



SOUTH BOULDER CREEK AREA MANAGEMENT PLAN

October 28, 1998

**City of Boulder
Open Space/Real Estate Department
P.O. Box 791
Boulder, Colorado 80306
(303) 441-3440
<http://openspace.ci.boulder.co.us>**

TABLE OF CONTENTS

LIST OF FIGURES vii

LIST OF TABLES vii

1. INTRODUCTION 1

 1.1 PURPOSE 2

 1.2 GOALS 2

 1.3 DESCRIPTION OF MANAGEMENT AREA 5

 1.4 AREA MANAGEMENT PLANNING PROCESS 5

 1.5 PLAN GUIDANCE 7

 1.6 SUMMARY 7

2. GEOLOGIC/PALEONTOLOGIC RESOURCES 8

 2.1 BACKGROUND 8

 2.2 GOAL STATEMENT 8

 2.3 OBJECTIVES 8

 2.4 MANAGEMENT RECOMMENDATIONS 8

 2.4.1 Objective #1: Identify, document, and evaluate significant geologic and paleontologic resource sites within the Management Area. 8

 2.4.2 Objective #2: Protect and preserve significant geologic and paleontologic resources within the Management Area. 9

 2.4.3 Objective #3: Interpret appropriate sites to promote understanding and appreciation of geologic and paleontologic resources. 10

 2.4.4 Objective #4: Identify properties containing geologic, paleontologic, or other sensitive resources that could be threatened by surface mineral extraction. 10

3. VEGETATION 11

 3.1 INTRODUCTION 11

 3.2 GOAL STATEMENT 12

 3.3 OBJECTIVES 13

 3.4 MANAGEMENT RECOMMENDATIONS 13

 3.4.1 Objective #1: Integrate vegetation management with other resource goals and policies. 13

 3.4.2 Objective #2: Protect native plant community health using or simulating natural processes where possible. 14

 3.4.3 Objective #3: Prevent new infestations and manage existing infestations of priority non-native species of concern using the Integrated Pest Management planning process. 22

3.4.4	Objective #4: Protect and maintain rare species and communities of special concern.	31
3.4.5	Objective # 5: Establish and manage Special Land Designations (e.g., State Natural Areas) to highlight areas and communities with exceptional natural value.	35
3.4.6	Objective #6: Restore, reclaim, and enhance native vegetation in areas with restoration potential and/or reclamation needs. Use native plant species in the reclamation of areas impacted by development, land use, exotic plant control, and other ground disturbances.	36
3.4.7	Objective #7: Inventory and monitor native vegetation to evaluate the potential effects of land use and to measure the effectiveness of vegetation management techniques.	39
4.	WETLANDS AND RIPARIAN AREAS	41
4.1	BACKGROUND	41
4.2	GOAL STATEMENT	42
4.3	OBJECTIVES	42
4.4	MANAGEMENT RECOMMENDATIONS	42
4.4.1	Objective #1: Preserve and protect important wetland and riparian areas.	42
4.4.2	Objective #2: Restore or enhance suitable wetlands and riparian areas.	43
4.4.3	Objective #3: Monitor wetland and riparian related issues.	45
5.	WILDLIFE	47
5.1	BACKGROUND	47
5.2	GOAL STATEMENT	48
5.3	OBJECTIVES	49
5.4	MANAGEMENT RECOMMENDATIONS	49
5.4.1	Objective #1: Inventory wildlife species to establish accurate and replicable monitoring and evaluate effectiveness of land management techniques.	49
5.4.2	Objective #2: Maintain and/or restore wildlife habitat and/or populations at risk, based upon results of ecological research and site-specific monitoring.	50
5.4.3	Objective #3: Coordinate wildlife management in the Management Area with other resource management plans and agencies such as the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i>	51
5.4.4	Objective #4: Integrate wildlife population and habitat protection/ enhancement into other resource management actions.	53
6.	CULTURAL RESOURCES	55
6.1	BACKGROUND	55
6.2	GOAL STATEMENT	55
6.3	OBJECTIVES	55
6.4	MANAGEMENT RECOMMENDATIONS	55

6.4.1	Objective #1: Identify, document, and evaluate significant national, state, and local cultural resource sites, landscapes, and themes within South Boulder Creek.	55
6.4.2	Objective #2: Protect and preserve significant national, state, and local cultural resources within the Management Area.	56
6.4.3	Objective #3: Interpret sites and educate visitors to understand and appreciate cultural resources.	58
7.	PROPERTY	60
7.1	BACKGROUND	60
7.2	GOAL STATEMENT	61
7.3	OBJECTIVES	61
7.4	MANAGEMENT RECOMMENDATIONS	61
7.4.1	Objective #1: Acquire lands surrounding and within the Management Area that meet Open Space Charter and area management goals.	61
7.4.2	Objective #2: Research and document all easements and mineral and water rights in the Management Area.	62
7.4.3	Objective #3: Monitor existing Open Space conservation and other easements for compliance.	62
7.4.4	Objective #4: Work with adjacent landowners and agencies on cooperative management issues.	63
7.4.5	Objective #5: Establish appropriate leases to meet management goals.	63
7.4.6	Objective #6: Coordinate and integrate reviews of new acquisitions.	63
8.	FACILITIES	65
8.1	BACKGROUND	65
8.2	GOAL STATEMENT	65
8.3	OBJECTIVES	65
8.4	MANAGEMENT RECOMMENDATIONS	66
8.4.1	Objective #1: Ensure proper management of existing buildings and structures.	66
8.4.2	Objective #2: Ensure all facilities are safe and maintained to an acceptable standard.	67
8.4.3	Objective #3: Develop policies for the use of facilities.	67
9.	AGRICULTURE	68
9.1	BACKGROUND	68
9.2	GOAL STATEMENT	68
9.3	OBJECTIVES	69
9.4	MANAGEMENT RECOMMENDATIONS	69
9.4.1	Objective #1: Enhance the balance between natural resources and agricultural practices.	69

9.4.2	Objective #2: Use agricultural facilities as appropriate and make improvements to the facilities so that benefits will be maximized.	73
9.4.3	Objective #3: Use the City's adjudicated water rights effectively and efficiently to sustain the natural values of the area.	74
10.	PASSIVE RECREATION	78
10.1	BACKGROUND	78
10.2	GOAL STATEMENT	78
10.3	OBJECTIVES	79
10.4	MANAGEMENT RECOMMENDATIONS	79
10.4.1	Objective #1: Provide a variety of appropriate quality passive recreational activities, outdoor education opportunities, and visitor services where consistent with overarching environmental values.	79
10.4.2	Objective #2: Preserve scenic vistas and undeveloped views.	83
10.4.3	Objective #3: Provide trails, access points, and passive recreational facilities to accommodate appropriate uses and to connect with adjacent trail systems.	83
10.4.4	Objective #4: Provide safe passive recreational experiences.	89
10.4.5	Objective #5: Minimize passive recreational impacts to natural, cultural, and agricultural resources.	90
11.	PUBLIC SAFETY AND RESOURCE PROTECTION	92
11.1	BACKGROUND	92
11.2	GOAL STATEMENT	92
11.3	OBJECTIVES	92
11.4	MANAGEMENT RECOMMENDATIONS	93
11.4.1	Objective #1: Improve levels of service and coverage to enhance emergency response for medical, fire, flood, and law enforcement incidents.	93
11.4.2	Objective #2: Continue to enforce laws, including state hunting and fishing regulations and local laws.	93
11.4.3	Objective #3: Enhance patrol activities to educate the public, monitor natural and cultural resource impacts, and respond to visitor conflicts with the ultimate objective of proactively reducing the need for future enforcement	94
11.4.4	Objective #4: Improve levels of patrol to increase awareness and compliance with agreements in the Dog Management Plan.	94
11.4.5	Objective #5: Evaluate public safety hazards such as mine subsidence areas, flood hazards, tree hazards, and wildlife interactions.	94
12.	EDUCATION AND OUTREACH	96
12.1	BACKGROUND	96
12.2	GOAL STATEMENT	96
12.3	OBJECTIVES	97
12.4	MANAGEMENT RECOMMENDATIONS	98

12.4.1 Objective #1: Disseminate information concerning the ecology, natural history, and cultural history of the area. 98

12.4.2 Objective #2: Disseminate information concerning the goals, projects, and operations of the Open Space Program. 98

12.4.3 Objective #3: Disseminate information about the situations that arise when humans interact with natural systems and about ways of lessening or eliminating the impact of these interactions. 99

12.4.4 Objective #4: Conduct projects and activities that provide opportunities for people to establish a relationship with the Open Space Program and land system. 99

12.4.5 Objective #5: Engage in public participation processes which provide opportunities for public input and involvement in Open Space planning and decision making. 100

12.4.6 Objective #6: Identify goals and priorities for volunteer programs in the South Boulder Creek area and implement these programs with neighbors, visitors, and interest groups. 100

13. PLAN IMPLEMENTATION 101

PLAN CONTRIBUTORS 163

REFERENCES 165

APPENDICES 168

APPENDIX 1.1 CHARTER OF THE CITY OF BOULDER, COLORADO 168

APPENDIX 1.2 PUBLIC COMMENT RESPONSE SUMMARY 169

APPENDIX 3.1: COORDINATED RESOURCE MANAGEMENT FRAMEWORK FOR THE SOUTHERN PORTION OF THE SOUTH BOULDER CREEK MANAGEMENT AREA 220

APPENDIX 3.2 INTERIM WILDFIRE MANAGEMENT PLAN 250

APPENDIX 3.3 PRESCRIBED BURN PLAN OUTLINE 255

APPENDIX 3.4 (DRAFT) FIRE MANAGEMENT PLANNING IN THE SOUTHERN PORTION OF THE MANAGEMENT AREA 257

APPENDIX 3.5 PREVENTION AND CONTROL OF TARGET WEED SPECIES 264

APPENDIX 3.6 UNDESIRABLE PLANT SPECIES 274

APPENDIX 3.7 COLORADO TALLGRASS PRAIRIE NATURAL AREA ARTICLES OF DESIGNATION 276

APPENDIX 3.8 SOUTH BOULDER CREEK NATURAL AREA DRAFT ARTICLES OF DESIGNATION 283

APPENDIX 4.1 ACTION ITEMS IN THE SOUTH BOULDER CREEK MANAGEMENT PLAN APPLICABLE TO THE INSTREAM FLOW AND RIPARIAN MANAGEMENT STRATEGY 290

APPENDIX 5.1 PRAIRIE DOG COLONY DESIGNATIONS AND BOUNDARY
CHANGES 296

LIST OF FIGURES

FIGURE

1.1	South Boulder Creek Management Area.	3
1.2	Management Area Units	4
1.3*	Natural Areas	
3.1	Sub-Areas	18
5.1	Prairie Dog Habitat Conservation Areas and Transitional Areas.	52
7.1*	Property, Acreage, Year of Acquisition	
9.1	Selected Agricultural Management Changes.	72
10.1	Dog Regulations.	82
10.2	Trail Proposals.	84
10.3*	Dry Creek Options	
10.4	Greenbelt Trail Options.	87

*These figures are not incorporated into the text. They are located together at the end of the document.

LIST OF TABLES

TABLE

13.1	Prioritized Management Actions	103
------	--------------------------------------	-----

1. INTRODUCTION

Vision

Dateline Boulder 2020 - City officials today held a celebration of the South Boulder Creek Open Space Management Area, 43 years after the first Open Space land was preserved in the Management Area. Not only did they celebrate the purchase of area properties, they lauded the citizen support for wise management that took a long-term view and preserved the land's wild value.

Mayor Smith said "I remember as a child my grandparents taking me for hikes or pointing out the area as we drove by on our way home from Denver. Now the metro area has grown together, except for our Open Space. But what is every bit as impressive was our forethought on how to manage the land. Preservation is more than not allowing houses to be built, it is wise management and the willingness to leave room for wildlife.

"We listened to the public and we worked to preserve the extraordinary wildlife diversity in the area. Our planning of appropriate trail alignments provided us with an opportunity to hike and bike and preserve rare species such as the Ute ladies'-tresses orchid and Preble's meadow jumping mouse.

"We also carried out our charge to preserve agriculture in the Valley by using prescriptive grazing to achieve objectives such as weed control. We recognized the threat to the wildlife diversity that weeds are and worked hard to control them.

"The bottom line is that I can now take my grandchildren out and show them the

treasure we have preserved, through acquisition and wise management. If we continue our path, my grandchildren will be able to do the same with their grandchildren."

Officials echoed the Mayor's comments and pointed to the emphasis that was placed on the north, middle, and southern parts of the South Boulder Creek Management Area.

Former Open Space Board Trustee Martha Brown, a Board member at the time the first South Boulder Creek Area Management Plan was adopted, explained the Board's vision for each part. "To the north, near Fourmile Canyon Creek, we made agriculture the dominant theme. Trails were placed to provide visitors with a good experience and minimize the impact to agricultural operations and important habitats.

Brown continued, "In the middle part of the Management Area, impacts from adjacent commercial development and past aggregate operations near Boulder Creek made the area a definite management challenge. Restoration was conducted where it made sense and recreational opportunities were provided.

