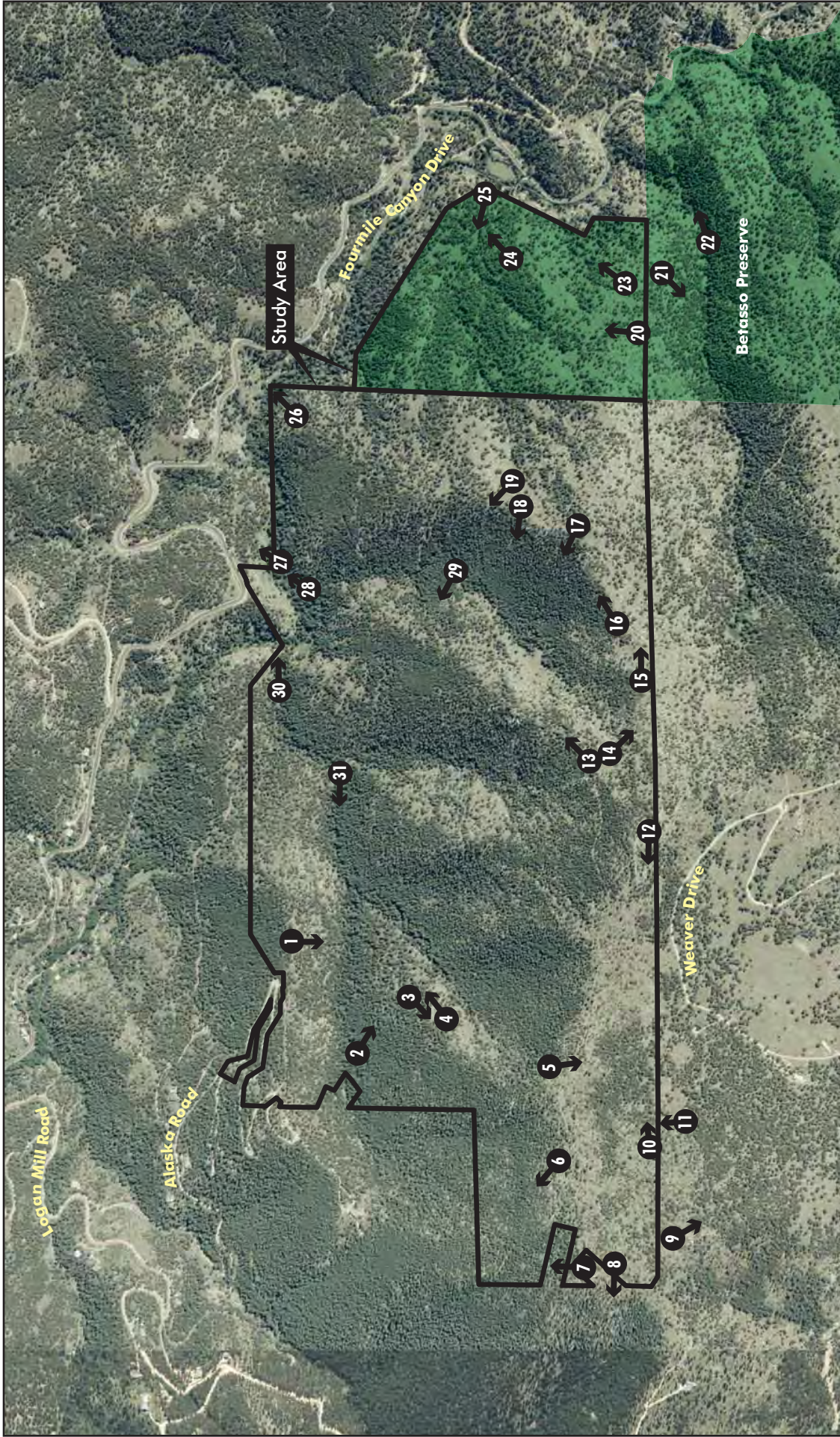
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**Benjamin/Betasso Open Space
Rapid Resource Assessment**

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APPENDIX A
PHOTO POINT MAP AND DOCUMENTATION



ERO
 ERO Resources Corp.
 1842 Clarkson Street
 Denver, CO 80218
 (303) 830-1188
 Fax: (303) 830-1199

Benjamin/Betasso RRA

Photo Point



1 Inch = 1,000 feet

Appendix A
Photo Point Map

Prepared for: Boulder County Parks
 and Open Space
 File: 3920 Appendix A.pdf
 August 2007

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 1 - View south from north edge of study area near Alaska Road.



Photo 2 - Social Trail C near the west boundary

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 3 - Steep section along Social Trail C



Photo 4 - View northeast from clearing along Social Trail C

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 5 - Steep section near the top of Social Trail C



Photo 6 - Looking west along upper ridgeline, Social Trail B

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 7 - View north near west boundary



Photo 8 - View west along west boundary



Photo 9 - Sign along trail near the southwest corner of the study area



Photo 10 - View east along southern boundary of study area

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 11 - Survey point along southern boundary of study area



Photo 12 - View west from rocky high point along southern boundary

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 13 - View northeast from rock outcrop near Social Trail B



Photo 14 - Social Trail B before it begins to descend

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 15 - Old fenceline along the southern boundary



Photo 16 - Social Trail B descending the east ridgeline

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 17 - Steep, eroding trail along east ridgeline



Photo 18 - View west across broad valley near the center of the study area

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 19 - Open clearing along ridgeline, looking northwest



Photo 20 - Clearing dominated by downy brome (cheatgrass)

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 21 - Social Trail B heading south towards Betasso trails



Photo 22 - Trail along narrow drainage in Betasso area

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 23 - Lower slopes of Betasso area looking northeast



Photo 24 - Summer coralroot on the forest floor

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 25 - Water pipe along east boundary of Betasso



Photo 26 - Northeast property corner

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 27 - Footbridge across Fourmile Creek near the north boundary



Photo 28 - Social Trail A along old railroad grade

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 29 - Open mine tunnel near the center of the study area



Photo 30 - Social Trail A along Arkansas Gulch

**BENJAMIN/BETASSO RAPID RESOURCE ASSESSMENT
PHOTO POINT DESCRIPTIONS**



Photo 31 - Steep section of Social Trail A along Arkansas Gulch

APPENDIX B
PLANT SPECIES

APPENDIX B: PLANT SPECIES
(Observed during the May 30, 2007 Site visit)

Species Name	Common Name	Synonym	Ponderosa Pine Forest	Douglas Fir Forest	Foothills Grassland	Foothills Riparian
Native Annual/Biennial Forbs						
Chenopodium leptophyllum	narrowleaf goosefoot		■			
Cirsium undulatum	wavyleaf thistle		■			
Collinsia parviflora	maiden blue eyed Mary		■			
Erigeron divergens	spreading fleabane		■			
Erysimum asperum	western wallflower					■
Grindelia squarrosa	curlycup gumweed		■		■	
Oreocarya virgata	miner's candle	Cryptantha virgata				■
Introduced Annual/Biennial Forbs						
Alyssum parviflorum	smallflowered alyssum	Alyssum simplex			■	
Camelina microcarpa	littlepod false flax				■	
Lactuca serriola	prickly lettuce		■			
Tragopogon dubius ssp. major	yellow salsify				■	
Verbascum thapsus	common mullein		■			
Native Perennial Forbs						
Achillea lanulosa	western yarrow	Achillea millefolium	■			
Adenolinum lewisii	prairie flax	Linum lewisii	■			
Allium textile	textile onion		■			
Ambrosia psilostachya var. coronopifolia	Cuman ragweed		■	■		
Amerosedum lanceolatum	spearleaf stonecrop	Sedum lanceolatum	■		■	
Antennaria rosea	rosy pussytoes				■	
Apocynum androsaemifolium	spreading dogbane					■
Artemisia ludoviciana	pasture sage		■		■	
Cerastium strictum	field chickweed	Cerastium arvense	■			
Corallorhiza maculata	summer coralroot					■
Delphinium ramosum	mountain larkspur		■	■		
Eriogonum umbellatum	sulphur-flower buckwheat		■			
Fragaria virginiana ssp. glauca	Virginia strawberry		■			
Galium septentrionale	northern bedstraw	Galium boreale	■			
Harbouria trachyleura	whiskbroom parsley		■			
Helianthus pumilus	little sunflower		■			
Heterotheca villosa	hairy false goldenaster		■			

Species Name	Common Name	Synonym	Ponderosa Pine Forest	Douglas Fir Forest	Foothills Grassland	Foothills Riparian
<i>Heuchera hallii</i>	Front Range alumroot			■		
<i>Hydrophyllum capitatum</i>	ballhead waterleaf					■
<i>Hydrophyllum fendleri</i>	Fendler's waterleaf					■
<i>Ipomopsis aggregata</i>	scarlet gilia		■	■		
<i>Lesquerella montana</i>	mountain bladderpod		■			
<i>Liatris punctata</i>	gayfeather, dotted blazing star		■	■		
<i>Lupinus</i> sp.	lupine					■
<i>Mertensia lanceolata</i>	prairie bluebells				■	
<i>Monarda fistulosa</i> var. <i>mentifolia</i>	mintleaf bergamot					■
<i>Osmorhiza depauperata</i>	bluntseed sweetroot	<i>Osmorhiza obtusa</i>	■			
<i>Oxytropis lambertii</i>	purple locoweed				■	
<i>Paronychia jamesii</i>	James' nailwort		■			
<i>Penstemon angustifolius</i>	broadbeard beardtongue				■	
<i>Penstemon secundiflorus</i>	sidebells penstemon		■			
<i>Penstemon strictus</i>	Rocky Mountain penstemon				■	
<i>Phacelia heterophylla</i>	varileaf phacelia				■	
<i>Phlox multiflora</i>	Rocky Mountain phlox		■		■	
<i>Rubus idaeus</i> ssp. <i>melanolasius</i>	grayleaf red raspberry		■			
<i>Scutellaria brittonii</i>	Britton's skullcap			■		
<i>Thelesperma megapotamicum</i>	Hopi tea greenthread		■			
<i>Thermopsis rhombifolia</i>	prairie thermopsis				■	
<i>Tradescantia occidentalis</i>	prairie spiderwort		■			
<i>Vaccinium myrtillus</i> ssp. <i>oreophilum</i>	whortleberry		■			
<i>Viola nuttallii</i>	Nuttall's violet		■			
Introduced Perennial Forbs						
<i>Galium verum</i>	Yellow Spring bedstraw		■			
<i>Hypericum perforatum</i>	common St. Johnswort		■			
<i>Taraxacum officinale</i>	common dandelion		■			■
Introduced Annual Grasses						
<i>Anisantha tectorum</i>	cheatgrass	<i>Bromus tectorum</i>	■			
Native Perennial Cool Season Graminoids						
<i>Carex filifolia</i>	threadleaf sedge		■		■	
<i>Carex pensylvanica</i> ssp. <i>heliophila</i>	sun sedge	<i>Carex heliophila</i>	■			