"To the south along South Boulder and Dry Creeks, an area more rich in wildlife and rare species, more of an emphasis was placed on native plants and animals. Much of this richness is centered around the riparian area of South Boulder Creek. Water was acquired to sustain the fish and insect

life in the winter months when the creek used to run dry. The riparian area was managed primarily for wildlife, including the threatened Ute ladies'-tresses orchid and Preble's meadow jumping mouse. Trail options were pursued away from these sensitive areas. Grazing was used prescriptively so that impacts were managed

and management objectives, such as weed control, were achieved.

She concluded, "By thinking long-term and managing thoughtfully, I think we've left a priceless legacy for citizens to enjoy and for the wildlife that depend on the area for continued survival."

1.1 PURPOSE

The purpose of the South Boulder Creek Area Management Plan (Figure 1.1) is to provide specific management direction for natural, cultural, agricultural, and passive recreational resources, to resolve potential conflicts between management goals, and to ensure effective public participation. South Boulder Creek is one of six distinct areas delineated for area management planning; area delineation was based primarily on size, watershed, location, and land uses (Figure 1.2).

Land and resource management is based on the best available information. Results of monitoring the effects of land uses and management actions over time will help determine adaptive management responses to changing natural conditions.

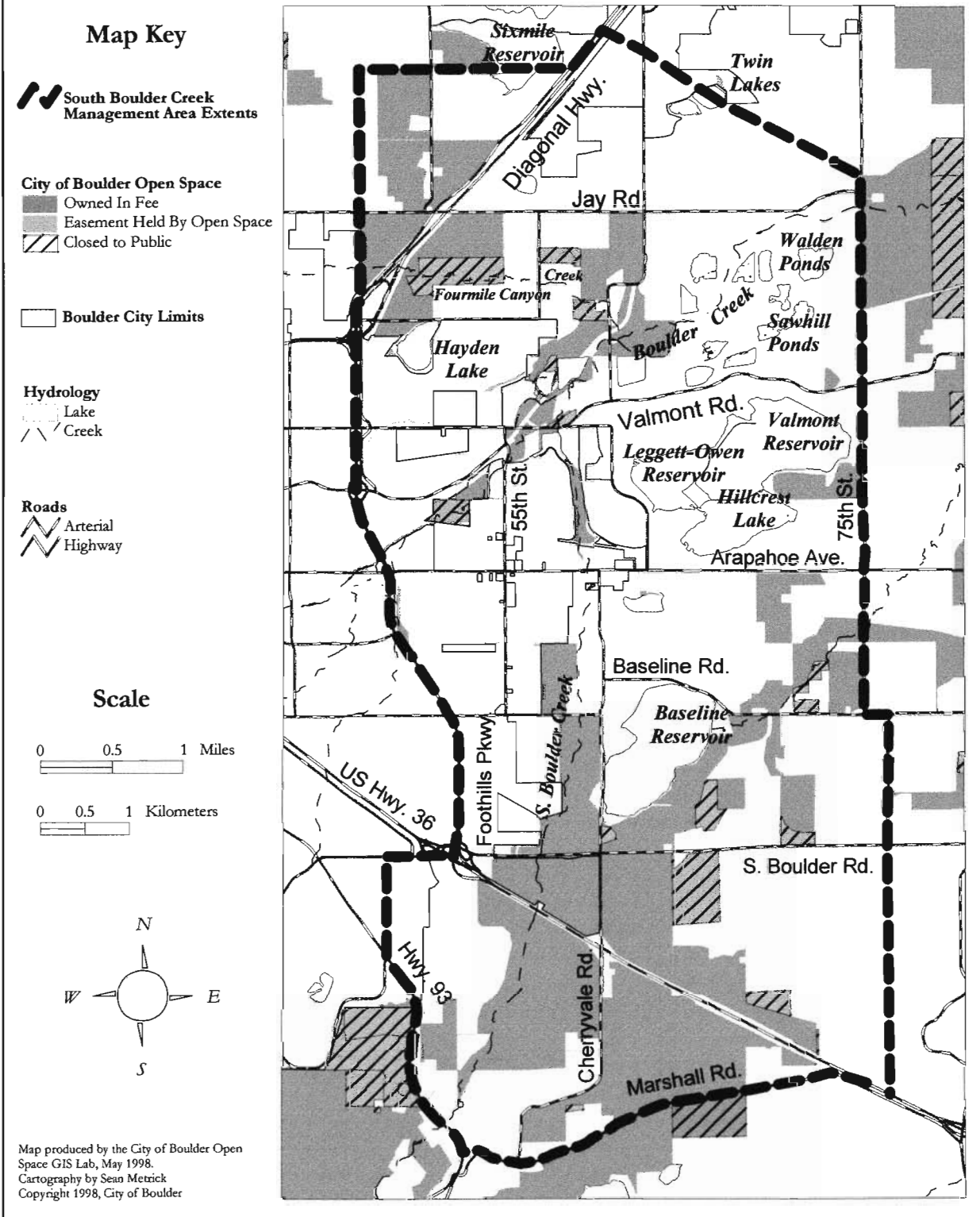
1.2 GOALS

Plan goals provide the framework to guide the development of the management actions for the South Boulder Creek Management Area. These broad goals are further defined in the accompanying resource chapters of this Plan. Each resource chapter contains specific resource goals, objectives, and management actions.

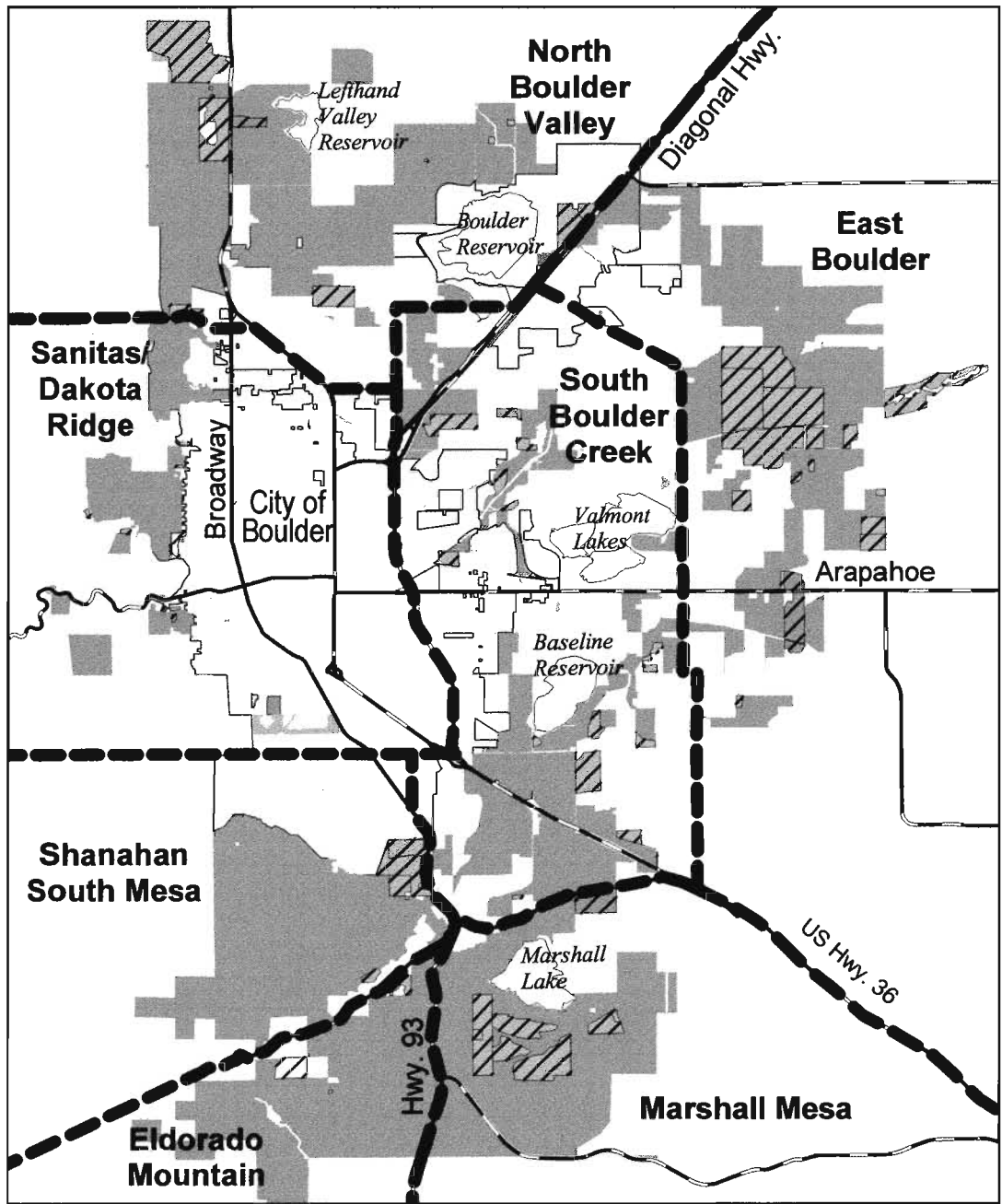
The goals of the South Boulder Creek Area Management Plan are:

- **Acquire lands consistent with the Open Space Charter (Appendix 1.1) and the Area Management Plan goals and ensure proper management of easements and Open Space properties**
- **Manage and preserve the natural and cultural resources of South Boulder Creek**
- **Restore and improve natural, cultural, passive recreational, and agricultural resources where suitable**
- **Manage and preserve land for passive recreational use, for its aesthetic or passive recreational value, and for its contribution to the quality of life of the community**
- **Maintain sustainable agricultural operations by balancing economic and natural resource considerations**

**Figure 1.1:
South Boulder Creek Management Area**



**Figure 1.2: Management Area Units
South Boulder Creek Management Area**



City of Boulder Open Space
 ■ Owned by Open Space
 ■ Easement Held by Open Space
 ▨ Closed to Public

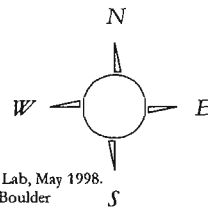
South Boulder Creek Management Area Extents

Map Key

□ Boulder City Limits
 ○ Major Lakes
 ≡ Highway

Scale

0 1 2 Miles
 0 1 2 Kilometers



Map produced by the City of Boulder Open Space GIS Lab, May 1998.
 Cartography by Sean Metrick. Copyright 1998, City of Boulder

- **Use education and outreach to accomplish the management goals of the South Boulder Creek Area Management Plan**

1.3 DESCRIPTION OF MANAGEMENT AREA

The combination of topography, climate, geology, hydrology, and soils results in a rich ecological matrix. The ponderosa pine scarp woodlands with native grass and shrubs on Davidson Mesa, xeric tallgrass, mixed grass and shortgrass prairies, lush riparian corridors along creeks and lakes--all are significant plant communities in the Management Area. Rare plants, such as Ute ladies'-tresses orchid (*Spiranthes diluvialis*), American groundnut (*Apios americana*), and the toothcup (*Rotala ramosior*) occur in the moist lowlands. Four streams, abundant ponds and reservoirs, and extensive irrigation ditches support numerous wetlands, including sedge meadows, cattail marshes, and lake shorelines.

These diverse plant communities and water sources support a wide variety of mammals, birds, reptiles, amphibians, and invertebrates. Grassland habitats and riparian areas provide critical habitat for sensitive species, such as the bobolink. Riparian areas support a myriad of wildlife, including the Preble's meadow jumping mouse that is listed as threatened under the Endangered Species Act. The Management Area is also home to two rare fish species: the orange-spotted sunfish and the plains topminnow. Records reveal the presence of 62 species of state or federal concern: 54 bird species, six mammal species, and two fish species.

Fertile soils and abundant water make the bottomlands and terraces of the area agriculturally rich and help maintain the rural character in the southern end of the Boulder Valley. Predominant agricultural operations include cattle grazing and harvesting of irrigated forage crops (hay).

The Management Area supports a variety of recreational uses. Common activities include jogging, bicycling, exercising pets, hiking, horseback riding, photography, and wildlife viewing. Historic meanders and oxbows of South Boulder Creek offer a quiet respite from the daily bustle or an opportunity to observe or study a variety of plant and animal life.

The *South Boulder Creek Management Area Inventory Report* (City of Boulder 1997b) contains detailed information on resources and land uses accompanied by extensive resource maps. The *Inventory Report* is designed as a reference and is the data source for the South Boulder Creek Area Management Plan.

1.4 AREA MANAGEMENT PLANNING PROCESS

An interdisciplinary team of Open Space staff was formed in 1997 to develop a management plan for the City of Boulder Open Space lands in the South Boulder Creek Management Area. The purpose of the interdisciplinary team was to integrate the various skills and expertise within the Open Space Program into a common problem-solving effort. The interdisciplinary team is

primarily responsible for implementing the planning process necessary to meet the goals of the Management Area. Steps in the planning process are:

1. Identify issues and concerns
2. Conduct a thorough resource inventory and complete an inventory report
3. Develop general management direction
4. Draft plan with proposed management objectives and actions
5. Adopt and implement plan
6. Monitor and revise the selected plan

Public participation in the planning process was extensive.

The first step in the planning process began in the spring of 1995. The interdisciplinary team defined the Management Area and drafted the initial issues and concerns to be addressed in the Plan. South Boulder Creek Management Area issues and concerns were identified at a public forum held May 8, 1997. New issues from the forum were brought to the attention of the team. The team incorporated them and began developing a resource inventory report to provide the information needed to resolve these issues.