Species Name	Common Name	Synonym	Ponderosa Pine Forest	Douglas Fir Forest	Foothills Grassland	Foothills Riparian
<i>Ceratochloa carinata</i>	mountain brome, California brome	<i>Ceratochloa marginata</i>	■			
<i>Critesion jubatum</i>	foxtail barley	<i>Hordeum jubatum</i>	■			
<i>Elymus glaucus</i>	blue wildrye		■			
<i>Hesperostipa comata</i>	needle and thread	<i>Stipa comata</i>	■		■	
<i>Koeleria macrantha</i>	prairie Junegrass	<i>Koeleria gracilis</i>	■			
<i>Nassella viridula</i>	green needlegrass	<i>Stipa viridula</i>			■	
<i>Poa agassizensis</i>	Agassiz bluegrass		■			
Introduced Perennial Cool Season Grasses						
<i>Dactylis glomerata</i>	orchardgrass					■
<i>Festuca ovina</i>	sheep fescue				■	
<i>Poa pratensis</i>	Kentucky bluegrass					■
Native Perennial Warm Season Grasses						
<i>Andropogon gerardii</i>	big bluestem		■		■	
<i>Chondrosium gracile</i>	blue grama grass	<i>Bouteloua gracilis</i>	■			
<i>Schizachyrium scoparium</i>	little bluestem	<i>Andropogon scoparium</i>				■
Native Subshrubs						
<i>Artemisia frigida</i>	prairie sagewort		■		■	
Native Shrubs						
<i>Acer glabrum</i>	Rocky Mountain maple		■		■	■
<i>Arctostaphylos uva-ursi</i>	kinnikinnick					
<i>Ceanothus fendleri</i>	Fendler's ceanothus		■		■	
<i>Cercocarpus montanus</i>	alderleaf mountain mahogany		■			
<i>Juniperus communis</i> ssp. <i>alpina</i>	common juniper		■			
<i>Mahonia repens</i>	creeping barberry		■			
<i>Oreobatus deliciosus</i>	Boulder raspberry	<i>Rubus deliciosus</i>	■			
<i>Padus virginiana</i> ssp. <i>melanocarpa</i>	black chokecherry	<i>Prunus virginiana</i> ssp. <i>melanocarpa</i>		■		■
<i>Rhus aromatica</i> ssp. <i>trilobata</i>	skunkbush sumac	<i>Rhus trilobata</i>	■		■	
<i>Ribes cereum</i>	wax currant		■			
<i>Ribes inerme</i>	whitestem gooseberry		■			
<i>Rosa sayi</i>	prickly rose	<i>Rosa acicularis</i> ssp. <i>sayi</i>		■		■
<i>Rosa woodsii</i>	Woods' rose					■
<i>Symphoricarpos rotundifolius</i>	roundleaf snowberry	<i>Symphoricarpos oreophilus</i>		■		
<i>Toxicodendron rydbergii</i>	western poison ivy					■

Species Name	Common Name	Synonym	Ponderosa Pine Forest	Douglas Fir Forest	Foothills Grassland	Foothills Riparian
Native Trees						
Betula fontinalis	water birch	Betula occidentalis				■
Pinus ponderosa ssp. scopulorum	ponderosa pine		■			
Populus angustifolia	narrowleaf cottonwood					■
Populus deltoides ssp. monilifera	plains cottonwood					■
Populus tremuloides	quaking aspen		■		■	
Pseudotsuga menziesii	Douglas-fir		■			
Sabina scopulorum	Rocky Mountain juniper	Juniperus scopulorum	■		■	
Native Succulents						
Opuntia macrorhiza	twistspine pricklypear		■			
Opuntia polyacantha	plains pricklypear			■		■
Pediocactus simpsonii	Simpson hedgehog cactus		■			
Native Agavoids						
Yucca glauca	soapweed yucca			■		

APPENDIX C
REPORT PREPARERS

William J. Mangle *Natural Resource Planner***Education**

M.S. 2001, Natural Resource Policy and Planning, University of Michigan School of Natural Resources and Environment

B.A. 1996, History/Political Science, Colorado College

BACKGROUND

Bill has a broad background in natural resource and open space planning, natural resource assessments, NEPA documentation, and water resource studies throughout Colorado and the intermountain West. He has a sound understanding of environmental and land use planning, natural resource policy, biological sciences, and GIS mapping. This interdisciplinary background of technical and professional skills has enabled Bill to effectively coordinate diverse project teams. Bill's comprehensive approach to natural resource problems and issues enables him to develop workable and sustainable solutions.

SUMMARY OF EXPERIENCE

Natural Resource and Open Space Planning. Bill has considerable experience in completing effective natural resource management, open space conservation, and recreational use plans. His project experience includes baseline inventories, open space master plans and management plans, recreational trail planning, and regional conservation plans.

NEPA Documentation. Bill has worked on both large- and small-scale projects that require NEPA compliance. He has experience with all aspects of the NEPA process, from public scoping to impact assessment, and is able to develop clear, effective documentation.

Natural Resource Investigations. Bill has conducted and coordinated several projects involving natural resource assessment, permitting, planning, and protection. He is knowledgeable in a broad range of federal, state, and local statutes governing wetlands, threatened and endangered species, and infrastructure development, and has worked to balance project implementation with environmental protection.

Water Resources. Bill's work on water resource planning efforts ranges from regional water supply studies to basin or stream-specific vegetation and evapotranspiration studies. He is familiar with water law and policy in several states, and recognizes the growing importance of water rights and water supply in community development and environmental planning.

Representative Projects *William J. Mangle*

Natural Resource and Open Space Planning

Lafayette Open Space and Trails Master Plan, CO

Project manager and primary planner for an open space and trails master plan that includes prioritized open space recommendations, comprehensive trail recommendations, and issue-specific objectives and strategies for plan implementation.

St. Vrain Trail Master Plan, Boulder County, CO

Project manager and primary planner for a recreational trail plan balancing effective trail development and environmental protection along the ecologically sensitive St. Vrain Creek corridor.

Middle Snake Supplemental Management Plan, ID

Developed a Supplemental Management Plan for the Northwest Power and Conservation Council to distill recommendations in the existing Management Plan into a format for strategic implementation.

Blodgett and High Chaparral Open Space Master Plans, Colorado Springs, CO

Completed baseline inventories and assisted with site master plans and public involvement for two open space acquisitions encompassing shrubland, mixed grass prairie, and ponderosa pine communities.

Cherry Creek Open Space Conservation and Stewardship Plan, Denver, Arapahoe, and Douglas Counties, CO

Assisted with resource composite mapping and public involvement for the completion of a regional watershed conservation plan for the multi-jurisdictional Cherry Creek Basin.

Bluff Lake Natural Area Management Plan, Denver, CO

Conducted site management, monitoring, and resource planning recommendations for a nature preserve in Denver's Stapleton redevelopment area.

Huron River Greenway Trail, Washtenaw County, MI

Developed a master plan for multi-use trail alternatives for the Huron River corridor.

NEPA Documentation

Bison and Elk Management Plan and EIS, Jackson Hole, WY

Cumulative impact assessment, public comment evaluation, and general project management

assistance to complete NEPA documentation to support bison and elk management planning on the National Elk Refuge and Grand Teton National Park.

Rocky Flats National Wildlife Refuge Comprehensive Conservation Plan and EIS, Jefferson and Boulder Counties, CO

Core planning team member for the Rocky Flats CCP and EIS process to identify and analyze resource management and public use alternatives for the future Refuge. In 2006, this effort earned the Outstanding Plan Award from the U.S. Fish and Wildlife Service.

Northwest Corridor Transportation Study EIS, Jefferson County, CO

Natural resource investigations and project coordination for a comprehensive transportation study for the northwest region of the Denver metropolitan area.

Natural Resource Investigations

San Luis Valley Regional Habitat Conservation Plan, CO

Project coordination and HCP development for the endangered Southwestern willow flycatcher and other listed species in the San Luis Valley of southern Colorado.

75th Street Raw Water Line, Boulder County, CO

Prepared a 1041 Land Use Permit to allow the construction of a water supply line between Boulder Creek and the City of Lafayette.

Preble's Meadow Jumping Mouse Habitat Conservation Plan, Douglas County, CO

Developed land use mapping and projections, and identified potentially impacted parcels for the county-wide HCP.

Water Resources

Western Navajo and Hopi Water Supply Study, AZ

Technical support and oversight of a planning study to project and evaluate tribal water demand, supply, and delivery alternatives for the Little Colorado River Basin in Arizona.

Gila River Phreatophyte Study, AZ

Estimation of historical and current consumptive water use by floodplain plant species in the Gila River Basin in Arizona.

Andrew M. Cole *Natural Resource Planner*



BACKGROUND

Andy is a natural resource planner with over 12 years of experience in land management planning, federally listed species surveys, and habitat evaluations. In natural resource planning, Andy has collaborated with federal and state agencies, local municipalities, and not-for-profit organizations. His hands-on experience with habitat assessments, wildlife surveys, noxious weed control, prescribed burning, and preserve management helps him to address the issues surrounding natural resource decisions creatively.

Education

Master of Forest Science,
1995, Yale University
School of Forestry and
Environmental Studies

M.A. 1988, German,
Middlebury College

B.A. 1986, German and
Physics, Middlebury
College

Certifications and Affiliations

Trimble Navigation GPS
Certified

Society for Conservation
Biology

Chair, Arapahoe County
Open Space and Trails
Advisory Board

SUMMARY OF EXPERIENCE

Land Management Planning. Andy has worked with several federal and state agencies, municipalities, and land trusts seeking assistance with natural resource inventories, planning, and management. He has completed master plans prioritizing sensitive areas for acquisition, as well as site-specific assessments and management plans.

Baseline Inventories. Andy is experienced in preparing existing conditions reports in compliance with the Federal Internal Revenue Code for landowners who donate conservation easements to qualified organizations. He prepares easement documentation in accordance with the guidelines established by the Colorado Coalition of Land Trusts.

Threatened and Endangered Species. Andy's experience includes a wide variety of natural resource investigations, including field surveys and habitat assessments for several threatened, endangered, and candidate species such as the greenback cutthroat trout, boreal toad, bald eagle, piping plover, and Preble's meadow jumping mouse.

Natural Resource Assessments. Andy has assisted clients with forest management planning, wildfire analysis, wildlife surveys, and weed management. He has prepared evaluations of impacts on vegetation, wetlands, soils, water, wildlife, and other natural resources.

NEPA Compliance. Andy has been involved in the preparation of numerous environmental impact statements (EISs) and environmental assessments (EAs). He has assisted federal and state agencies such as the National Park Service, U.S. Fish and Wildlife Service, Federal Highway Administration, and Colorado Department of Transportation.

Representative Projects *Andrew M. Cole*

Land Management Planning

Trust for Public Land, CO

Project manager and facilitator for the Mosquito Range Heritage Initiative to identify priority areas in Park County for protection based on historic, recreation, and natural resources.

General Services Administration, CO

Principal field investigator and planner for the wildlife management plan at the 670-acre Denver Federal Center in Lakewood.

Town of Nederland, CO

Project manager and principal planner for the open space, trails, parks, and outdoor recreation master plan; open space management guidelines; and open space acquisition plan.

City of Lafayette, CO

Facilitated and developed policy for management of black-tailed prairie dogs.

City of Wheat Ridge, CO

Project manager and principal planner for the open space, noxious weed, and fire management plans for the Clear Creek Greenbelt.

City and County of Broomfield, CO

Developed revegetation strategy and management guidelines for short grass restoration on the Field open space.

Roxborough State Park, CO

Developed and implemented a plan for the use of fire in noxious weed management.

Natural Resource Assessments

City of Boulder, CO

Conducted natural resource and impact assessment and proposed mitigation in Community and Environmental Assessment Process (CEAP) for proposed Valmont Butte fire training center and biosolids recycling center.

State Land Board, CO

Project manager for field-based inventories on 45 Stewardship Trust parcels throughout the state.

State Land Board, CO

Project manager and principal field investigator for environmental study of 14,000 acres on the Lowry Range parcel in Arapahoe County.

Buckley Air Force Base, Aurora, CO

Project manager and principal field investigator for black-tailed prairie dog and burrowing owl surveys as part of monitoring program in the Integrated Natural Resources Management Plan.

Cheyenne Mountain State Park, CO

Evaluated potential impacts on vegetation communities and wildlife habitat as part of the park master plan.

Office of Energy Management and Conservation, CO

Field investigator for inventory and assessment of 35 wastewater treatment wetlands throughout the state, for the Governor's office.

Threatened and Endangered Species

Douglas County, CO

Evaluated potential Preble's meadow jumping mouse habitat for Habitat Conservation Plan.

Chatfield State Park, CO

Biological Assessment and Section 404 Permit for waterline crossing of the South Platte River in designated critical habitat.

Castlewood Canyon State Park, CO

Biological Assessment and Section 404 Permit for the East Canyon Trail.

NEPA Compliance

Rocky Mountain National Park, CO

EA for Bear Lake Road improvement project, Phase II and bicycle trail.

Department of Transportation, CO

Noxious weed mapping and management plan for New Pueblo Freeway EIS.

Yellowstone National Park, WY

Analyzed 47,000 public comment documents and provided technical support for Supplemental Winter Use EIS.

Federal Highways Administration, CO

EA and FONSI for reconstruction of Tarryall Creek Road in Park County.

Bureau of Reclamation, CO

Prepared wildlife technical report, documenting affected environment and potential impacts associated with the Aurora Exchange Project.

Cindy Trujillo *Plant Ecologist*



BACKGROUND

Cindy is a plant ecologist with expertise in plant identification and vegetation monitoring. She has collected vegetation data for ecological monitoring projects and surface mining reclamation plans throughout the intermountain West. Cindy has conducted baseline vegetation studies, weed surveys, and rare and endangered plant surveys. Her experience also includes natural resource assessments, vegetation mapping, weed management plans, habitat evaluation, wetland delineations, and wetland planting and seeding.

SUMMARY OF EXPERIENCE

Education

B.S., 2000, Biology/
Conservation Biology,
New Mexico State
University

Wetland Education
Program, Research
Experience for
Undergraduates,
University of Notre
Dame, 1999

U.S. Army Corps of
Engineers Wetland
Delineation and
Management Training
Program

Certifications and Affiliations

Colorado Native Plant
Society

Society of Wetland
Scientists

Threatened and Endangered Species. Cindy has surveyed for many federally listed threatened and endangered plant species in eastern and western Colorado, Arizona, Idaho, and Wyoming. She has conducted inventories for Ute ladies'-tresses orchid, Colorado butterfly plant, Dudley Bluffs bladderpod, slickspot peppergrass, Piceance twinpod, Graham beardtongue, and White River penstemon. Cindy has also conducted surveys for culturally important plant species in northeastern Arizona.

Wetland Delineations. Cindy has performed wetland delineations in conjunction with the U.S. Army Corps of Engineers 404 permitting throughout Colorado, Wyoming, and North Dakota, conducting site evaluations based on vegetation, soil, and hydrology.

Vegetation Monitoring. Cindy has extensive experience with plant monitoring. She has established and monitored vegetation transects for areas with noxious weeds, prairie dog colonies, and prairie relic ecosystems. She frequently uses a point intercept quantitative vegetation measurement device to measure vegetation cover.

Reclamation. Cindy has collected data for reclamation sites in Arizona, Texas, Montana, Wyoming and western Colorado. She has supervised field crews for vegetation monitoring teams and compiled data to prepare reports for submission to the states' Divisions of Minerals and Geology.

Representative Projects *Cindy Trujillo*

Rare Plant Surveys

Peabody Western Coal Co., Monument Valley, AZ
Performed sensitive, threatened, and endangered surveys for 21 different rare, culturally important Colorado Plateau plant species, on the Navajo and Hopi reservations.

Private Mining Co., Rio Blanco County, CO
Performed plant surveys for sensitive, threatened, and endangered high altitude plant species.

Ada County, ID
Performed rare plant survey for slickspot peppergrass.

Reclamation Monitoring

Peabody Western Coal Co., Rosebud County, MT
Monitored and reported annually on reclaimed and native lands for five years. Collected optical percent cover data as well as shrub density and total biomass production.

Foundation Coal Co., Campbell County, WY
Annually monitored and reported on reclaimed lands. Completed baseline surveys, weed density data studies, and rare plant surveys.

Peabody Western Coal Co., Routt County, CO
Monitored and reported on reclaimed and native lands. Collected optical percent cover data and shrub density data.

Wetland Delineations and Permitting

Village Homes, Douglas County, CO
Conducted wetland delineations and habitat assessments in Douglas County.

Peabody Western Coal Co., Routt County, CO
Delineated wetlands and prepared Individual 404 Permits for the Seneca II W Mine.

City of Aurora, CO
Delineated wetlands and performed other natural resource reviews for a proposed water pipeline.

NEPA Compliance

Southern Delivery System, El Paso and Pueblo Counties, CO
Currently addressing sensitive plant community issues for the water delivery pipeline.

Vegetation Monitoring

City of Boulder Open Space and Mountain Parks, CO
Monitored vegetation on multiple properties and open space easements for six consecutive years, using a point intercept quantitative measurement device. Monitored areas infested with weeds and areas of special concern, including short grass and tall grass prairie ecosystems.

Boulder County Open Space, CO
Monitored vegetation on grazing parcels using a point intercept quantitative vegetation measurement device.

City of Boulder Open Space and Mountain Parks, CO
Monitored vegetation inside and outside of established prairie dog communities for six consecutive years to determine vegetation change as the colonies modified and stabilized as part of the Open Space Prairie Dog Habitat Conservation Plan.

Boulder County Open Space, CO
Established and monitored belt vegetation transects inside and outside prairie dog colonies to determine vegetation change as colonies modified and stabilized. Monitored pre- and post-prairie dog release sites and documented habitat changes as prairie dogs were introduced by relocation projects.

City of Louisville, CO
Monitored vegetation for a prairie dog release site. Established and monitored vegetation transects for two years to track changes.

Revegetation and Wetland Mitigation

Urban Drainage and Flood Control District, CO
Designed plans and specifications for native plant restoration for wetland, upland, and riparian areas in Jefferson County.

**M. Benjamin Property and Betasso Preserve
Trail Feasibility Study
(IMBA Trail Solutions and ERO Resources 2008)**

Benjamin Property and Betasso Preserve Trail Feasibility Study

Final Report, December 3, 2008

Prepared by:



IMBA Trail Solutions
PO Box 7578
Boulder, CO 80306



ERO Resources Corp.
1842 Clarkson St
Denver, CO 80218

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1 Introduction

This report presents the feasibility of new recreation trails on the Benjamin Property and Betasso Preserve managed by Boulder County Parks and Open Space (BCPOS).

The objective of this study is to determine where sustainable, multiple-use trails are feasible, with an emphasis on linking the existing Betasso Canyon Loop Trail to the Benjamin Property and other access points and regional connections.

This study focuses on trail feasibility and related issues of trail routes, connections, recreation experience, and property constraints. A study of natural resources such as vegetation and wildlife was conducted independent of the trail study.

IMBA Trail Solutions and ERO Resources Corp. were hired by Boulder County Parks and Open Space to perform the study through a public bidding process in June 2008.

2 Project Objective

As stated in the contracted scope of work, the objective of this study is to determine conceptual trail alignments for public input and management plan direction for the Betasso Preserve and the Benjamin Property. Conceptual alignments are sought for three broad base themes as feasible on the ground, with the understanding that loop trails, out and back trails, and one-way trails will be considered. All trail design themes are for sustainable, multi-use trails that minimize impacts to significant natural and cultural resources, as well as to adjacent neighbors. Contractor shall field flag proposed trail corridor(s) with clinometers to comply with trail standards and achieve trail objectives. Contractors were asked to analyze and incorporate the use of existing social trails if sustainable and appropriate.

Additionally, a study of possible trail options from Betasso Preserve to the western terminus of the Boulder Canyon Bike Path (located at the junction of Fourmile Canyon Drive and Boulder Canyon Drive) was added to the scope of work.

3 Executive Summary

Extensive research in the field indicates that a variety of trail alternatives are feasible in the study area, especially in the eastern region and lower elevations. The steep and rugged terrain presents a challenge to trail design and construction, however this same terrain offers excellent recreation opportunities with interesting natural features, scenic views, challenging routes, and the opportunity to experience the remote slopes of Arkansas Mountain. Proposed new trails could greatly complement and enhance the existing Betasso trail system, providing valuable trail options close to downtown Boulder as well as improved regional trail connections. At the same time, a significant portion of

the study area could remain without trails. Public access points are limited, leading to significant constraints on trail locations and connections.

4 Background

Betasso Preserve was purchased by Boulder County Parks and Open Space in 1976 and consists of 784 acres. The Benjamin Property was acquired in 2007 and consists of 391 acres. The properties will be combined under one management plan.

Betasso currently has 5 miles of multi-use trails including the 3.2-mile Canyon Loop Trail, the 0.25-mile Bummer's Rock Trail, and the 1.25-mile Link Trail. The Benjamin Property has several non-designated "social" trails, which were created prior to the acquisition of the property by the County.

5 Study Area

The study area (see map) includes all of Benjamin and Betasso, but effort is focused on Benjamin and the northern portion of the Betasso Preserve.

The area is primarily a steep, forested mountainside interrupted by several intermittent drainages, sloping meadows, and a short section of Fourmile Creek. Elevations in the study area range from about 7,700 feet in the southwest corner (near summit of Arkansas Mountain) to about 6,100 feet in the northeast corner (adjacent to Fourmile Creek), a difference of more than 1,600 vertical feet.