The *South Boulder Creek Management Area Inventory Report* was completed in mid-September 1997 and reviewed at a public open house held September 24, 1997. After the open house, the results of the *Inventory Report* were presented to the Open Space Board of Trustees.

Public field trips were held January 9 and 10, 1998, to review and seek input on significant issues within South Boulder Creek. A panel discussion with the Open Space Board of Trustees and selected interest groups was held on February 11, 1998, to review information and refine the general management direction for the area. The general management direction was approved by the Open Space Board of Trustees on February 11, 1998 following public comment.

Staff met with the Greenbelt Meadows homeowners four times from April through July and held a field trip at Dry Creek Trail on August 12. Staff also interviewed various interest group representatives on how to improve public outreach process. A "citizens' guide" plan summary was prepared and mailed to individuals and groups for review. Public participation opportunities on the draft included: an open house on August 26 and comment opportunities at the Open Space Board meetings on August 26, September 9 and 23, and October 14. Additional input opportunities included field trips, e-mail, mail, and informal conversations with individuals and groups. The Revised Plan was approved with two changes and made final on October 28, 1998.

At each step listed above the plan was improved using suggestions from the public. Appendix 1.2 provides a summary of comments received by staff in the inventory, general management direction, and draft stages of the planning process and how they have been addressed in the plan. Each open house and public meeting was announced in local newspapers, posted on information boards throughout the Management Area, advertised on the Internet, publicized in the Open

Space newsletter, advertised in utility bill inserts, and notices were mailed to interested individuals.

Open Space staff will develop implementation strategies and integrate the approved management actions into annual work programs and capital improvement projects. Annual work programs and capital improvement projects are reviewed and approved by City Council through the City's budget process. The Plan will be monitored and evaluated on an annual basis.

1.5 PLAN GUIDANCE

The Planning Context chapter in the *South Boulder Creek Management Area Inventory Report* outlines the basis for the policies and direction of the Open Space Program in the Boulder Valley. Area management plans translate the general direction contained in the Open Space *Long Range Management Policies* (City of Boulder 1995), City of Boulder Charter, *Boulder Valley Comprehensive Plan* (City of Boulder 1996b), and the *Colorado Tallgrass Prairie Management Plan* (Colorado Natural Areas Program 1986) into specific management actions on the ground.

Portions of the South Boulder Creek floodplain and nearby terraces were registered as the South Boulder Creek State Natural Area in 1998 (Figure 1.3*). Registration is the second in a three-step process in designating a State Natural Area. Final approval will be sought after the South Boulder Creek Area Management Plan is completed because it will be the management plan for the South Boulder Creek Natural Area (see Vegetation chapter).

1.6 SUMMARY

The following chapters of this Plan have been arranged by individual resource for organizational purposes. However, it is important to note that all resources are interconnected and interdependent. Each chapter has been reviewed by the interdisciplinary team to integrate the various resource goals, objectives, and recommended management actions. In many cases, individual resource objectives and management actions are so closely related that some repetition occurs between chapters.

The Implementation chapter describes overall plan priorities, with management actions prioritized into tiers. The tiers will be used to determine annual work programs and will incorporate the management needs of South Boulder Creek with those of the rest of the Open Space system.

Monitoring outcomes of the recommended management actions will result in adjustments through the use of a dynamic management approach. Success will be measured by the long-term health and functional integrity of the land.

2. GEOLOGIC/PALEONTOLOGIC RESOURCES

2.1 BACKGROUND

The extent and significance of the geologic/paleontologic resources within the South Boulder Creek Management Area are not fully known. However, the general area around Marshall near Highway 170 is recognized for its geologic/paleontologic resources, and other important sites have also been located within the Management Area. Many of these resources are considered irreplaceable. A comprehensive inventory of these geologic and paleontologic resources should be conducted, and suitable sites identified and interpreted. Visitor use should be discouraged or restricted in sensitive areas. Every effort will be made to preserve and protect significant geologic and paleontologic resources whenever possible and reasonable. Interpreting, protecting, and preserving significant and fragile geologic and paleontologic resources are major management challenges.

2.2 GOAL STATEMENT

The following broad goal statement was developed to guide geologic and paleontologic resource conservation for the South Boulder Creek Management Area:

Preserve and interpret significant geologic and paleontologic resources of the area.

2.3 OBJECTIVES

The Open Space Program has set the following objectives in order to meet the geologic and paleontologic resource management goal. The objectives are:

- Identify, document, and evaluate significant geologic and paleontologic resources within the Management Area
- Protect and preserve significant geologic and paleontologic resources within the Management Area
- Interpret appropriate sites to promote understanding and appreciation of geologic and paleontologic resources
- Identify properties containing geologic, paleontologic, or other sensitive resources that could be threatened by surface mineral extraction

2.4 MANAGEMENT RECOMMENDATIONS

2.4.1 Objective #1: Identify, document, and evaluate significant geologic and paleontologic resource sites within the Management Area.

The extent and significance of geologic/paleontologic resources within the Management Area have yet to be fully explored. An inventory of these resources should be conducted, suitable sites identified and interpreted, and visitor use should be discouraged or restricted in sensitive areas.

Recommended Management Actions

- Inventory significant paleontologic resources in the area. Significant fossils, for the purpose of this Management Plan, include vertebrate fossils and any invertebrate fossils that are commonly collected without permits.
- Prepare a map of the area locating geologic and paleontologic features of: (1) educational significance, (2) known sites of rare or unique rock, mineral, or fossil occurrences, and (3) potential locations of illegal “casual collecting” of rock, mineral, and fossil specimens. The base map on which the various sites are located should be a geologic map because geologic specimens found in one site within a formation are often found at other sites in the same formation. This map will be used by Open Space to aid in the protection and management of these resources (e.g., patrol and monitoring).

2.4.2 Objective #2: Protect and preserve significant geologic and paleontologic resources within the Management Area.

Protecting and preserving geologic and paleontologic resources present unique challenges. Generally, only vertebrate fossils may be protected under the authority of various federal and state laws. On City of Boulder Open Space lands, all geologic and paleontologic resources are protected from collection. Special management actions may be required to protect geologic and paleontologic resources on Open Space lands and should be considered on a case-by-case basis. These measures will vary with individual situations but may include: (1) physical protection, such as fences, grills, barriers, and other structures, (2) increased patrol of properties which are especially vulnerable to vandalism or other damage, (3) use of signs where they will not attract attention to otherwise inconspicuous sites, (4) development of measures which consider geologic and paleontologic resource management in other resource management and development programs, (5) avoiding publicity about resources susceptible to vandalism. Anonymity of sites, where necessary for their preservation, should be maintained by careful review of any requests from the public for locational information, (6) gaining public understanding and support through education and interpretation efforts, (7) closing of sites or areas, and (8) selected removal and preservation of rare or unique geologic and paleontologic specimens that are fragile or susceptible to erosion, vandalism, or theft. Records will be made of the nature and location of geologic and paleontologic resources as outlined under Objective 2.4.1. Once the decision to recover geologic and paleontologic resources has been made, all materials collected will be stored and maintained in an authorized repository except when being used for display, research, evaluation, or other educational purposes, as approved by the Open Space Program.

Recommended Management Actions

- Interpret suitable sites (see Objective 2.4.3).

- Discourage public access in areas susceptible to damage and vandalism.
- Notify Open Space staff of known geologic and paleontologic resource sites and potential locations of illegal “casual collecting” sites, and patrol these areas on a routine basis.
- Train Open Space staff to identify potential geologic and paleontologic resources in the field.

2.4.3 Objective #3: Interpret appropriate sites to promote understanding and appreciation of geologic and paleontologic resources.

Gaining public understanding and support through education and interpretation is one of the most effective ways to protect geologic and paleontologic resources. Suitable geologic and paleontologic resource sites should be identified and interpreted. Suitable geologic and paleontologic resource sites for education are generally sites which are well known and that are not susceptible to vandalism. Interpretive signs should only be used where they will not attract attention to an otherwise inconspicuous site.

Recommended Management Actions

- Interpret suitable sites. Geologic and paleontologic interpretive themes should focus on geologic processes such as the formation of the Rocky Mountains and their relationships to the history of the area (coal mining and agricultural land uses).
- Interpret the foothill riparian and floodplain transition zones as the geographic boundary between the High Plains and the Rocky Mountains. A discussion about the functions and importance of these areas in relation to their limited extent could be developed for the Management Area.
- Discourage access in areas susceptible to damage and vandalism (e.g., erodible soil types, rare vertebrate fossils).

2.4.4 Objective #4: Identify properties containing geologic, paleontologic, or other sensitive resources that could be threatened by surface mineral extraction.

Much of the Management Area lies within the floodplains of Boulder Creek, Fourmile Canyon Creek, and South Boulder Creek. The floodplains are frequently identified as the best areas for extractive (gravel) mining. Where practicable, mineral rights should be acquired to avoid adverse impacts to geologic, paleontologic, or other sensitive resources which result from gravel mining (see Property chapter, Objective 7.4.2).

Recommended management actions

- Of the Management Area properties that have sensitive geologic or paleontologic resources, identify the ones that do not have mineral rights included in their title.
- Rank the properties for priority and practicality of acquiring the mineral rights.

3. VEGETATION

3.1 INTRODUCTION

This chapter of the South Boulder Creek Area Management Plan provides guidelines for managing and restoring native upland plant communities. Wetland and riparian communities and predominantly non-native agricultural areas will be handled in separate chapters of the Plan. Although it is practical to separate major vegetation types in a planning document, many vegetation and land use types overlap in terms of ecology and on-the-ground management.

The Vegetation chapter provides recommended management actions and groups them by major objectives. Area specific actions identify a subarea, property cluster, or individual property for which the action is designed.

The Role of Native Plants

Native plants provide the basic structure and energy base for natural communities. Plant species diversity supports wildlife diversity by providing shelter, food, and nutrient cycling. Plant roots anchor soil and slow erosion and provide food for extensive underground communities of micro-organisms that cycle nutrients and allow the soil to support plants. Healthy native plant communities can serve as reference points for the restoration of degraded communities on similar sites. Diverse, colorful, and intriguing plant communities provide high-quality visitor experiences. The native ecosystems in the South Boulder Creek Management Area are part of a rich natural heritage that can be passed on to future generations through good land stewardship.

Overview of Vegetation and Management Direction

Native vegetation in the Management Area consists of short/midgrass prairie, mid/tallgrass prairie, tallgrass prairie, plains and foothills (scarp) shrubland, riparian woodland, wet meadows, and other wetland communities. Wetland vegetation is discussed in another chapter of this Plan. Some of the major influences affecting plant community character and condition are natural disturbances, soil types, topography, hydrology, wildlife interactions, invasion by non-native plant species, land use, and land management. Many of today's vegetation management challenges in the Boulder Valley stem from past land use, including water manipulation for irrigation, livestock grazing, fire suppression, and the intentional or accidental introduction of non-native plant species.

Priorities for native vegetation management in the Management Area are to preserve biological diversity at a variety of scales and to improve the condition of native plant communities. These goals can be accomplished by allowing and encouraging the function of natural processes and simulated natural processes, integrated weed management, and other restoration activities. Native plant conservation and management plans have been developed within the landscape context of Boulder Valley and the Colorado Front Range. The coordination of land stewardship

with surrounding landowners and public land management agencies is an important component of the program.

Rare Plant Species and Communities and Special Land Designations

The southern half of the Management Area contains important habitat for rare plant species and communities and numerous rare animal species. Most of the Ute ladies'-tresses orchid (*Spiranthes diluvialis*) occurrences in Boulder County are in the South Boulder Creek floodplain and nearby terraces. Other rare or unusual species known from the area are American groundnut (*Apios americana*), dwarf indigo (*Amorpha nana*), and toothcup (*Rotala ramosior*). The *Inventory Report* (City of Boulder 1997b) and the rare species objective below provide more detail.

Xeric and mesic tallgrass communities in the southern half of the Management Area are considered some of the best examples in the state (Moir 1972, Baker and Galatowitsch 1985, Colorado Natural Areas Program 1986). In 1984, several high-quality tallgrass community patches were designated as the Colorado Tallgrass Prairie Natural Area by the Colorado Natural Areas Program in cooperation with the Open Space Program. In 1998, portions of the South Boulder Creek floodplain and nearby terraces were registered by the Colorado Natural Areas Program as the South Boulder Creek Natural Area. The South Boulder Creek Natural Area features tallgrass patches, wetlands, riparian forest, and rare plant and animal habitats.

The balancing of rare species and community protection and management, agricultural practices, and recreational use in the Management Area is one of the most complex natural area management challenges in the Boulder Valley. An overall program goal is to sustain this sensitive, complex system over the long-term. There is a critical need for detailed management planning and continual, integrated management in order to accomplish this goal.

3.2 GOAL STATEMENT

Preserve and maintain native plant communities, protect rare species and communities, and restore native vegetation in suitable areas.

Major Assumptions

- Native plant communities are dynamic over time in terms of spatial distribution and species composition. Management planning needs to consider and allow for vegetation dynamics.
- The preservation of native plant communities is largely dependent on: (1) the preservation and management of natural processes (e.g., hydrologic regime, fire, wildlife activity) that support native plant species, and (2) the protection of these communities from highly competitive non-native species.