There are no significant old roads in the study area. While there are numerous small mines scattered throughout, they are mostly limited excavations that apparently never reached a scale to justify road building. A few faint mining or logging routes can be found, but they are generally short and do not connect together. The primary exception is the historic railroad grade along Fourmile Creek that is currently a well-used social trail.

Maps of the area are limited to large-scale topos with contour lines at 40-foot intervals, which is not detailed enough to reveal specific terrain features. Many cliffs, gullies, sub-summits, rock outcrops, ridges, and other features are not indicated on maps.

Additional details about the property can be found in related BCPOS documents.

6 Existing Social Trails

There are several non-designated social trails in the study area. These routes include the Switzerland Trail railroad grade, faint historic mining and logging tracks, wildlife trails, and some recent trails used for recreation. The more frequently used trails are illustrated on the Existing Conditions map. Most of these social trails are point-to-point routes that were formerly accessed from the south and west edges of the property and travel from upper elevations down to eventually exit the property and connect to Fourmile Canyon

Drive. In general, these trails are excessively steep and were not properly designed or constructed. They all start or finish on private land. Except for a few unconnected short segments, they are unsustainable and are not viable for inclusion in a permanent trail system.

7 Trail Design Methods

Traditional field-based trail planning and design techniques were used. The entire study area was explored extensively during a three-month period in the summer of 2008 to understand the property boundaries, terrain, natural edges, features of significance, major landmarks, valleys, views, habitat areas, etc. All possible trail corridors and trail connections were investigated, and feasible routes were evaluated and flagged using commonly-accepted best practices for trail design.

The specific trail standards and objectives used for this project are defined in the contracted scope of work, and include specific guidelines such as: average grade of the trail should not exceed 8-percent, and maximum grades up to 20-percent are allowed on short sections, less than 50 linear feet.

8 Summary of Major Issues

Topography: Most of the study area is located on the steep slopes of Arkansas Mountain. Vertical gain is more than 1,600 feet in a relatively short distance. The terrain is extremely rough, with numerous gullies, cliffs, rock outcroppings, and extreme slopes. While scenic and interesting, it is a difficult property for trails. A principle challenge is that sustainable, contouring trails must necessarily travel across the slopes, perpendicular to drainages and rock bands. As a result, terrain obstacles are frequently encountered along the way.

Access: The Benjamin property is almost entirely encircled by private land, and the only legal public access is through Betasso Preserve, or near the end of Alaska Road, a small dirt road off Logan Mill Road at the western side of the Benjamin property. This lack of public access points makes through-routes, connections, and new trailheads difficult. The Betasso property is similarly encircled by private land, limiting connections to Fourmile or Boulder Canyon roads. Additional property acquisitions or trail easements could improve access by connecting public roads to the properties.

Fourmile Canyon Drive Access Point: A proposed trail connection has been identified that links Benjamin to Fourmile Canyon Drive by passing through a section of BLM and private property (Pinto). A Pinto access trail easement has been acquired by Boulder County, but the trail could not be used unless this route was approved in the management plan process and the BLM grants permission for the County to use the BLM-owned parcel separating the Pinto property from the Benjamin property. This route is identified on the included maps as Trail 7, and is located 2.7 miles up Fourmile Canyon Drive.

Inaccessible Upper Elevations: Importantly, there are no public access points on the upper elevations of the property. These high ridges and sub-peaks of Arkansas Mountain offer appealing recreation destinations and are easily reached from the high ground to the south and west, including the private residential areas above Betasso and near Sugarloaf. However, these southwestern approaches and the existing social trails in the area cross private land. The only legal way to access these upper elevations is by ascending the mountain on public land from north or east starting at Betasso or Alaska Road.

If additional public property were available to provide access from the southern and western approaches, it is possible that trails would be feasible in these upper elevations of the property and with a connection down through Benjamin to Betasso. Linking the upper elevations to the lower elevations would require a lengthy trail that zigzags back and forth across the mountainside with switchbacks and difficult construction challenges. Due to the zigzag configuration of such a trail, it might need to be an out-and-back route or a through-route instead of a loop. If no public access at the upper approaches becomes available, a trail connecting the lower to upper elevations and dead-ending near the top might lead to a temptation by trail users to connect through private property to nearby roads and regional routes.

Property Shape: The relatively small, rectangular shape of the study area limits options for longer distance trails. The outer dimensions of the Benjamin property measure only about 5,000' x 2,500'.

Difficult Trail Construction: Construction difficulty of the proposed routes ranges from moderate to extreme, with no segments of easy construction. Vehicle and equipment access is very limited. In comparison, the proposed trail system would be more difficult to construct than recent Boulder County projects such as Heil Ranch or Hall Ranch, but not beyond the typical challenges of trailbuilding in mountainous terrain such as Walker Ranch.

9 Specific Trail Design Objectives

Some of the specific design objectives for new trails in this area are:

- Provide new multi-use trails available to hikers, mountain bikers and equestrians
- Provide trails while minimizing impacts to ecologically sensitive areas and wildlife habitat
- Provide a loop (s) that can be easily combined with the Betasso trails to create a more varied and lengthy trail experience
- Provide a "through route" that allows users to enter the Benjamin/Betasso trail system from one direction, and leave in another, thus establishing regional trail connections and improving user experiences
- Expose users to the remote and rugged Benjamin property and slopes of Arkansas Mountain
- Include mini-destinations along the routes, such as sub-peaks, highpoints, ridges, viewpoints, forest groves, rock gardens, natural gateways, edges, etc.

- Provide fun and interesting routes, with twists and turns, ups and downs
- Provide the opportunity for challenging uphill and downhill; yet maintain sustainable grades
- Bring trail users into natural and undeveloped areas; yet retain portions of the land without trails
- Avoid unnecessary or redundant stream crossings
- Maintain tracts of undisturbed habitat
- Consider wildlife movement corridors between Fourmile Creek and Arkansas Mountain
- Minimize disturbance to the Arkansas Gulch riparian corridor and allow for restoration of the existing social trails
- Minimize new disturbances to the Fourmile Creek riparian corridor

Additional Trail Design Considerations

Loops: The best trail systems link different segments of trail in various loops so that visitors can customize their experiences—choosing the starting and finishing point, length of the trail, the type of terrain, and difficulty. Each visitor’s idea of a perfect route may vary, but most want loops of varying terrain all connected to other trails or roads.

Difficulty Level: The majority of proposed trails in this area would be considered intermediate to advanced difficulty level largely due to the rugged, rocky terrain. Fortunately, the existing Canyon Loop Trail on the Betassso property is of beginner or intermediate difficulty, thus providing an appealing loop for those visitors closest to the trailhead. Intermediate and advanced users know their skill level and will seek out more technically challenging trails, and are willing and able to travel several miles to get to them.

Impacts: All trails will result in localized impacts to the natural environment, including soils, vegetation, and wildlife. A sound trails plan will avoid impacts to the most sensitive resources, while minimizing impacts to other resources through proper trail location and design. These varying resource impacts may be evaluated or considered against the increased opportunity for the public to enjoy and appreciate nature and resource conservation through trails.

10 Major Control Points

Trails are generally designed to travel to *positive* control points and avoid *negative* points. Typical negative points are property boundaries, areas of extreme terrain, steep V-shaped drainages, and direct sightlines to development. Typical positive control points are access points, interesting natural features, viewpoints, less-extreme terrain, natural platforms or landings for switchbacks or trail intersections, and suitable drainage crossings. Oftentimes, a control point can be both *positive* and *negative*.

Some of the significant control points in the study area have been assigned names to aid the planning process. They include:

- *Betasso Canyon Loop Trail*: The primary existing trail and common-sense starting point for new trails in the study area. An appealing starting point has been identified at the northern end of the loop.
- *Pinto Access Point*: A potential new secondary access point 2.7 miles up Fourmile Canyon Drive that could be established as a no-parking trailhead if access to the Pinto and BLM properties can be gained.
- *Alaska Road*: A small dirt road and access point located off Logan Mill Road on the western edge of the Benjamin property that could potentially be established as a minor no-parking trailhead.
- *Skunk Gulch*: An intermittent drainage gully on the northern portion of Betasso Preserve. Any trail leading from Betasso into Benjamin must unavoidably cross this drainage.
- *Granite Ridge*: A prominent ridge that extends out from the surrounding terrain on the eastern edge of Benjamin. It offers a variety of views and is a marked change from the typical slopes in the study area. Trail 2 loops out and along the ridge top through granite features.
- *Betasso Overlook*: A small cliff/rock outcrop with a level platform on top that offers an ideal location for a trail intersection and switchback, and provides great views back toward Betasso and Skunk Gulch. There is some exposure, and careful trail design is needed to manage risk.
- *Cactus Ridge*: A prominent ridge that acts like a natural divider between Betasso and Benjamin. Once past this ridge, views back toward Betasso are cut off, providing a sense of traveling into new environs.
- *Peak 6,600*: A sub-peak and saddle in the mid-elevations of the study area that provides a positive destination. It would be an advantage to the new trail system to include a peak or highpoint to provide trail users the experience of climbing to higher elevations and to get a sense of Arkansas Mountain. Views extend in 360 degrees.
- *Prospector Gulch*: An intermittent drainage gully in the eastern region of the Benjamin property that includes interesting vegetation and other elements not typically found along the more commonly dry and sparse slopes. Terminates at the RR grade.
- *Historic Mine Site*: One of many small mine sites in the Benjamin property. This particularly appealing site includes the mouth of a horizontal mine tunnel about 4-feet tall and a level, 75-foot long road-like platform made of old tailings. Trail 3 passes the mouth of the tunnel and along the tailings platform. If the tunnel is closed with a durable grate, there doesn't appear to be any hazard.
- *Fourmile Creek*: A perennial stream that passes along the extreme northern edge of Benjamin. A bridge would be required to cross. The historic railroad grade is located alongside the creek.
- *North Ridge*: A prominent ridge that rises from the Fourmile valley directly up through the Benjamin property. It offers numerous sub-peaks and viewpoints that climb like steps upwards. *Peak 6,600* is located on this ridge.
- *Switzerland Trail*: The historic railroad grade located along Fourmile Creek. Trail 7 would be located here.

11 Requested Trail Planning Themes

The project scope stipulates that trail options be presented according to the following themes, quoted here directly from the scope of work:

1. Limited recreation: the emphasis of this theme is to maximize preservation of the natural and cultural resources and evaluate limited recreational opportunities.

- Provide minimal trail development for multiple users
- Provide viewing and scenic opportunities
- Avoid trails in close proximity to neighboring properties
- Avoid trails in core/sensitive habitat areas. Consolidate areas without trails to maximize core habitat areas. If a loop trail is considered, it should be done with the assumption that a large core habitat area would be preserved and the trail would not dissect large areas of the Benjamin Property.
- Use portions of existing social trails if appropriate and sustainable

2. Moderate recreation: the emphasis of this theme is to balance recreation opportunities with the preservation of natural and cultural resources.