3.3 OBJECTIVES

- Integrate vegetation management with other resource goals and policies.
- Protect native plant community health using or simulating natural processes where possible.
- Prevent new infestations and manage existing infestations of priority non-native species of concern by using the Integrated Pest Management planning process.
- Protect and maintain rare species and communities of special concern.
- Restore, reclaim, and enhance native vegetation in areas with restoration potential and/or reclamation needs. Use native plant species in the reclamation of areas affected by development, land use, exotic plant control, and other ground disturbances.
- Inventory and monitor native vegetation to evaluate the effects of land use and to measure the effectiveness of vegetation management techniques.
- Encourage public understanding of the ecology and conservation of native plants using educational materials and programs and by providing opportunities for volunteer involvement in resource management activities.

3.4 MANAGEMENT RECOMMENDATIONS

3.4.1 Objective #1: Integrate vegetation management with other resource goals and policies.

The protection and management of plant communities in South Boulder Creek are guided by Open Space policy and intra- and interagency natural resource planning. Major themes for coordinated resource planning and management are native community restoration, wildlife habitat enhancement, Integrated Pest Management, water quality maintenance, fire management, and passive recreation management. The Open Space Program uses a coordinated resource management framework and the concept of adaptive management to more effectively integrate natural resource planning and management.

Typical coordinated resource management programs strive to enhance communication and cooperation among agencies, staff members, and other stakeholders (public and private). The Open Space Program coordinated resource management framework is designed to facilitate implementation of resource projects by interdisciplinary teams. Through the use of coordinated resource management, all major actions are discussed by the appropriate stakeholders, and decisions are made by the consensus of a staff coordinated resource group. Open Space staff, serving as coordinated resource managers, is responsible for integrating and documenting activities within a coordinated resource management area. A coordinated resource manager functions as the principal contact for staff communication and public inquiry related to resource management activities. The Open Space system is divided into three coordinated resource management areas which are superimposed on smaller management areas. The South Boulder Creek Management Area represents a significant portion of the northern coordinated resource management area.

Management actions have been formulated to promote intra- and interagency coordinated management.

Recommended Management Actions

- Integrate vegetation management in South Boulder Creek with the *Long Range Management Policies, City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan*, Open Space area management plans, and other resource management plans (e.g., Forest Ecosystem Plan).
- Implement vegetation management through the Open Space coordinated resource management framework as described in Appendix 3.1.
- Participate in City-wide and interagency fire planning and integrate South Boulder Creek fire management objectives and recommendations with interagency planning.
- Participate in interagency Integrated Pest Management planning and management.
- Develop a system-wide Open Space Integrated Pest Management plan to guide and integrate Integrated Pest Management activities.
- Coordinate resource management planning with neighboring public land management entities and other stakeholders. Major groups include City of Boulder Mountain Parks, City of Boulder Water Quality/Environmental Services, City of Boulder Fire Department, interagency wildfire suppression team, Boulder County weed management, Colorado Department of Transportation, agricultural lessees, and adjacent homeowner associations.
- Work with the University of Colorado to coordinate resource management planning (e.g., Integrated Pest Management and reclamation) and to ensure that adjacent Open Space properties are not adversely affected by reclamation and development of its Gateway property.
- Consult with Colorado State University experts to develop Integrated Pest Management and restoration plans, when appropriate.

3.4.2 Objective #2: Protect native plant community health using or simulating natural processes where possible.

Natural Processes: An Overview

Native plant and animal communities are adapted to natural disturbances such as fire and ungulate grazing. The condition of native communities generally declines in terms of diversity, reproductive output, and overall vigor if important natural processes are interrupted or prevented from occurring. In the absence of fire, woodlands may encroach upon grasslands, and grassland species may become less competitive in the face of weed invasions. When disturbances like fire and ungulate grazing are removed from the native grassland ecosystem, the resulting build-up of dried plant material can impede the flow of important essential nutrients and increase the potential for a large uncontrollable wildfire to occur.

The South Boulder Creek Management Area includes some of the largest remnant patches of xeric and mesic tallgrass in the Boulder Valley, and includes a patchwork of mixed- and

shortgrass communities. Numerous natural processes continue to maintain and contribute to the dynamic nature of these grasslands. Prescribed fire and livestock grazing are tools available to resource managers for simulating natural processes that have been suppressed or otherwise altered over the last 150 years or more. In addition to fire and grazing, treatments such as mowing, hand pulling, and chemical application are used to control and manage non-native species (see Integrated Pest Management objective). Native plant community management on Open Space is often integrated and dependent on agricultural operations (see Appendix 3.1).

Management Framework

The preservation of native plant communities and natural processes in the South Boulder Creek involves ongoing active management. A coordinated resource management framework is used by the Open Space Program to integrate the management of multiple resources and land uses. Long-term vegetation management in the Management Area will be based on the coordinated resource management framework and an adaptive management strategy. Major components of the adaptive approach include:

- Collection of baseline information (e.g., inventories and mapping)
- Assessment of the condition of major community types and sensitive species/communities
- Integration of baseline information and assessment results into resource management planning
- Scheduled monitoring of condition, management treatment effects, and rare plant population status
- Analysis of monitoring data and formulation of adjusted management recommendations based on the results

Fire

Fires are a natural ecosystem process as evidenced by the abundance of fire-adapted native plants in prairie communities. Historically, natural fires may have burned every 3 to 10 years in grasslands (Veblen 1996); however, fire histories are difficult to obtain for grasslands. Fires help to maintain the species diversity and composition of native communities by reducing thatch accumulation and creating structural diversity. Well-timed prescribed fires tend to shift the competitive advantage to fire-adapted native species and, typically, disadvantage non-native species.

Implementation of the fire management program within the Management Area will consider the following factors:

- Weather
- Air quality conditions/status
- Site conditions addressed by Best Management Practices (Appendix 3.2; e.g., wet and muddy conditions)
- Proximity to urban interface

- Hazardous materials
- Resource management conflicts (e.g., grazing rotations, weed control treatments, sensitive wildlife habitat, rare plant habitat)
- Species biology (e.g., timing in terms of plant growth stages and animal life cycles)
- Fire ecology of a particular plant community

Prescribed Fire

Prescribed fire is carried out on Open Space land according to the *Long Range Management Policies*. Numerous objectives are accomplished through the use of fire in native communities, agricultural fields, and irrigation ditches. Fire is mentioned as a valuable management tool in several of the natural resource chapters in the Management Plan. This section will focus on the use of fire as a natural process to maintain healthy native grassland patches and larger blocks throughout the Management Area. The understories of shrubland and riparian woodland communities may be included in prescribed fires, but burns are not typically conducted in shrubland and riparian woodland patches. Appendix 3.3 is an outline of a prescribed burn plan.

Recommended management actions for prescribed fire (general)

- Restore and manage fire as a natural or simulated natural process in grassland, wetland, shrubland, and woodland communities (see Wetlands chapter).
- Stimulate native plant species growth and competitive ability by removing accumulated dead plant material. In general, fire stimulates plant growth by making important minerals available and allowing sunlight to reach the soil surface. Cool and warm season species are optimally benefited when fire occurs during a dormant period (i.e., when a species is not actively growing). Dormancy for the two types is different, and fires timed at a certain time may benefit one and negatively impact the other.
- Exclude riparian areas from prescriptive burning on properties, unless monitoring and research recommend it be done.
- Enhance wildlife habitat. Improving or restoring sensitive species habitat is often a priority in burn planning. Creating patch mosaics of different composition and structure can enhance wildlife species diversity. In addition, the nutritional value of many plant species is improved after fire.
- Control exotic plant species of concern. Some weed species like Canada thistle and cheatgrass can be managed by using carefully-timed fire and other follow-up treatments. Research is still needed to fully understand the effects of fire on many problem non-natives (e.g., diffuse knapweed). A common strategy is to stimulate native species growth to provide competition for invasive non-natives.
- Reduce the risk of accidental, unplanned fire by reducing dry fuels. Fire risk mitigation is particularly important at the urban/open land interface.
- Maintain irrigation ditch function and efficiency.
- Formulate annual fire plans by convening planning meetings during winter months and clearly defining staff roles for developing and implementing burn plans. Develop 2 to 5 year timeline for burn planning to accommodate monitoring and coordination with

Integrated Pest Management and agricultural operations (see Appendix 3.4 for an example).

- Burn in orchid habitat that has been held out of haying for a season.
- Develop a fire information database and Geographical Information Services component that manages documentation on fire history, fire weather and behavior, and fire effects monitoring.
- Conduct research on the fire ecology of *Spiranthes diluvialis*, diffuse knapweed, and tallgrass communities.
- Develop educational programming and materials that promote the use of fire as a natural process to restore and maintain native plant communities and as a technique for fire risk mitigation.
- Integrate prescribed burn planning for the Management Area with system-wide Open Space fire management planning, including interagency burn planning within Boulder County.
- Work with local fire agencies to prevent damage to natural resources, fence, irrigation structures, etc. when responding to a fire report. Follow Best Management Practices outlined in Appendix 3.2.

Recommended management actions for prescribed fire (specific)

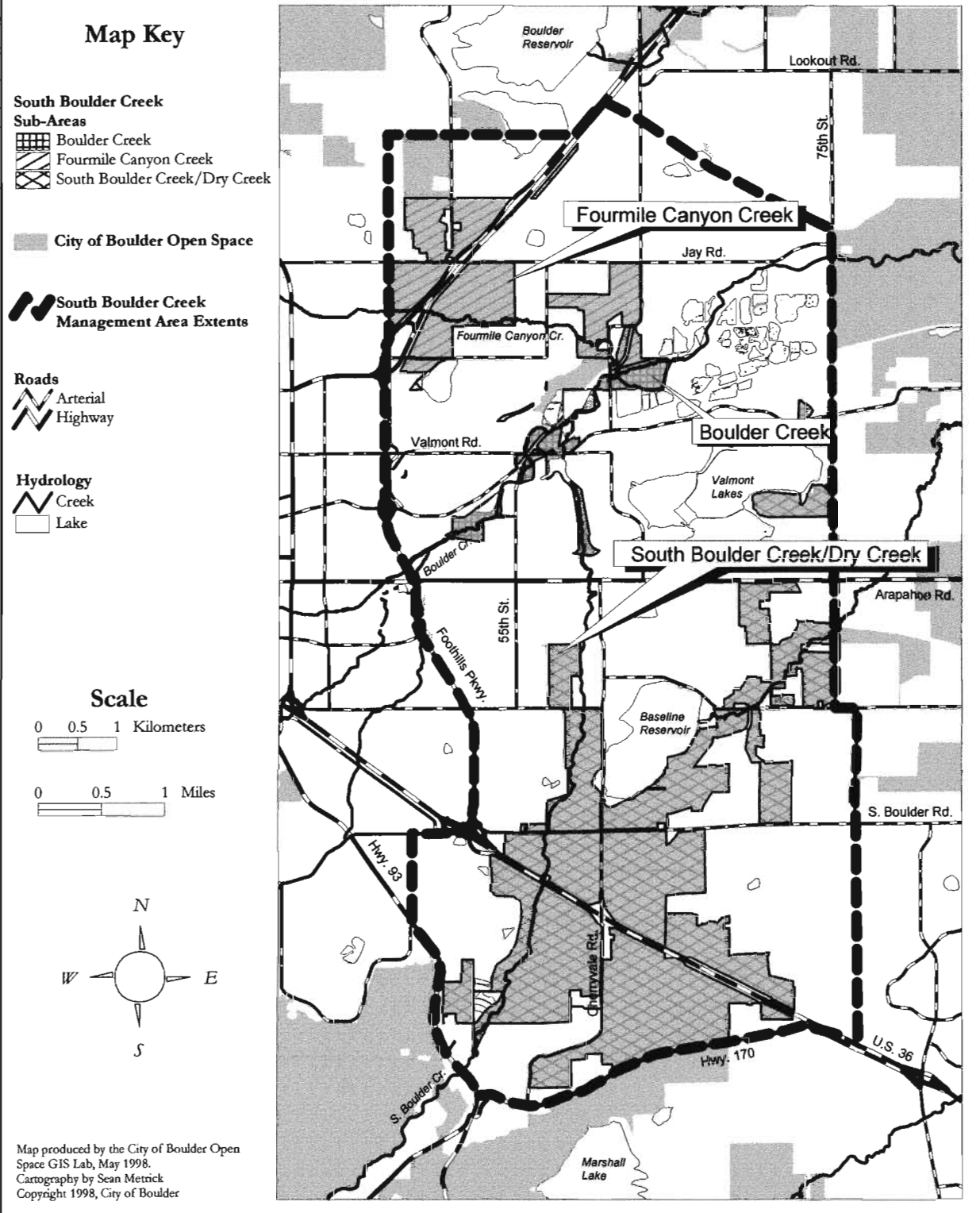
Fourmile Canyon Creek subarea (Figure 3.1)

- Burn upland patches of grassland dominated by native species in Gallagher, Lousberg, and on Andrus Mesa with a fire frequency of 3 to 8 years based on monitoring results. Burns should be conducted between March 1 and May 15 and September 1 and October 31. They need to be coordinated with the cattle grazing regime in each area. Native grassland patches need to be mapped, and potential prescribed burn acreage tallied.
- Use fire, whipping, wicking, and a modified grazing regime to control the teasel and Canada thistle on McKenzie in riparian areas.

Boulder Creek subarea

- Burn the mosaic of upland grassland and wetland patches on Short and Milne and adjacent Colorado Open Lands every 3 to 8 years based on monitoring results. Burns should be conducted between March 1 and May 15 and September 1 and October 31. Prescribed burning is the preferred treatment over grazing to remove thatch and stimulate upland and wetland vegetation in the Short and Milne area.
- Evaluate the potential for using prescribed burning to manage weedy vegetation in the understory of the Cottonwood Grove.
- Use prescribed burning to control Canada thistle, teasel, and smooth brome throughout the subarea. Each species requires specific timing of treatments to impact vulnerable phenological stages.

Figure 3.1: Sub-Areas South Boulder Creek Management Area



South Boulder Creek/Dry Creek subarea

- Maintain a habitat mosaic that manages for biological and landscape diversity. Create a patch mosaic of 1-year, 3-year, 6-year, and older prescribed burns.
- Identify specific locations and design for long-term burn planning.
- Burn wet meadow and tallgrass communities with a fire frequency of 3 to 8 years. Base burn schedule and timing on monitoring results, Integrated Pest Management regime, grassland bird and orchid life cycle (phenological) stage, and the emergence of Preble's meadow jumping mouse from hibernation. Coordinate grazing regime with burn plans. Spring burns favor warm season grasses and usually allow soil surface to be well-mulched by winter time. Spring burning instead of grazing in wet meadow/wetland habitat prevents damage to wetland soils from cattle trampling.
- Shift native plant communities from non-native, cool season species dominance toward native, warm season species dominance where appropriate. Past year-round or summer-long cattle and horse grazing and the introduction of cool season pasture grasses have contributed to a shift away from native, warm season species (Sinton 1997). Spring fires and early to mid-spring cattle grazing and rest-rotation regimes are important methods to use in reversing this trend. On the other hand, prescribed fires should be planned to preserve overall native species diversity, including native, cool season species (e.g., needle and thread grass (*Hesperostipa comata*)). Spring grazing should be used in upland areas and in bottomland areas only where negative impacts to wetlands, wet meadows, and native, cool season plant species can be minimized.
- Burn in spring, if necessary, in orchid habitat that has been held out of haying for a growing season.

Long-term prescribed fire planning in the South Boulder Creek floodplain and upland terraces

The southern half of the Management Area provides the largest, most contiguous blocks of grassland habitat where fire can be used effectively as a management tool. The area also presents significant constraints to burning due to conflicting sensitive species needs. A framework that has been prepared as part of this planning project documents existing coordinated resource management in the South Boulder Creek subarea and allows for adaptations of present management (see Appendix 3.1). The framework describes various habitat types, sensitive species and communities, and agricultural practices, and defines the management methodology and emphasis for individual patch-types throughout the area. Prescribed fire is an important management treatment used to implement the coordinated framework.

Prescribed Natural Fire

Prescribed natural fire is fire of natural origin permitted to burn, under certain conditions, to achieve predetermined resource management objectives. Wildfires originating in areas that meet all prescription parameters may, with the prior written agreement of managers of adjacent land and wildland fire control agencies, be reclassified as prescribed natural fires and managed in accordance with the approved fire management plan for the Management Area.

Recommended management actions for prescribed natural fire

- Promote and implement prescribed natural fires as another means to meet resource management objectives.
- Include prescribed natural fires in the prescribed fire and annual Wildfire Operational Plans.
- Investigate the feasibility of small-scale, prescribed natural fire in the Management Area.
- Identify potential areas where prescribed natural fires may be used.
- Create a clear and concise map displaying these areas for use by wildfire managers.
- Identify areas and seasons where fires should be controlled to prevent damage to sensitive species or other native species important to management goals.

Prescriptive Livestock Grazing

Livestock grazing is used: (1) for prescriptive management of native grasslands and non-native species of concern and (2) as a component of agricultural operations. In natural resources management, livestock grazing is often used to simulate the effects of natural processes that may be missing or functionally altered in ecosystems. The effects of natural disturbances such as native ungulate grazing, flooding, and fire are approximated through prescriptive livestock grazing.

Cattle are the most commonly used grazers on Open Space land (see Agriculture chapter). The use of cattle to approximate native ungulate grazing patterns and intensities is limited. Native bison grazed areas in large herds intensively and infrequently (Colorado Natural Areas Program 1998), preferring upland plant communities. Domestic cattle graze species and areas selectively tending toward low areas. Today, cattle graze relatively small, fenced areas, and grazing is usually of lower intensity, higher frequency, and longer duration than historic native ungulate grazing patterns.

The long-term effects of cattle grazing are evident in some plant communities within the Management Area (Bunin 1985, ERO 1996). For example, big bluestem and blue grama are co-dominant on several hundred acres of the southern portion of the Management Area. Blue grama, in particular, increases in dominance under intensive grazing regimes. The common occurrence of big bluestem may indicate recovery from past livestock grazing (Bunin 1985, ERO 1996).

Recommended Management Actions for Prescriptive Livestock Grazing (General)

- Time livestock grazing on native grasslands to minimize negative impacts to native grasses and forbs and to provide the opportunity for native plant reproduction to occur. Time grazing to minimize or eliminate impacts to ground-nesting birds. Late fall, winter, and early spring grazing is preferred for short- and mixed grassland types and tallgrass patches. This timing benefits native, warm season plant species, can help control undesirable non-native species like Canada thistle, and minimizes direct effects on known sensitive species. On the other hand, the long-term maintenance of native plant species diversity and overall biological diversity may require a more varied grazing regime and/or periods of rest from annual

grazing. Grazing effects monitoring should be designed to detect trends in plant species diversity, and grazing plans should be adjusted based on monitoring results.

- Manage livestock grazing patterns through the strategic placement of fencing, salt blocks, and watering areas.
- Develop annual and long-term grazing prescriptions for native grasslands.
- Establish range monitoring in each grazed native community type. Identify and recommend sites for monitoring. Develop methods to assess and monitor grassland condition. Use the results of monitoring and assessing condition to develop and adjust annual grazing plans. Factors influencing condition include native plant vigor, native species composition, non-native species composition and status, amount of plant litter accumulation, soil stability, and amount of bare ground.
- Coordinate prescribed burn planning and Integrated Pest Management planning with grazing rest/rotation regimes where appropriate.
- Use prescriptive grazing as an Integrated Pest Management technique to control target weed species (Appendix 3.5). Spring grazing can be used to control Canada thistle and cheatgrass. Grazing regimes in knapweed-infested areas should optimize native grass growth and reproduction (e.g., dormant season grazing). Support ongoing research investigating grazing effects on diffuse knapweed.
- Protect riparian and shrub communities and assist in the restoration of woody vegetation by adjusting grazing regimes, removing areas from grazing, fencing areas for one or more grazing periods, and/or manipulating the distribution of use through water source and salt block placement.
- Schedule “rest” for all upland communities. The rest/rotation goal is one ungrazed season every 3 years. Longer rest periods are desirable, and monitoring results should be used to determine optimum regime. Identify rest rotation areas and design schedules.

Recommended Management Actions for Prescriptive Livestock Grazing (Specific)

- Monitor richness and cover of plant species and streambank condition in riparian corridors and bottomland grassland patches that are exclosed from cattle grazing. Research (literature sources) and monitor the effects of burning vegetation adjacent to riparian areas (e.g., erosion, wildlife habitat disturbance). Monitor Canada thistle densities. Survey annually for *Spiranthes diluvialis*. Monitoring priorities are: (1) in the second Van Vleet field south of U.S. 36 and (2) riparian reaches that will be fenced upon implementation of this Plan.
- Evaluate Colorado Tallgrass Prairie Natural Area exclosures to determine whether occasional (e.g., a 2- to 3- year interval based on observations throughout each growing season), winter/early spring grazing (high intensity, short duration), and/or late spring mowing should be used to control weeds and stimulate growth of perennial grasses. Fire and mowing are the management tools used presently. Reassess the management prescriptions for the exclosures during the process of revising the *Colorado Tallgrass Prairie Management Plan* (1986).

3.4.3 Objective #3: Prevent new infestations and manage existing infestations of priority non-native species of concern using the Integrated Pest Management planning process.

Non-native species are a management concern because they threaten native plant communities and agricultural operations by displacing desirable native species. Exotic plants that are highly invasive usually do not have natural pathogens and predators to keep their populations in check. Some non-natives, like diffuse knapweed, compete with natives and may produce substances that are toxic to other plant species. Problem species may compete effectively for light, water, nutrients, and other resources. By displacing native species, aggressive non-natives threaten native plant community integrity and wildlife habitat.

The primary non-native species requiring management actions are Canada thistle (*Breca arvensis*), purple loosestrife (*Lythrum salicaria*), diffuse knapweed (*Acosta diffusa*), Russian olive (*Elaeagnus angustifolia*), cheatgrass (*Anisantha tectorum*) and musk thistle (*Carduus nutans macrollepis*). These species are designated as undesirable plants by the Colorado Weed Management Act, Boulder County Undesirable Plant Management Plan, and/or the Open Space Program. Dalmatian toadflax (*Linaria genistifolia* ssp. *dalmatica*), yellow toadflax (*Linaria vulgaris*), myrtle spurge (*Tithymalus myrsinites*), sulfur cinquefoil (*Potentilla recta*), tansy (*Tanacetum vulgare*), tamarisk (*Tamarix ramosissima*), teasel (*Dipsacus fullonum*) and scotch thistle (*Onopordum acanthium*) are less common in the South Boulder Creek Management Area than the species listed above but also pose significant potential threats to native communities. Other exotic species that have the ability to take over natural areas and/or degrade agricultural lands do exist and will be monitored as time allows. Many of these species are available as ornamentals from nurseries and other plant suppliers and are frequently used in residential and commercial landscaping.

The Open Space Program accomplishes non-native species control through Integrated Pest Management. The City of Boulder Integrated Pest Management Policy (City of Boulder undated) provides the general guidance for the Open Space Integrated Pest Management program. Integrated Pest Management is a decision-making process which selects, integrates, and implements weed control techniques to prevent or manage non-native populations. Integrated Pest Management focuses on long-term prevention or suppression of problem species while reducing the impact that control techniques may have on the environment, human health, and non-target organisms. A “whole systems approach” is used, evaluating the non-native species as they relate to the entire ecosystem.

Ranking, inventorying, mapping, monitoring, and evaluating are the methods used in setting Integrated Pest Management priorities. A ranking system provides an objective, ecologically-based, decision-making framework for targeting species and infestations. Weed maps and inventories characterize infestations in terms of size and density, location, and threat to

resources. Monitoring and evaluating track infestations and treatments over time to determine the successes and failures of the Integrated Pest Management program.

This Management Plan contains detail that may not be included in subsequently developed area management plans. Additional information concerning the Integrated Pest Management process and specific treatments are outlined and will be incorporated into a system-wide Integrated Pest Management plan.

The Integrated Pest Management program for South Boulder Creek is designed to adapt to the dynamics of weed infestations, plant communities, and land uses. Integrated Pest Management is an ongoing process and a significant time commitment. Annual implementation of the Integrated Pest Management recommendations in the Management Area depends on the prioritization of Integrated Pest Management needs and actions across the Open Space system. Prevention and control are the primary strategies used in Integrated Pest Management, and management actions for each strategy are listed below. Species specific descriptions and prevention and control methods are presented in Appendix 3.5. Crop pests are addressed in the Agricultural chapter.

Prevention and Education

Neighboring Lands

Prevention of new infestations of non-native species will be accomplished by working with neighboring landowners, agencies, and Open Space lessees to coordinate management of shared weed problems.

Recommended management actions for prevention and education on neighboring lands

- Develop a memorandum of understanding with the Colorado Department of Transportation, Boulder County (Parks and Open Space, Transportation, Weed District), the University of Colorado (Gateway property), and other City of Boulder departments (Parks and Recreation and Public Works) concerning control of diffuse knapweed and Canada thistle in state and County road right-of-ways and City-owned lands. Include guidelines for rare and uncommon plant species conservation along highway right-of-ways and on City-owned lands.
- Develop a process for coordinated weed management planning. Work with County Weed District Officer to educate landowners on integrated weed management for their lands.
- Develop cooperative weed management strategies. Examples of cooperative weed control tasks are: (1) organize community weed pulls and hand-digging of weeds in rare plant habitat and other appropriate areas and encourage groups or individuals to adopt a rare species and/or conduct stewardship projects in sensitive areas, (2) install fence line barriers to control knapweed spread, (3) mow problem areas, using the proper seasonal timing to prevent spread of target species (Appendix 3.5), and (4) develop educational materials for new landowners.
- Communicate regularly with neighboring landowners to coordinate Integrated Pest Management planning and activity.

- Work with Accent Gardens adjacent to the St. Walburga property to ensure that steps are being taken to prevent cultivated/ornamental species from escaping onto neighboring Open Space orchid habitat. Monitor adjacent Open Space lands for escaped ornamentals.
- Use Integrated Pest Management treatment selection criteria (Appendix 3.5) in planning cooperative weed control efforts. Emphasize the goals of protecting good water quality, human safety, and rare plant and animal species and communities.
- Include weed management strategies in conservation easement agreements.