- Provide moderate trail development for multiple users
- Provide viewing and scenic opportunities
- Avoid trails in close proximity to neighboring properties
- Provide diversity of recreation experience (loop trail, out-and-back, etc.) while protecting significant natural and cultural resources
- Attempt to provide trail access from Betasso Preserve and/or the Benjamin Property to Fourmile Canyon Drive, Arkansas Mountain Road, and/or Alaska Road. These potential access points could provide possible connections to surrounding roads and trails, which could create informal regional trail connections. No additional vehicle parking will be considered for these potential new access points; vehicle parking will only be provided at the existing Betasso Preserve Trailhead.
- Use portions of existing social trails if appropriate and sustainable

3. Maximize recreation: the emphasis of this theme would be to provide the most recreational opportunities available that do not substantially impact significant natural and cultural resources.

- Provide maximum trail development for multiple users
- Provide viewing and scenic opportunities
- Protect the most significant natural and cultural resources
- Avoid trails in close proximity to neighboring properties
- Provide diversity of recreation experience (loop trail, out-and-back, etc.)
- Analyze a loop trail potentially covering a large portion of the Benjamin Property with some spur trails to scenic vistas or other interesting points

- Attempt to provide trail access from Betasso Preserve and/or the Benjamin Property to Fourmile Canyon Drive, Arkansas Mountain Road, and/or Alaska Road. These potential access points could provide possible connections to surrounding roads and trails, which could create informal regional trail connections. No additional vehicle parking will be considered for these potential new access points; vehicle parking will only be provided at the existing Betasso Preserve Trailhead.
- Use portions of existing social trails if appropriate and sustainable
- Analyze the potential for separate use trails to minimize conflicts

12 Proposed Trail Alternatives

A variety of trail alternatives have been identified. Each alternative is specifically described below, shown on the attached maps, and flagged in the field. *For each alternative, there exists a range of possible adjustments, substitutions, and options.* It is not practical to display each and every possible option, but the most significant are identified. For example, a given trail could be shortened, lengthen, moved up or down the slope, etc. This is especially true in Alternatives 2 and 3, where the greater number and length of proposed trails leads to increased opportunities for adjustments or substitutions.

12.1 Alternative 1:

This alternative would consist of a point-to-point trail leading from Betasso to Fourmile Canyon Drive. The final section connecting to Fourmile Drive requires a trail easement through BLM property. (See map) Approximate total length: 2.5 miles.

Opportunities or Positives:

- Connection between Betasso and Fourmile Canyon Drive
- New trail would be consolidated on a small area
- Interesting natural features
- Connection to regional road routes in Fourmile area, Poorman, and beyond
- Provides a loop for mountain bikers when combined with roads like Fourmile Canyon Drive, Boulder Canyon Drive, the Canyon Loop Trail, and the Betasso Link Trail
- Visits the historic RR grade

Constraints or Negatives:

- Limited length
- Limited viewing and scenic opportunities
- Does not include a trail loop
- Limited diversity of recreation experience
- Localized impacts to the natural environment
- Bridges required at Fourmile Creek and Skunk Gulch
- A constructed staircase required to ascend the short cliff at RR grade
- Fourmile Drive connection includes difficult trail construction

- Fourmile Drive connection not appropriate for equestrians

12.2 Alternative 2:

This alternative provides several trails that include a link from Betasso, a loop, and a connection to Fourmile Canyon Drive. The route would begin at the northern end of Betasso Canyon Loop Trail, travel about .6 miles, and then split into a 3-mile loop. The connection to Fourmile Canyon Drive would be 1-mile long and require a trail easement on the BLM property. There are several options within this alternative, including Trail 5A or 5B shown on the map. Approximate total length: 4.6 miles.

Opportunities or Positives:

- Loop trail, allowing for improved user experience
- Diversity of recreation experience
- Excellent viewing and scenic opportunities
- Connection to regional routes
- Historic items, including railroad grade and mine
- Includes an appealing highpoint, Peak 6,600'
- Greater elevation gain
- Greater feeling of remoteness
- Greater dispersion of trail users

Constraints or Negatives:

- Difficult trail construction
- Uses larger portion of property
- Limited new trail miles
- Localized impacts to the natural environment
- Trail easement required at Fourmile access point
- Bridges required to cross Fourmile Creek and Skunk Gulch
- Two crossings of Prospector Gulch (bridges not needed)
- Constructed staircase required at railroad grade

12.3 Alternative 3:

This scenario would provide several lengthy trail loops, a connection to Alaska Road, the same connections to Fourmile and Betasso as previously mentioned, and the open-ended potential for routes to the upper elevations and future access points. The potential Trail 2/3/4/9/10 loop would be about 5 miles long, and all trails together would be 7 miles or longer. (See map)

The more distant trail locations and high points of proposed trail corridors in this scenario provide the greatest future possibilities for connections to the upper elevations and southwest approaches to the Benjamin property. Climbing to these upper elevations

would involve an elevation gain of an additional 500 feet from the highest point on the proposed Trail 10.

Because the purpose of Alternative 3 is to investigate maximum trail development, there exists the potential for variations, substitutions, and adjustments that are impossible to specify prior to the establishment of more detailed criteria, such as trail starting points, connections, and other opportunities and constraints.

Additionally, due to the longer distances, greater elevations, and uncertainties inherent in a feasibility study of this nature, the trail corridors identified in Alternative 3 are less precise than the detailed routes presented in Alternatives 1 and 2. Further study would be necessary to establish precise routes.

Opportunities or Positives:

- Same opportunities as Alternatives 1 and 2, plus:
- Long, adventurous loops
- Highest elevations
- Greatest feeling of remoteness
- Greatest viewpoints and natural features
- Greatest utilization of property for recreation
- Diversity of recreation experience
- Greatest dispersion of users
- Best potential for separate-use trails to minimize user conflicts

Constraints or Negatives:

- Greatest cost
- Greatest trail construction difficulties
- Greatest potential for environmental impact
- Close proximity to property boundaries (if routes are extended to that extent)
- Potential for temptation for unauthorized access through private property

12.4 Common Elements in all Alternatives:

All themes include Trail 1, the primary connection between the Betasso and Benjamin properties that begins at the northern end of the Canyon Loop Trail and travels across Skunk Gulch and toward Benjamin.

All themes include Trail 2, a contouring trail that travels generally along the 6,300 elevation to the northwest into Benjamin through forested slopes and meadows.

All themes include Trail 6 and 7, a connection to Fourmile Canyon Drive that requires a trail easement through a BLM parcel and the Pinto property.

Alternatives 2 and 3 add trail loop (s), whereas Alternative 1 has no loop.

13 Other Alternatives Considered

Many other trail options were explored. These included attempts to use existing social trails, provide connections to other potential access points, opportunities for longer trail loops, greater variety in trail experiences, and travel to higher elevations and peaks in the study area. Generally, these attempts failed due to extreme terrain and/or private property. It should be reiterated that the study area is relatively small, surrounded by private property, and steep. These constraints greatly limit feasible trail routes.

14 Summary of Alternatives: Comparison Table

Summary Trail Alternative Comparison

	Total Length	Connections	Opportunities or Positives	Constraints or Negatives
Alternative 1	2.5 Miles	Betasso Fourmile	Connection to Fourmile Dr. Appealing Route Interesting Views and Features Cactus Ridge Vista Granite Ridge Vista Limited Footprint	No Trail Loop Limited Length Skunk Gulch Bridge Needed Fourmile Creek Bridge Needed Construction Access Difficult Localized Resource Impacts Fourmile Connection not Appropriate for Equestrians
Alternative 2	4.6 Miles	Betasso Fourmile	Similar to Above, Plus: Includes Loop Benjamin Views Prospector Gulch Historic Mine Site Peak 6,600 Greater Elevation Gain Greater Diversity of Trails	Similar to Above, Plus: More Difficult Terrain Greater Construction Challenges Prospector Gulch Crossing Potential Resource Impacts
Alternative 3	7 Miles	Betasso Fourmile Alaska	Similar to Above, Plus: Long, Adventurous Loops Alaska Rd. Connection Greatest Elevation Gain Greatest Trail Diversity Greatest Dispersal of Trail Users Maximizes Recreation	Similar to Above, Plus: Most Difficult Terrain Greatest Construction Challenges Arkansas Gulch Crossing Potential Resource Impacts Alaska Rd. Local Impacts

15 Specific Trail Details

Trail Segments				
Trail	Flagging	Length (Feet)	Length (Miles)	
1	Blue	3,538	0.7	
2	Pink	4,224	0.8	
3	Pink	6,072	1.2	
4	Orange	5,390	1.0	
4 Peak Loop		500	0.1	
5A	Blue	3,643	0.7	
5B	Pink Polkadot	900	0.2	
6A	Blue	2,640	0.5	
6B	Pink	2,710	0.5	
7 RR Grade	None	900	0.2	
7 Pinto	Blue	1,954	0.4	
9 (estimated)	Pink (Limited)	5,280	1.0	
10 (estimated)	Blue (Limited)	7,000	1.3	
Loops Collected				
Fourmile Link Total		5,494	1.0	
Trail 2,3,4 Loop		15,686	3.0	
Trail 2,3,4,9,10 Loops		27,966	5.3	
Alternatives Collected				
Alternative 1 Total		13,256	2.5	
Alternative 2 Total		24,718	4.7	
Alternative 3 Total		36,998	7.0	

Trail 1: This segment provides a starting point from the Canyon Loop. It would require a 20' foot bridge at Skunk Gulch, and has one short section of 15-20 percent grade. The segment ends at "Betasso Overlook," an appealing viewpoint and potential intersection location to begin a loop.

Trail 2: This segment begins at the end of Trail 1, and contours to the north and into the Benjamin property along the 6,300' contour. It passes around the nose of "Cactus Ridge", and weaves in and out of numerous wrinkles in the hillside. It meets "Granite Ridge" and loops out and back along this rocky terrain feature. It ends at a meadow location that offers a good intersection point. Due to terrain constraints, there are no options that could be substituted.

Trail 3: This segment provides the main route to climb from the lower trails to the important upper control point called "Peak 6,600." The trail passes around the nose of "North Ridge" and toward the west, offering views into the western part of Benjamin. It continues west and crosses "Prospector Gulch," then switchbacks and returns to the east. This upper leg of the trail passes the "Historic Mine" and crosses "Prospector Gulch" again before finally reaching "Peak 6,600." The terrain along this route is steep and rocky, with numerous rock spines, boulders, and outcrops.

Trail 4: This segment links "Peak 6,600" to "Betasso Overlook" and completes a loop when combined with Trail 2 and 3. It is mostly located along higher elevations and offers long-distance views all along its length. It passes around the nose of "Cactus Ridge" and includes a switchback (s) before meeting Trails 1 and 2 at the "Betasso Overlook" intersection.