Open Space Lands

Open Space Program activities will be conducted to minimize the potential for introducing weeds or creating conditions conducive to weed invasion.

Recommended management actions for prevention and education on Open Space lands *Agriculture*

- Irrigate uniformly and efficiently to discourage the spread of Canada thistle, teasel, and knapweed.
- Use cultivation practices, plant materials, and crop rotation that will maximize the competitive ability of annual crops and hayfield species. Clean cultivating equipment before moving from one field to another.
- Prevent over-fertilization of cropland and transport of excess fertilizer by runoff (high soil nitrogen levels can increase the competitive ability of some weed species over most native species).
- Manage weed infestations in agricultural field buffer areas and along fence lines to prevent infestations in crop/hayfields.
- Prevent weeds from becoming established along ditches and laterals. Incorporate prescribed fire into ditch management.
- Place fences to avoid the creation of weedy areas that are difficult to manage (e.g., fenced ditch corridors that are periodically disturbed by cleaning become good sites for weeds to populate and are unavailable for prescriptive grazing or mowing). Place fences or reinforce existing fences to prevent the spread of knapweed. Place fences to maximize the benefits of prescribed livestock grazing while minimizing the potential for creating conditions for weed spread.
- Include weed management strategies in lease agreements. Involve lessees in the development and review of annual operating plans.
- Design livestock grazing regimes (timing, duration, stocking rate) to prevent overgrazing, erosion, and creation of cattle paths. Place salt blocks, water sources, and supplemental forage to minimize erosion. When possible, use supplemental feed (hay) that is produced on the same property containing the livestock. If hay is brought in from outside the leased area, use certified weed-free hay whenever possible. If weed infested hay is used to feed contained livestock, manure should be composted for one year before depositing onto hay fields.
- Visit those lands where cattle are pastured during seasons when cattle are absent from Open Space. Determine weed species present and assess if cattle are capable of

transporting these weed species to Open Space via manure, fur and/or hoof. Consider containment period for cattle before entering Open Space or revise lease conditions to address weed control.

Passive recreation

- Plan trails to minimize the risk of weed introduction and spread. Do not place trails in areas with severe existing weed infestations. Keep trails out of wet areas. Minimize ongoing erosion in steep areas. Avoid creating a trail corridor that stretches from a weed infested area into an area with relatively few or no noxious weed infestations.
- Use weed-free materials in trail construction. Clean equipment used in the construction of trails before it is used on a new project and before it is moved to the next project. Minimize the area of ground disturbance and degree of soil compaction resulting from construction activities by limiting trips by equipment across an area, choosing staging areas that minimize erosion, and limiting the number of turn-around areas. Reclaim disturbed areas promptly to reduce the chance of weed invasion. Survey new trails for weed infestations annually.
- Encourage use of pelletized feed or weed-free forage for horses before and during visits to Open Space through signing at trailheads and working with equestrian groups (Boulder County Horseman's Association).
- When closing trails, use appropriate weed free materials. Do not use these materials in an amount or fashion that could lead to weed invasions (placing too many branches in an area can lead to Canada thistle problems). Monitor all trail closures for 3 to 5 years to ensure they are not creating weed problems.

Fire management

- Ensure wildfire suppression and prescribed burning monitoring activities are conducted under the guidance of a trained "resource advisor" who is responsible for: (1) select and use staging areas to minimize ground disturbance and avoid the spread of weeds to other areas, (2) avoid or minimize the construction of ground-disturbing fire breaks, and (3) avoid or minimize off-road use of vehicles and completely avoid wet or friable soils.
- Plan the timing and frequency of prescribed burning to optimize native plant growth and reproduction.
- Implement timely reclamation in areas where ground disturbance has occurred. Native plant species should be used in post-burn reclamation seedings or plantings.
- No slash piles will be left on site since these establish weed infestations.

Reclamation

- Use native plant species in reclamation projects following the guidance set by the *Long Range Management Policies*.
- Before reseeding a disturbed area, monitor the area for weed species well in advance of the project and take steps to ensure the reclamation area (and surrounding area) is free of noxious weeds. Do not reclaim an area when weed species are present.
- Use local weed-free topsoil and mulch materials for reclamation projects.

- Review, evaluate, and manage reclamation projects annually for a minimum of 3 years to ensure early detection of weed infestations.
- Monitor reclaimed areas annually for 3 to 5 years after closure.

Wildlife management

- Use weed prevention and control techniques in prairie dog Habitat Conservation Areas in concordance with the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan*. Use control techniques (e.g., mowing) in occupied prairie dog areas to prevent “seed set” and the spread of target weeds to neighboring areas. Coordinate grazing and fire management to optimize the regrowth of native vegetation in occupied and abandoned prairie dog habitat. Reseed areas where plague has occurred as soon as possible to discourage weed establishment.

Weed management

- Detect, map, and eradicate isolated infestations or single plants of high-priority weed species before spreading occurs.
- Develop and implement strategies to minimize the potential for introducing weeds and for creating conditions conducive to weed invasion (e.g., use of pre-cleaned construction equipment, weed-free hay, weed-free road and trail construction materials, native seed mixes in reclamation projects, timely reclamation in disturbed areas, etc.).

Education

- Train staff, lessees, volunteers, and the public to recognize weeds and the conditions that lead to their establishment.
- Educate agencies and the public about weed-free products (e.g., hay, road base, topsoil) and other opportunities to prevent weed introduction and spread.
- Educate the public about aggressive ornamental plants and native plant alternatives.

Control

Appropriate techniques, following Integrated Pest Management guidelines, will be implemented to control target species. These include prevention, education, and cultural, mechanical, biological, and chemical control. Effective economical weed management combines several techniques to achieve desired results with the minimum environmental impact. Control strategies and management by the Open Space Program will be adapted over time as the results of monitoring and research become available. The list of species targeted for control will change as the status of weed populations change.

Periodic mapping of target species will be conducted to provide information for Integrated Pest Management planning and monitoring of treatment. Baseline mapping of the distributions and densities of primary weed species in the Management Area was completed in 1997. Additional techniques may be used to monitor treatment effects and the effects of weed infestations on native communities. Monitoring may be included in the design of research projects conducted by staff, contractors, and researchers participating in the Open Space research program.

Species specific prevention and control methods, as well as recommendations, are in Appendix 3.5. The control treatments outlined in Appendix 3.5 describe annual strategies rather than a long-term plan. Any of the treatments described may be continued for many years before other treatments are used, or different treatment types may be alternated every year or so. Treatment strategies are designed and redesigned each year as field observations and monitoring provide information for making management decisions.

South Boulder Creek is the most challenging management area for the Integrated Pest Management Program. Management priority must be given to the many threatened or rare plant and animal species found in this area, as well as to the historical agricultural practices which govern the health and abundance of these species. This is especially true in the South Boulder Creek floodplain area. Control options for weed species must work within a variety of constraints resulting in limited viable control options (limited/no herbicide use) and treatments not always occurring at the most optimal period for certain weed species. Close coordination must occur between numerous staff members managing the area and its resources, as well as the lessees in the area. Through communication, cooperation, and seasonal adjustments, weed control is effective.

Recommended Management Actions for Control (General)

- Use Integrated Pest Management decision-making process and treatment selection criteria to choose treatments (City of Boulder undated). The selection criteria are:
 - Least hazardous to human health
 - Least disruptive of natural controls
 - Least toxic to non-target organisms
 - Least damaging to the general environment
 - Most likely to produce a permanent reduction in the environment's ability to support target pests
 - Cost effectiveness in the short-term and long-term
 - Coordinate prescribed burn planning and Integrated Pest Management planning with grazing rest/rotation regimes where appropriate.
 - Use prescriptive grazing as an Integrated Pest Management technique to control target weed species (Appendix 3.5). Spring grazing can be used to control Canada thistle and cheatgrass. Grazing regimes in knapweed infested areas should optimize native grass growth and reproduction (e.g., dormant season grazing). Support ongoing research investigating grazing effects on diffuse knapweed.
- Develop and apply criteria to prioritize weed management projects. Examples of criteria include:
 - Species of management concern include a state-listed noxious weed, County-listed noxious weed, and/or Open Space priority weed (Appendix 3.6)
 - Species of management concern which threaten a rare plant species or community or the habitat of a rare wildlife species (e.g., Canada thistle is invading *Spiranthes diluvialis* habitat)
 - Immediate control of an infestation is key to preventing its spread. Immediate control

should occur at trailheads, isolated patches, or individuals at the edge of, or beyond, larger infestations

- Species of concern which are highly aggressive and rapidly spreading. Control treatments to date have not significantly reduced aerial extent, densities, or seed production
- Control can be achieved largely through treating an infestation on Open Space and neighboring lands by way of coordinated management
- Species for which effective control methods are known and projects for which resources are available
- Conduct research or monitoring projects that potentially contribute to the knowledge of weed species biology, control methods, and effects on native species.
- Develop monitoring plan for priority weed species to monitor control treatment effects.
- Monitor Van Vleet area south of U.S. 36, if excluded from grazing for increase in noxious weed species. Treat appropriately.
- Develop a weed management plan for the Cottonwood Grove area. Work with staff to determine resource management goals for this area.
- Work with staff to evaluate weed control responsibilities of different lessees according to lease agreements. Educate lessees on their responsibilities and work with them on what control options they have available to them.
- Investigate the potential for acquisition of land, conservation agreements, or coordinated Integrated Pest Management control where Open Space land receives an ongoing weed seed source from neighboring lands dispersed by the prevailing west-to-east wind direction.
- Emphasize prevention.
- Develop a small parcel management plan that would include weed species management.

Recommended Management Actions for Control (Specific)

County listed

- Focus and increase control strategies for species listed on the Boulder County Noxious Weed List while keeping with the resource management goals of the individual properties. Not all listed species are currently in the Management Area.

Canada thistle

- Require cultural practices, including mowing, fire, and tillage in cultivated agricultural lands to prevent seed formation of Canada thistle. Management should include all ditches and buffer areas.
- Mow Canada thistle before July 4th in pastures using the appropriate equipment. Coordinate these activities with timing of irrigation and sensitive plant and animal species.
- Encourage research on different control techniques for Canada thistle, especially grazing and fire used in the South Boulder Creek floodplain and related tallgrass areas. Impacts to native plant and animal species should also be examined.
- Examine grazing schedule annually in the South Boulder Creek floodplain and ensure that priority areas of Canada thistle are being addressed.

- Integrate prescribed fire into the South Boulder Creek floodplain area. Priority areas are the cordgrass areas in orchid habitat that are ungrazed by cattle, tallgrass parcels, and sensitive wetland areas.
- Coordinate with staff on appropriate timing of different control techniques in areas with sensitive species (Preble's meadow jumping mouse, bobolinks, Ute ladies'-tresses orchid). Work control techniques around closure dates, breeding periods, irrigation, etc.
- Continue intensive hand whipping and wicking efforts along Burke I riparian area.
- Incorporate periodic fire in riparian area where beneficial to natives species.

Musk thistle

- Continue to monitor properties for infestations that may be approaching unacceptable levels. Control these populations using mechanical treatments.
- Continue to control musk thistle on Gallucci next to U.S. 36.

Knapweed

Diffuse knapweed is not prevalent in the Management Area. More intensive strategies do occur in other management areas.

- Increase the use of reinforced fencing to prevent major adjacent infestations from spreading into Management Area. Coordinate control strategies with adjacent landowners with weed infestations on properties, including Wildflower Ranch, Baseline Reservoir, and East Boulder Community Center.
- Continue to assist in the control of knapweed at East Boulder Community Center. Continue yearly contact with Park Superintendent to discuss control efforts.
- Coordinate with other City departments to control knapweed in areas around the Tributary Greenways Program bike path adjacent to the Cottonwood Grove and Colorado Open Lands.
- Hand pull small infestations of mapped knapweed. Utilize volunteers, jail crews, and volunteer stewards when possible.
- Control small mapped infestations of moderate to heavy densities with wick applicators. Tractor spray areas with larger infestations.
- Encourage research on control strategies and the effects of control treatments on native species.

Purple loosestrife

- Intensify control efforts at Flatiron Industrial Park.
- Continue working with East Boulder Community Center and adjacent private landowner to eliminate purple loosestrife from their properties.
- Monitor known properties (Mary Clyncke, Burke II, adjacent private) where individual loosestrife plants have been reported in the past for reoccurrences.

Dalmatian and yellow toadflax

- Hand pull all mapped dalmatian toadflax (except one large infestation on Van Vleet) in the Management Area. Monitor these areas annually for recurrences.

- Continue chemical control efforts on the largest infestation of dalmatian toadflax in the Management Area located on Van Vleet east of Cherryvale next to the Oakley Conservation Easement until the infestation is eliminated or reduced to where mechanical control efforts are feasible. Educate owners of the Oakley conservation easement about the dalmatian toadflax infestation on their property and potential control methods.
- Continue control efforts for yellow toadflax on Klein until eliminated.

Other species

- Control or eliminate where feasible those weed species not on the Boulder County Noxious Weed List but have the potential to become widespread and/or threaten rare plant/animal habitat. Research controls available for these species. Many of these species are new invaders to Boulder County's native plant communities, and effective controls are uncertain.

Russian olive

- Prioritize areas and focus control efforts according to available labor sources, season, and surrounding sensitive species (plant and animal). Current priority areas are the tallgrass community in the area of Short, Yunker, East Van Vleet, and West Church south of Sam's Lane.

Oxeye daisy

- Eliminate oxeye daisy from Burke I and Burke II hayfields using mechanical techniques if possible. Monitor results of control efforts yearly and adjust treatment if necessary.

Teasel

- Develop integrated weed management strategies for teasel.
- Monitor treatment effects in two or more pilot areas.

Myrtle spurge

- Hand pull all known infestations of myrtle spurge annually and monitor for recurrences.

Sulfur cinquefoil

- Develop and implement a management plan for sulfur cinquefoil in the South Boulder Creek floodplain. Involve appropriate staff.
- Monitor areas prone to invasion by sulfur cinquefoil.

Bouncing bet

- Develop and implement a management plan for bouncing bet in the South Boulder Creek floodplain. Involve appropriate staff.

Queen of the meadow

- Research possible controls available for queen of the meadow. Develop a plan of action for this species in the northeast Burke II property.

Smooth brome

- Avoid the use of smooth brome in agricultural and reclamation seedings.

Crack willow

- Remove crack willow from riparian and floodplain areas when feasible. Consider wildlife use of crack willow trees before removing.

3.4.4 Objective #4: Protect and maintain rare species and communities of special concern.

The Management Area supports a diverse native flora, including rare species and communities. An important purpose of City of Boulder Open Space is to preserve and restore natural areas supporting “outstanding or rare examples of native species” (City of Boulder Charter). Several rare plant species occur in the Management Area, including Ute ladies’-tresses orchid (*Spiranthes diluvialis*), American groundnut (*Apios americana*), toothcup (*Rotala ramosior*), and dwarf indigo (*Amorpha nana*). Rare communities include tallgrass prairie and wetland. These species and communities are included in the Colorado Natural Heritage Program list of “rare and imperiled animals, plants, and natural communities.” Several additional rare communities potentially occur, but candidate areas have not been evaluated. Appendix 7.2 of the *South Boulder Creek Management Area Inventory Report* summarizes the Colorado Natural Heritage Program information that is pertinent to the Management Area and explains rare plant status rankings.

The major threats to species and communities of special concern are loss of habitat, displacement by non-native species, and direct destruction of individuals and habitat. The Open Space Program strives to preserve habitat and mitigate threats where possible.

Ute Ladies’-Tresses Orchid (*Spiranthes diluvialis*)

Ute ladies’-tresses orchid is a rare, perennial species belonging to the orchid family. The plant is endemic to the western United States in Colorado, Wyoming, Utah, Montana, Idaho, Washington, and, historically, in eastern Nevada. The U.S. Fish and Wildlife Service assigns threatened status to the orchid. It is the only plant species in the Boulder Valley protected by the Endangered Species Act. The plant is thought to be rare because it occurs in low-elevation riparian and wet meadow habitats that have been largely degraded and eliminated by water use, flood control, agricultural practices, and urban development over the last 150 years. The U.S. Fish and Wildlife Draft Recovery Plan (1995) provides a detailed habitat model for the orchid.

Significant occurrences of the orchid are found in the Management Area. Approximately 13,000 plants have been documented over several years of inventory. That number represents about 1/4 of the Ute ladies’-tresses orchid plants known throughout its range. In 1997 approximately 8,000 previously undocumented individuals were counted in one 40 acre native hayfield. New locations and numbers of the orchid are discovered each year on Open Space.

The orchid is part of a larger riparian/floodplain and irrigated hay meadow community complex that also supports bobolink, Preble's meadow jumping mouse, tallgrass, riparian forest, and important agricultural species. The balancing of rare species and community protection and management, agricultural practices, and recreational use in the Management Area is one of the most complex natural area management scenarios in the Boulder Valley. Conflicting needs of many of the sensitive resources create difficult management decisions. For example, hay is cut in mid-summer, ideally after ground-nesting birds have fledged and before orchid flowering stalks are tall enough to be cut. The ideal window of time for hay cutting is often very short and sometimes does not appear. Weather and equipment are also complicating factors. The overall program goal is to sustain this sensitive, complex system over the long-term. There is a critical need for detailed management planning and continual, integrated management in order to accomplish the goal.

In summary, the continued viability of Ute ladies'-tresses orchid in the Management Area hinges on the integration of agricultural practices, water management, wildlife management, prescribed fire, and recreation management. Current land management in the South Boulder Creek floodplain and adjacent uplands supports some of the largest occurrences of the species throughout its range.

American Groundnut (*Apios americana*)

American groundnut is a Great Plains species that is near the western edge of its range in Colorado. Throughout most of its range the groundnut is infrequent to common (McGregor et al. 1986), and in Colorado the species is considered rare. The habitat includes moist soils in prairie ravines, pond and stream banks, and thickets. In Boulder Valley, American groundnut occurs along fence lines in moist soils in the South Boulder Creek floodplain. Several of the local occurrences are on Open Space in the Management Area.

An inventory and monitoring program has not been developed for this rare species. Occurrences in the Management Area are documented by dot placements on aerial photos and by the completion of Element Occurrence Records (Colorado Natural Heritage Program).

It is important to integrate the protection and management of American groundnut with prescribed fire planning, haying practices, weed control treatments, and ground-disturbing activities in the vicinity of fence lines (e.g., fence replacement, road maintenance, ditch maintenance). Fence lines in wet areas of the South Boulder Creek floodplain and adjacent terraces appear to be the best remaining habitat for the species in the Boulder Valley.

Toothcup (*Rotala ramosior*)

This is a rare species known in Boulder Valley from two ephemeral (seasonal) wetland sites within and near the Management Area. One site is in the South Boulder Creek floodplain near the riparian zone, and the other is near Baseline Lake. In Colorado, the species is at the western edge of its range and may even be considered non-native by some botanists.

Toothcup habitat is found along stream margins, wet depressions, and mudflats. The site where the plant occurs in the Management Area is a wet depression by a gate providing access to an agricultural field. This occurrence was recently discovered and documented. The species appears to exist on the site despite light use by vehicles, cattle, and pedestrians.

Planning for recreation, agriculture, and water resources should consider toothcup occurrences and potential habitat. Frequent, repeated trampling of toothcup habitat should be avoided, particularly during the growing season (from approximately June through October). Surveys of likely habitat and monitoring of documented occurrences can add information needed for conserving the species.

Dwarf indigo (*Amorpha nana*)

Dwarf indigo is a small shrub in the legume family that occurs in Colorado at the western edge of its range. Like American groundnut, it is a prairie species with diminished habitat due to habitat destruction across the Great Plains. Dwarf indigo is found in relatively dry sites in xeric tallgrass communities, forest openings, and other grassland settings. In the Management Area, the species occurs in several of the Colorado Tallgrass Prairie Natural Area patches and in small, relatively dry micro-habitats within the South Boulder Creek floodplain meadows.

Special consideration should be given this species during prescribed fire, Integrated Pest Management, and livestock management planning. The fire ecology of dwarf indigo needs to be researched, and fire effects monitoring on Open Space should include areas occupied by the species. Herbicides that target the legume family and/or woody species should not be used in the vicinity of dwarf indigo occurrences. Late fall, winter, and early spring cattle grazing, as currently conducted, appears to minimize impacts on the dwarf indigo.

Colorado butterfly weed (*Gaura neomexicana* ssp. *coloradensis*)

This rare plant is found in a few places on the Rocky Mountain Front Range in Wyoming, Nebraska, and Colorado. The only occurrence in the Boulder Valley was documented in 1984 near the base of Lee Hill Road. Potential habitat exists on Open Space within the Management Area, particularly in the moist, floodplain meadows of South Boulder Creek (south of Arapahoe Road). General surveys for sensitive plant species on Open Space should include this species.

Showy prairie gentian (*Eustoma grandiflorum*)

The prairie gentian is one of the showiest rare plants in Colorado and was once relatively common across the western Great Plains. Like the Colorado butterfly weed, the gentian grows in moist floodplain meadows. Habitat for both species has been reduced and altered by land use (e.g., gravel mining) over the last 150 years. The prairie gentian is found in eastern reaches of the Boulder Creek floodplain on Open Space but is not documented in the Management Area. Potential habitat exists in the wet meadows associated with South Boulder Creek upstream from Arapahoe Road.

Recommended Management Actions (General)

- Plan recreational development to avoid or minimize direct, indirect, and cumulative negative effects on rare species, communities, and potential habitat. Direct impacts refer to displacement of plants and destruction of habitat by a ground-disturbing project. Examples of indirect impacts are erosion, weed invasion, or trail widening over time. Cumulative effects include soil compaction, weed invasion, and multiple trails in sensitive habitat. Consider sensitive plants when planning for trail placement, types of recreation authorized, trail surfacing, and maintenance.
- Develop and use a project checklist to identify and evaluate potential impacts to sensitive resources. The checklist would include information on presence and condition of rare plants, resulting in a “rare plant clearance” for projects on Open Space. Significant impacts include habitat destruction or degradation, weed introduction, and the cumulative impacts of multiple disturbances.
- Integrate rare plant management and weed management. Use control techniques that avoid negative impacts to species of special concern.
- Integrate rare plant management and fire management. Plan prescribed burning to avoid negative impacts to species of special concern. Use prescribed fire to enhance habitat for species and communities of special concern.
- Integrate rare plant management and livestock grazing management. Prevent negative impacts to species and communities of special concern by excluding livestock or by employing prescriptive grazing only.
- Solicit and support research on topics related to rare plant conservation and management in order to fill important information gaps. Examples of important research topics include: fire ecology of *Spiranthes diluvialis*; identification and status of *Spiranthes diluvialis* pollinators and their habitat in Boulder Valley; the effects of various Integrated Pest Management treatments on several rare species; hydrologic conditions in *Spiranthes diluvialis* habitat relating stream, ground water, and irrigation influences; *Eustoma grandiflorum* habitat requirements related to livestock grazing, hydrologic conditions, and plant community; the distribution and status of *Apios americana* in the Boulder Valley and vicinity.

Recommended Management Actions (Specific)

- Develop a monitoring plan for Ute ladies’-tresses to document ongoing monitoring. Monitoring to date has been focused on collecting trend data for numbers of flowering plants (per year, per site), and demographic data (in a design using two treatments). Fire effects monitoring is a data gap.
- Participate in *Spiranthes diluvialis* recovery efforts through involvement (membership) in the recovery team, development of a habitat management plan (South Boulder Creek Area Management Plan), monitoring of management effects and potential threats, supporting research to fill priority information gaps, coordinating with other landowners who own or influence orchid habitat (e.g., the University of Colorado and Denver Water Board), and developing a conservation agreement between the U.S. Fish and Wildlife Service, Open Space Program, and other key stakeholders (e.g., ditch companies) to establish and implement recovery guidelines.

- Follow recovery plan guidelines when establishing management goals for maintaining population numbers, key processes, and areal extent of habitat.
- Establish orchid habitat restoration guidelines, including the identification of reference community/habitat sites, recommended fluvial geomorphological conditions, and recommendations for the use of fire and other management treatments.
- Monitor orchid phenology in hayfields annually and coordinate with Open Space agricultural managers, wildlife biologist, and lessees to minimize negative effects from haying.
- Continue agricultural leasing and irrigation water management in orchid habitat and apply adaptive management to traditional practices to ensure orchid recovery.
- Conduct surveys for Ute ladies'-tresses on East Church (before haying), along Viele Channel, in the Dry Creek riparian area between Baseline Lake dam (east side) and 75th Street, the Lousberg spring-fed pond, and any new properties with potential habitat. Map all occurrences and submit documentation to the Colorado Natural Heritage Program annually.
- Survey for *Spiranthes romanzoffiana* throughout *Spiranthes diluvialis* habitat, particularly in the South Boulder Creek floodplain. Verify and document any occurrences.
- Survey fencelines and other potential habitat for American groundnut (*Apios americana*) throughout the Management Area and all Open Space. Map all occurrences and submit documentation to the Colorado Natural Heritage Program.
- Conduct rare plant clearances for all ground-disturbing or fence replacement projects within the Management Area and all Open Space in potential or known American groundnut (*Apios americana*) habitat.
- Survey potential habitat in the Management Area and all Open Space and map all occurrences and submit documentation to the Colorado Natural Heritage Program for the following species: toothcup (*Rotala ramosior*), dwarf indigo (*Amorpha nana*), Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*), and showy prairie gentian (*Eustoma grandiflorum*).

3.4.5 Objective # 5: Establish and manage Special Land Designations (e.g., State Natural Areas) to highlight areas and communities with exceptional natural value.

Special land designations enable public and private landowners to highlight exceptional natural features and to design site-specific management plans. Presently, the Open Space Program has two categories of special land designation: the grassland Habitat Conservation Area and the State Natural Area, a designation made in cooperation with the Colorado Natural Areas Program.

Colorado Tallgrass Prairie Natural Area

Xeric and mesic tallgrass communities in the southern half of the area are considered some of the best examples in the state (Moir 1972, Baker and Galatowitsch 1985, Colorado Natural Areas Program 1986). In 1984, several high-quality tallgrass community patches were designated as the Colorado Tallgrass Prairie Natural Area by the Colorado Natural Areas Program in cooperation with the Open Space Program (Appendix 3.7).