Trail 4 Peak Loop: This is a short 500' scenic loop that brings visitors from the main trail located in a nearby saddle to the summit of "Peak 6,600" and back.

Trail 5: This segment is an option to replace Trail 3. It climbs to "Peak 6,600" in a series of 3 switchbacks that are located in and around "North Ridge". It avoids crossing "Prospector Gulch" and limits travel further west into the Benjamin property. The terrain along this route is very steep and rocky, with numerous rock spines, boulders, and similar. Trail 3 may have advantages over Trail 5 because it has fewer switchbacks and offers visitors the opportunity to experience more varied views, terrain, and a greater area of Benjamin.

Trail 6: This segment links Trail 2 to the railroad grade (and eventually Fourmile Canyon Drive via the Pinto property.) It descends and includes switchbacks. The middle portion of this segment offers two options around "North Ridge". 6A descends in a series of 5 switchbacks, while 6B has the advantage of only 2 switchbacks. However, a portion of 6B is located near the top of cliff and includes some difficult construction challenges.

Trail 7 RR Grade: This short segment travels along the existing railroad grade and crosses Fourmile Creek. A bridge would be required.

Trail 7 Pinto: This segment connects the railroad grade to Fourmile Canyon Drive. It requires a set of constructed timber or stone stairs to climb up the steep slope originally caused by the construction of the railroad. This staircase would be about 60 feet long, and ascend 15-20 vertical feet. It would be fairly gradual with 2-3 foot treads and 6-9 inch risers, ideally constructed from stone. The route is rocky and technical, with few alternative options due to rocky cliffs and outcrops. It would be narrow and tight, with 4 sharp switchbacks and 1 gentle climbing turn before meeting the road at an existing pull out. This could be designated a no parking area.

Trail 9: This segment connects Trail 3 to Alaska Road. It climbs gradually and crosses several drainages, the most significant being Arkansas Gulch. Generally it is a contouring route with no switchbacks, major cliffs, or overwhelming difficulties. This corridor is less

precise than other routes and further study would be necessary to establish the exact location. A portion of this route could use an existing social trail briefly near Alaska Road. This access point could be designated a no parking area.

Trail 10: This conceptual segment connects "Peak 6,600" with Trail 9 near Arkansas Gulch. It is the upper leg of a large loop that could combine with other previously described segments as well as future hypothetical trails to maximize trail opportunities. This route provides the greatest possibilities for connections to the upper elevations and future access points. The terrain along this route is steep and rocky, with numerous rock spines, cliffs, drainages and similar obstacles. This corridor is less precise than other routes and further study would be necessary to establish the precise location. Many variations and combinations are possible.

16 Connections to Boulder Canyon

The scope of work also included evaluating trail options from Betasso Preserve to the western terminus of the Boulder Canyon Bike Path. The contractor also studied possible connections to Fourmile Canyon.

Unfortunately, there are very few options to provide a new connection that improves on the existing Canyon Link Trail. As a study of the maps reveal, private lands block access for the most part.

The Betasso property comes close to Boulder Canyon in just two locations: The upper location is where the existing Link Trail meets Canyon. The other location is at the intersection of Boulder Canyon and Fourmile Canyon.

While ideally situated near the end of the bike path, this second location presents severe difficulties for a trail. It appears that the Betasso property comes close, but only touches the highway at a 30-foot cliff. The location is very narrow and borders the highway on a sweeping, high-speed curve, making a safe highway crossing for trail users extremely difficult.

It is possible that these obstacles could be overcome with elaborate engineering solutions such as a pedestrian overpass, or excavating a larger shoulder and constructing a staircase to ascend the cliff. These potential solutions must be studied by qualified specialists and in conjunction with state highway officials.

Once the initial roadside obstacle is surmounted, initial research indicates that a switchbacking trail could feasibly connect up to the Canyon Loop Trail. This route would need to ascend from an elevation of 5,760' at Boulder Canyon to 6,400' at the Canyon Loop, a minimum of 640 vertical feet. A trail ascending at an average grade of 7 percent would be 9,000 feet long, or 1.7 miles. The lower elevations of the property are narrow, requiring frequent switchbacks, but the area becomes wider with more room for longer distances between switchbacks. Several knolls and saddles offer the opportunity for a

segment of winding trail that wraps in and out of contours, adding interest while gaining elevation.

If no new access point to Boulder Canyon can be created, the Link Trail could be modified with reroutes and maintenance to better meet the needs of trail users and improve sustainability.

Additional property acquisition or trail easements may be necessary to create more feasible connections to Boulder Canyon.

17 Connections to Fourmile Canyon

The Betasso property touches Fourmile Canyon Drive in two small places. These have been investigated and are extremely steep - practically cliffs - with no feasible trail routes.

However, a parcel of private land called the *Pinto Property* offers a potential secondary access point further up Fourmile Canyon Drive. This point has been identified and is described elsewhere in this report as Trail 7. If this access point and the related trails were established, this location would satisfy some of the demand for a connection. However, it should be noted that it is located 2.7 miles up Fourmile Canyon Drive from Boulder Canyon and presents difficult trail construction challenges. In our opinion, it is not feasible to construct a route appropriate for horses in this location due to the extreme terrain.

A recent property acquisition by BCPOS, known as the *Hannum Property*, was also investigated. This is a narrow 6-acre parcel sandwiched between Betasso Preserve and Fourmile Canyon Drive, located about 1.4 miles from Boulder Canyon. The property is comprised of extremely steep slopes and a section of Skunk Gulch, an intermittent drainage gully. It does not appear feasible to construct a connecting route on the Hannum Property due to steep terrain and narrow width. Many sections of a hypothetical trail would include steep trailside drop-offs, the switchbacks would be very tight and bordered by vertical drops, and some trail segments would be stacked nearly on top of each other, supported by tall retaining walls. This terrain is more extreme than the Pinto access point being studied. Further, there are very limited shoulders, pull-offs, and sightlines along this narrow and curving section of Fourmile Canyon Drive.

18 Construction Cost Estimates

The included construction estimates are based on common natural surface trail costs. It is difficult to provide accurate estimates because many details are yet to be decided. Some factors that would affect cost include: Trail style, width, turning radius, mechanized vs. hand construction, site access, engineering fees, bridges and abutments, environmental permits, riparian issues, blasting and rock breaking, mobilization of crew and equipment, soil type, excavated material dispersal technique, retaining wall/ structure specs, material availability such as rocks for walls, etc.

Trail Construction Estimate

Trail Construction Difficulty Level										
Trail Segment (Proposed)	Length (Feet)	Moderate (%)	Difficult (%)	Extreme (%)	Trail backs	Switch backs	Bridge	Sub Total	Mobilization 10%	Total
1	3,538	60%	35%	5%	\$26,181	\$ -	\$25,000	\$ 51,181	\$ 5,118	\$ 56,299
2	4,224	70%	30%	0%	\$27,878	\$ -	\$ -	\$ 27,878	\$ 2,788	\$ 30,666
3	6,072	40%	40%	20%	\$58,291	\$ 3,000	\$ -	\$ 61,291	\$ 6,129	\$ 67,420
4	5,390	50%	40%	10%	\$44,198	\$ 4,000	\$ -	\$ 48,198	\$ 4,820	\$ 53,018
4 Peak Loop	500	50%	50%	0%	\$ 3,500	\$ -	\$ -	\$ 3,500	\$ 350	\$ 3,850
5A	3,643	40%	40%	20%	\$34,973	\$ 9,000	\$ -	\$ 43,973	\$ 4,397	\$ 48,370
5B	900	55%	40%	5%	\$ 6,750	\$ -	\$ -	\$ 6,750	\$ 675	\$ 7,425
6A	2,640	40%	40%	20%	\$25,344	\$14,000	\$ -	\$ 39,344	\$ 3,934	\$ 43,278
6B	2,710	30%	50%	20%	\$26,558	\$ 6,000	\$ -	\$ 32,558	\$ 3,256	\$ 35,814
7 RR Grade	900	80%	20%	0%	\$ 5,760	\$ -	\$25,000	\$ 30,760	\$ 3,076	\$ 33,836
7 Pinto	1,954	30%	50%	20%	\$19,149	\$20,000	\$ -	\$ 39,149	\$ 3,915	\$ 43,064
9 (estimated)	5,280	50%	40%	10%	\$43,296	\$ -	\$ -	\$ 43,296	\$ 4,330	\$ 47,626
10 (estimated)	7,000	30%	50%	20%	\$68,600	\$ 3,000	\$ -	\$ 71,600	\$ 7,160	\$ 78,760
Loops Collected										
Trail 2,3,4 Loop	15,686							\$ 137,368		\$ 151,104
Trail 2,3,4,9,10 Loop	27,966							\$ 252,264		\$ 277,490
Fourmile Link, Trail 6, 7	5,494							\$ 109,253		\$ 120,179
Alternatives Collected										
Alternative 1 Total (1,2,6,7)	13,256							\$ 188,313		\$ 207,144
Alternative 2 Total 1,2,3,4,6,7)	24,718							\$ 297,802		\$ 327,582
Alternative 3 Total (1,2,3,4,6,7,9,10)	36,998							\$ 412,698		\$ 453,968

Notes:
 Estimates are for hand-built trail, 18-30" wide, rough and rocky tread surface.
 For wider, smoother trail, add approximately 50% to cost.

Unit Costs	Cost per unit
Trail, per linear foot	
Moderate terrain	\$ 6.00
Difficult terrain	\$ 8.00
Extreme terrain	\$ 20.00
Switchbacks/climbing turns, each	
Moderate terrain	\$ 3,000
Difficult terrain	\$ 5,000
Extreme terrain	\$ 7,000

19 Project Notes

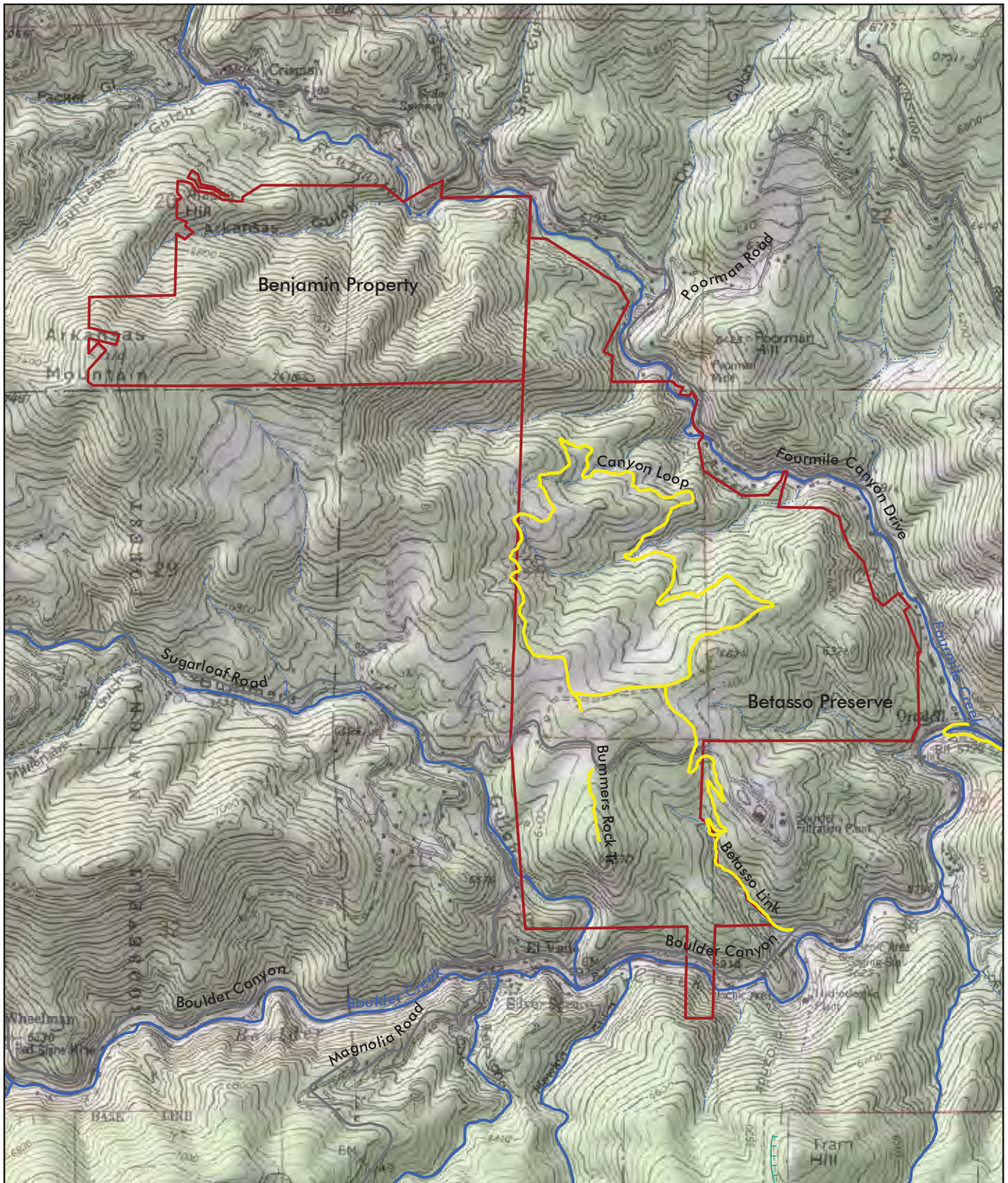
- Trail corridors are flagged in the field using ribbon tied to tree branches at eye-level. Different color flagging is used for each trail segment. Double flags are used to indicate switchbacks.
- Trail routes are general corridors only, with final tread location to be determined prior to construction. However, most flags are placed to indicate the exact recommended tread location.
- Corridors are generally of sufficient width to accommodate minor alignment adjustments to facilitate construction and meet experience goals within localized environmental constraints. It should be assumed that trail corridors are 15ft from either side of center.
- Grades were measured with a handheld clinometer and are fairly accurate. Distances and elevations were calculated from maps and GPS and are not precisely accurate. GPS data was gathered in the field with a 2007 Garmin GPSmap 60CSx handheld. Accuracy ranged from 10-30 feet, however, terrain prevented consistently reliable satellite reception. GPS data in these locations was manually edited to correct obvious errors.
- A variety of place names for locations such as viewpoints and drainages have been invented during the process to facilitate planning and discussion. These names are unofficial.

20 Consultants

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21 Maps

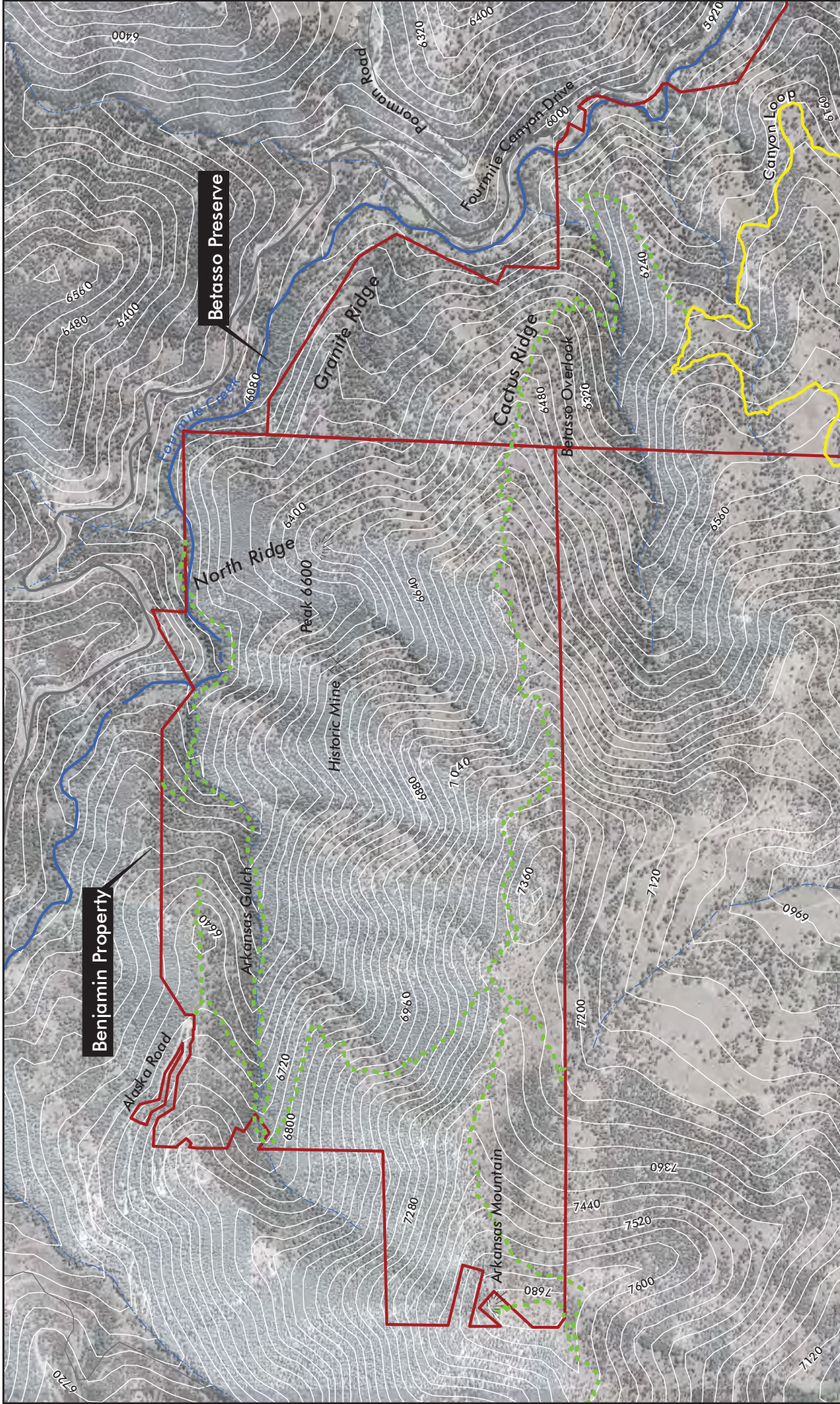


Benjamin/Betasso Trail Feasibility Study




Study Area

-  Benjamin and Betasso Properties
-  Existing Trails

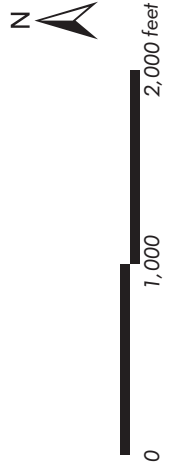


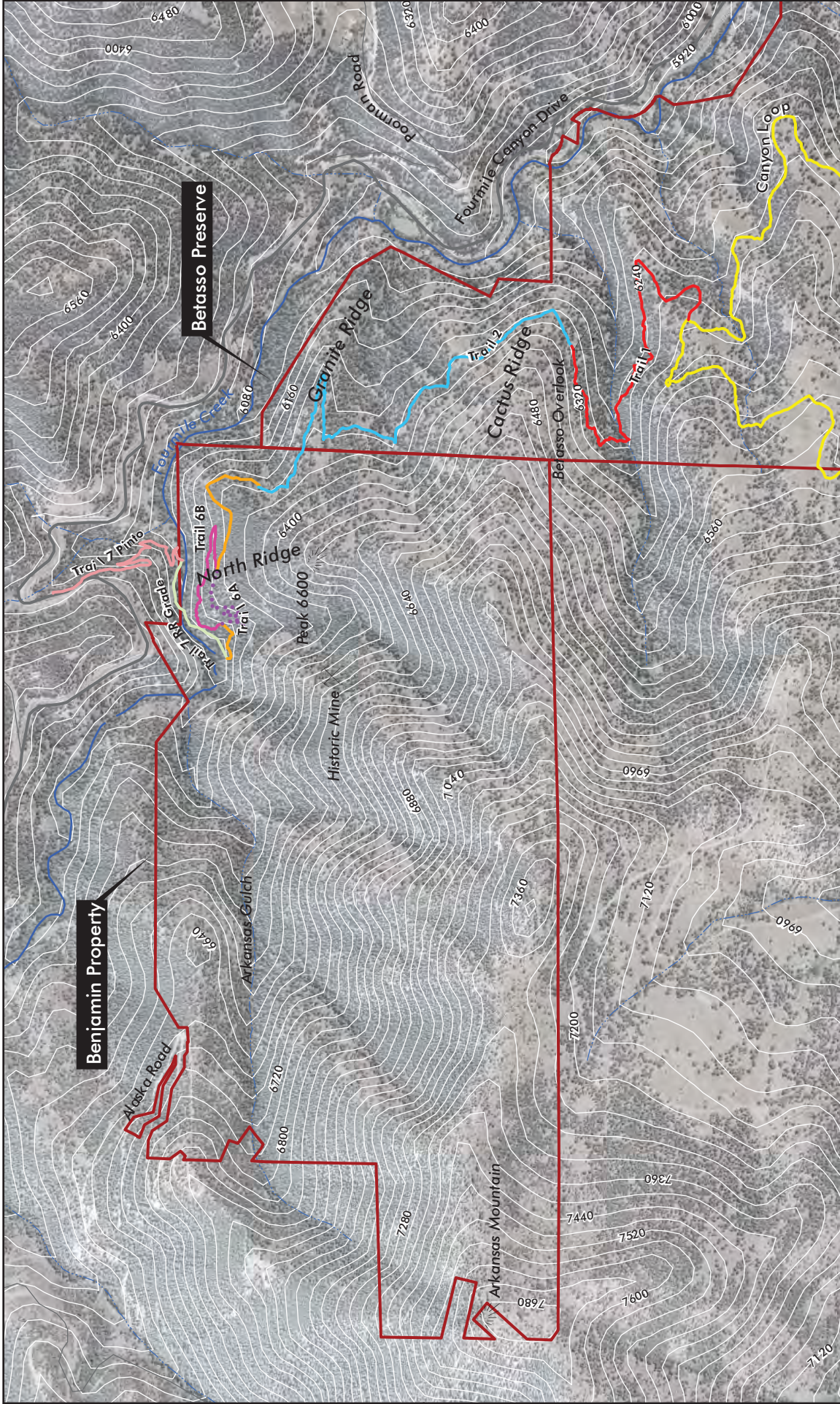


Benjamin/Betasso Trail Feasibility Study

-  Benjamin and Betasso Properties
-  Social Trails
-  Existing Trails

Existing Conditions



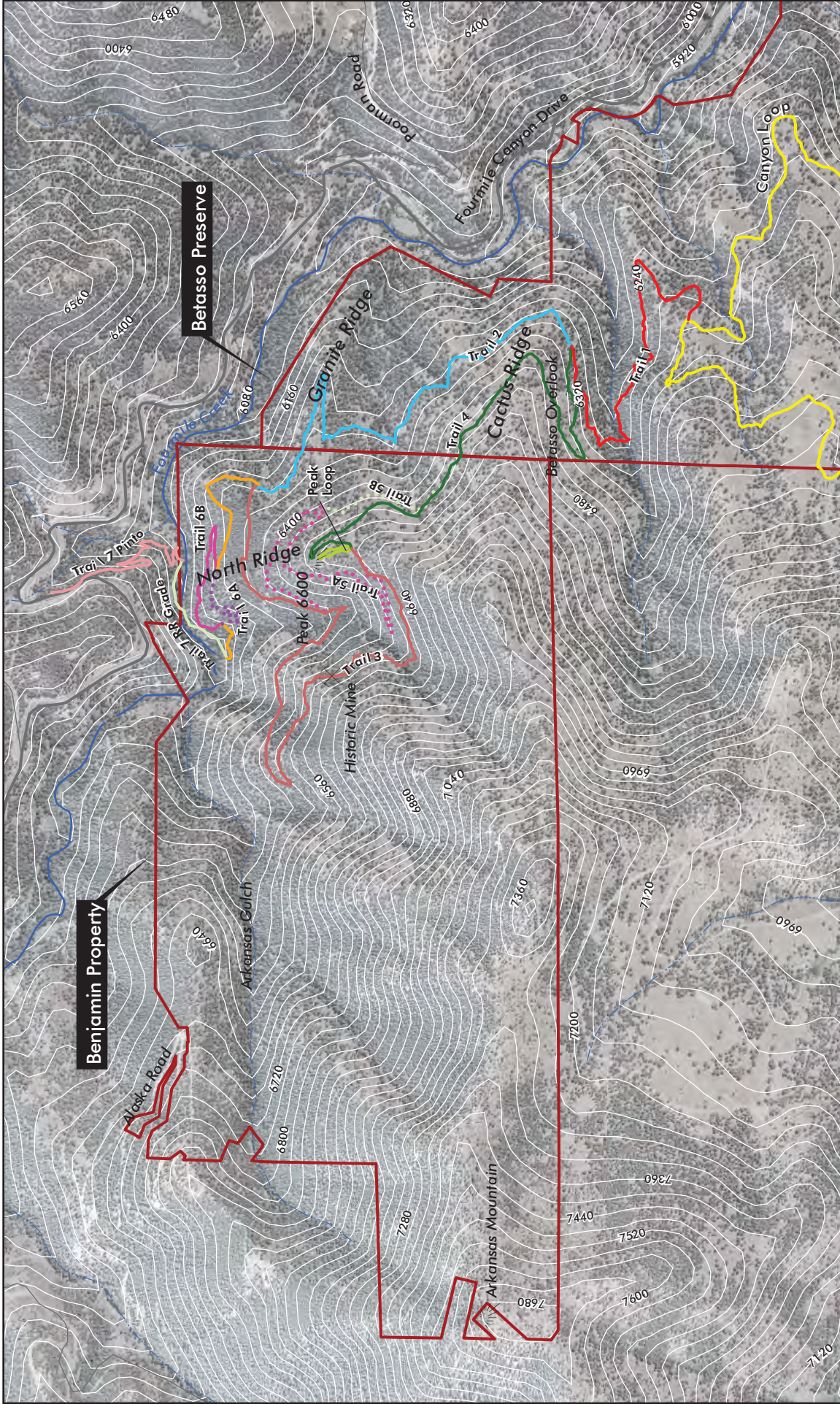


Benjamin/Betasso Trail Feasibility Study

- ▭ Benjamin and Betasso Properties
- ~ Existing Trails

Alternative 1

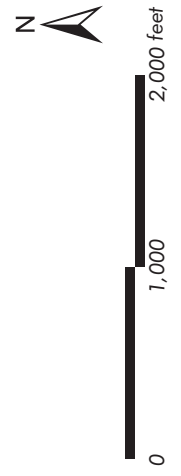


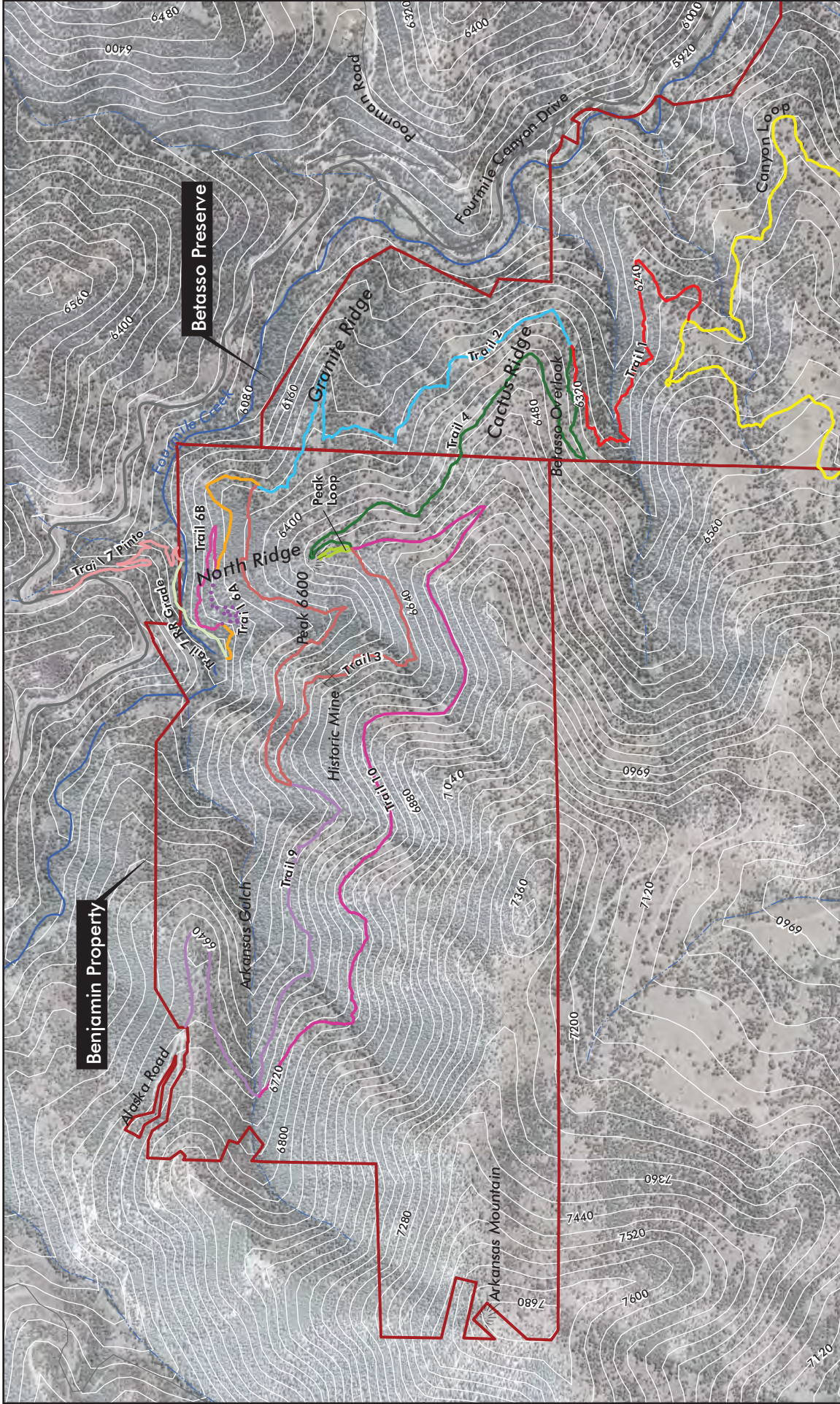


Benjamin/Betasso Trail Feasibility Study

-  Benjamin and Betasso Properties
-  Existing Trails

Alternative 2

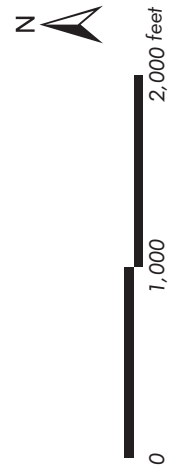




Benjamin/Betasso Trail Feasibility Study

-  Benjamin and Betasso Properties
-  Existing Trails

Alternative 3



N. BCPOS Interdisciplinary Team Members

Appendix N
Betasso Preserve Management Plan
BCPOS Interdisciplinary Planning Teams

Large Team

- Al Hardy – Trails Supervisor
- Amanda Hatfield – Resource Protection / Education and Outreach
- Brent Wheeler – Operations Manager
- Carol Beam – Cultural Resources
- Chad Julian - Forestry and Fire
- Claire DeLeo – Plant Ecology / Restoration
- Dave Hoerath – Wildlife
- Don Burd - Facilities
- Ernst Strenge – Resource Planner / Project Manager
- Jan Burns – Real Estate Manager
- Jennifer Kesler – Plant Ecology
- John Staight – GIS
- Mark Brennan – Wildlife
- Mary Olson – Landscape Architect
- Michael Bauer – Education and Outreach
- Ron Stewart –Director
- Rich Koopmann – Resource Planning Manager
- Sasha Charney – Water Resources
- Steve Sauer – Weed Management
- Therese Glowacki – Resource Management Manager

Small Team

- Al Hardy – Trails Supervisor
- Amanda Hatfield – Resource Protection / Education and Outreach
- Brent Wheeler – Operations Manager
- Chad Julian - Forestry and Fire
- Jennifer Kesler – Plant Ecology / Restoration
- Dave Hoerath – Wildlife Specialist
- Susan Spaulding – Wildlife Technician
- Ernst Strenge – Resource Planner / Project Manager / Lead Author
- Mary Olson – Landscape Architect
- Ron Stewart – BCPOS Director