Recommended Management Actions

- Continue management of the Colorado Tallgrass Prairie Natural Area according to 1986 *Management Plan* until reviewed and revised.
- Review and update the 1986 *Management Plan*.

South Boulder Creek State Natural Area

The Management Area contains land with important ecological values of statewide significance. In recognition of these ecological values, Open Space, in conjunction with the Colorado Natural Areas Program, has registered approximately 1,240 acres of the Management Area as the South Boulder Creek Natural Area.

Natural features include a mosaic of high-quality wetlands, wet meadows and mesic grasslands, including plains riparian forests and tallgrass prairie ecosystems. Although there is an existing level of disturbance in this urban location, South Boulder Creek continues to support significant natural attributes. The South Boulder Creek floodplain includes habitat for three species of concern identified by the Colorado Natural Heritage Program: the federally-threatened plant species, Ute ladies'-tresses orchid (*Spiranthes diluvialis*); the federally-threatened Preble's meadow jumping mouse (*Zapus hudsonius preblei*); and bobolink (*Dolichonix oryzivorous*), a locally rare bird on the edge of its range. South Boulder Creek also contains an important population of the plains topminnow (*Fundulus sciadicus*), a candidate for listing under the Endangered Species Act and the orange-spotted sunfish (*Lepomis humilis*), a fish species considered to be uncommon, and possibly in decline, by the Colorado Division of Wildlife. Boundaries for the natural area were developed based on the known distribution of the wetlands, tallgrass prairie, and rare species. The draft articles of designation are included in Appendix 3.8.

Recommended Management Actions

- Designate South Boulder Creek State Natural Area in cooperation with the Colorado Natural Areas Program.
- Ensure that provisions of the Colorado Natural Area Articles of Designation are met through the management actions in this plan.

Grassland Management: Black-tailed Prairie Dog Habitat Conservation Areas***Recommended Management Actions***

- Manage black-tailed prairie dog Habitat Conservation Areas as grassland preserves according to the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan*.

3.4.6 Objective #6: Restore, reclaim, and enhance native vegetation in areas with restoration potential and/or reclamation needs. Use native plant species in the reclamation of areas impacted by development, land use, exotic plant control, and other ground disturbances.

Restoration and reclamation priorities in the Management Area target preventing the introduction and spread of non-native species and manipulating the recovery of native communities that have been degraded by invasion of non-native species, land use, or current development projects. Species native to local ecosystems will be used in all seedings and plantings except for agricultural crop plantings (City of Boulder 1995).

The term “restoration” is used broadly here to describe the reestablishment of functioning native plant communities. Restoration techniques may include controlling non-native species of concern, adjusting prescriptive grazing regimes, using prescribed burning, interseeding, or planting propagules. Restoration plans will be based on soils information, pertinent literature (e.g., National Resource Conservation Service range site descriptions) and observations of the best local and regional examples of reference communities.

Reclamation refers to revegetating an area where vegetation has been removed by a disturbance such as trail and access point construction, high-intensity human use, wildlife activity (e.g., prairie dogs), weed control treatments, or the removal of a structure. Reclamation plans are a component of all development projects that result in ground disturbance.

In the context of vegetation management in the Management Area, wildlife habitat enhancement refers to the manipulation of vegetation structure and distribution, small-scale seedings or plantings, or the restoration of native plant communities. Enhancement projects may include seedings, plantings, weed control, prescribed fire, prescriptive grazing, or enclosure of livestock.

Recommended Management Actions

Restoration

- Identify and document native communities that can serve as templates or references for the restoration of other areas with similar site conditions.
- Evaluate native grass seed production as a crop alternative and a way of providing native seed for restoration and reclamation projects.

Reclamation (General)

- Reclaim areas affected by disturbances such as new trail and trailhead construction, weed control treatment, and undesignated trail closures.
- Seed irrigation ditch banks as needed when routine cleanings leave bare soil. Coordinate with ditch operating companies to ensure that soils disturbed during ditch cleaning be spread and smoothed evenly to match the ditch bank contour.
- Level and seed abandoned prairie dog burrow entrances outside of Habitat Conservation Areas to improve irrigation water application and to prevent and control weed invasion.
- Develop and implement a reclamation plan for sites where structures are demolished.
- Follow Best Management Practices during reclamation to prevent the introduction and spread of non-native plant species (see the Integrated Pest Management section for prevention recommendations) and to minimize soil erosion.

Reclamation (Specific)

- Seed Burke I east of concrete trail, north of East Boulder Ditch. A spring seeding is best.
- Seed Damyanovich snakeweed area after burning.
- Evaluate the reclamation needs and feasibility in the Van Vleet rock gravel mine and rock stockpile area.
- Evaluate the reclamation needs associated with weed control areas in the Boulder Creek corridor. Emphasize coordination between multiple landowners.
- Evaluate restoration potential on the west end of Andrus Mesa. Active prairie dog colonies will pose reclamation challenges.
- Control weeds and replace or amend topsoil on Reynolds property.
- Evaluate reclamation needs and potential for Celestial Seasonings property.
- Control weeds and seed upland areas on Short and Milne property
- Develop a restoration plan for Dry Creek riparian area, north and south of Baseline Road, that includes controlling Russian olives, planting native woody species, and creating the potential for orchid habitat to develop. Work with adjacent neighbors and conservation easements to develop compatible management plans.
- Convert Clough wheat fields into native perennial grasses. Coordinate with adjacent landowners (Klein) to assist them in converting to perennial grasses (landowner has suggested this).
- Convert the northeast cropped field of the St. Walburga property to native perennial grasses. Evaluate potential for using an eastern strip of that field for a small tree/shrub nursery.
- Reclaim any designated or undesignated trail sections that are closed at Dry Creek Trailhead area. Reclaim after trail building.
- Reclaim the Ute Industrial Park property remnants of the past subdivision development: the pond, stockpiled dirt, and other ground disturbance. Develop a reclamation plan that includes detailed Integrated Pest Management planning and a strategy for reclaiming the site in phases. Coordinate reclamation plans with Habitat Conservation Area management objectives.
- Reclaim/restore abandoned agricultural fields around the Ute Industrial Park butte on the west side of the property. Coordinate plans with Habitat Conservation Area management objectives.
- Work with the Public Utilities Department (Water) to reclaim the disturbed utility corridor on the Straty-Cline property. Adjust the cattle grazing regime to assist grassland restoration. Develop Integrated Pest Management priorities to control diffuse knapweed and several non-native thistle species.
- Work with the City Tributary Greenways Program to plan/ensure trailside maintenance (weed control) and post-construction reclamation on Flatiron Industrial Park, small properties along Boulder Creek, Belgrove, McKenzie, and the Bobolink bike path.
- Continue reclamation of the Jirkovsky property. Seed remaining disturbed areas on the eastern edge of the property. Continue mowing for weed control and develop a long-term Integrated Pest Management plan for the area. (Refer to the Agriculture chapter for action items regarding cattle grazing and proposed fencing changes.)
- Monitor reclamation and restoration projects and maintain documentation (records) of

seedlings and plantings.

- Collect seed from graminoid and woody species for propagation. Common species are: switchgrass, yellow Indiangrass, big and little bluestem, hawthorn, chokecherry, currant, rose.
- Collect cuttings for propagation or plantings. Common species are peach leaf willow, coyote willow, snowberry, and sumac.
- Convert annual crops to perennial grasses where appropriate.
- Salvage native plant propagules, when feasible, prior to machined ditch cleaning, trail building, and other ground-disturbing activities.
- Continue to consult/coordinate with the University of Colorado on the reclamation plans for its Gateway property.
- Avoid the use of smooth brome grass in agricultural seedlings.

Wildlife Habitat Enhancement

- Enhance wildlife habitat and use native plantings for black-tailed prairie dog management.
- Plant shrubs as visual barriers to control the distribution of prairie dogs (see Wildlife chapter).
- Plant trees to replace raptor perch sites where appropriate (see Wildlife chapter).
- Plant shrub and tree species in appropriate sites along riparian corridors.
- Convert agricultural fields from annual crops to perennial native grass species where feasible at the edges of native grasslands. (See the Agricultural chapter for recommendations related to the use of native hay as an alternative crop).

Monitoring and Research

- Document baseline site conditions and reclamation/restoration project plans.
- Develop and apply reclamation and restoration project evaluation protocols.
- Monitor and evaluate the ongoing success of reclamation and restoration projects annually for 3 to 5 years and adjust the monitoring schedule for subsequent years using evaluation results. The need for additional seedlings or plantings will be determined from annual monitoring and evaluation results. Monitoring for the presence and status of invasive weed species is critical.
- Support research in reclamation and restoration methods.

3.4.7 Objective #7: Inventory and monitor native vegetation to evaluate the potential effects of land use and to measure the effectiveness of vegetation management techniques.

Systematic inventories of plant species have not been conducted in the Management Area. Plant species inventory needs will be prioritized and completed as time and resources allow. Species condition will be assessed qualitatively or quantitatively. Criteria used to assess condition include native versus non-native species composition and cover, the presence and functional

status of various natural processes, and the extent or severity of erosion and compaction of the soil surface.

Vegetation monitoring in the Management Area will be prioritized along with system-wide monitoring project proposals. Monitoring may be conducted at a low-intensity (e.g., qualitative assessment from field reconnaissance) or at a higher intensity (e.g., quantitative data collection) depending on monitoring objectives, ecological community characteristics, and available resources.

Recommended Management Actions

- Collect the appropriate baseline data to use as a reference for short-term and long-term monitoring (see above research needs list for rare plants).
- Inventory plant species in prairie dog Habitat Conservation Areas.
- Conduct periodic inventories of rare species occurrences and potential habitat.
- Develop monitoring to evaluate community or population trends and management treatment effects. Monitor to achieve a better understanding of the effects of Integrated Pest Management control methods and treatments on native plants, restoration and reclamation techniques, livestock grazing, and prescribed fire. Monitor the status of rare plants. Priority monitoring projects include:
 - Population trends in *Spiranthes diluvialis*
 - Plant community structure, composition, and trends in and near prairie dog-inhabited sites within Habitat Conservation Areas
 - Fire effects on diffuse knapweed density and spread
 - Grazing effects on native plant community types (monitor all grazed areas to ensure that management objectives are met; monitoring may be low-intensity and qualitative or of higher intensity)
 - Effects of weed control treatments on target weed species and native plant communities
- Continue tallgrass community monitoring in tallgrass site 7, and in other tallgrass areas with established monitoring (e.g., Bock plots).
- Develop integrated resource inventory and monitoring when feasible to optimize efficiency in data collection.
- Develop a natural community classification that is based on site potential so that management actions can be guided uniformly across the Open Space system.
- Map native upland grassland patches on Gallagher and Lousberg properties.

4. WETLANDS AND RIPARIAN AREAS

4.1 BACKGROUND

Extensive, high-quality wetlands and riparian areas exist throughout the South Boulder Creek Management Area, including riparian forests, willow shrublands, freshwater marshes, and alkali wetlands. Several of these wetland types provide refuge for rare species such as Preble's meadow jumping mouse, Ute ladies'-tresses orchid, groundnut, and toothcup, while others are rare or imperiled on a statewide or global scale (Colorado Natural Heritage Program 1997). Wetlands perform a variety of important functions and provide values important to society. They also serve as habitat for many species of plants and animals. Wetlands filter runoff and protect the water quality of reservoirs, creeks, and drinking water. They protect shorelines from erosion and retain flood waters. Wetland plants provide food and shelter for many animals and are the basis for complex natural food chains. Wetlands produce great volumes of food for insects which are fed upon by fish, birds, bats, and frogs. These animals are eaten in turn by hawks, eagles, badgers, coyotes, and other predators.

In recognition of the multitude of ecological functions and human values provided by wetlands, government agencies have established wetland protection programs. The cornerstone of these protection programs are regulations that prohibit certain types of activities in wetlands unless a permit is first obtained. However, regulatory programs alone are not sufficient to protect wetlands and riparian areas. Natural resource management must focus on wetlands protection as well. Boulder's City Council endorses a program of wetland protection which includes the preservation of wetlands on City-owned property. Grazing, irrigation, and haying should be managed to avoid adverse impacts to wetlands and their ecological processes. Future trails should avoid significant wetlands, and passive recreational use should be compatible with wetland and riparian corridor preservation. Opportunities exist within the Management Area to restore or enhance degraded wetlands.

Although much information exists on these ecosystems, there are significant information gaps that must be filled to ensure proper management of wetlands and riparian areas in the Management Area. These gaps can be filled through research, monitoring, and adaptive management.

Undeveloped riparian corridors are becoming increasingly scarce along Colorado's Front Range and are particularly rare in the Denver-Boulder Metropolitan Area. Riparian corridors are threatened by urban and suburban development, overgrazing by livestock, water development and water management practices, utilities and transportation (including trail) development, and infestation of non-native plant species. Management of riparian zones should protect undeveloped areas, prevent further degradation, and, where possible, restore natural systems to a functional condition.

4.2 GOAL STATEMENT

This chapter provides specific recommendations for managing the wetlands and riparian areas in the South Boulder Creek Management Area. The following management goal statement was approved by the Open Space Board of Trustees:

Preserve significant wetlands and riparian areas, minimize impacts to important ecological functions, and restore or enhance suitable wetlands and riparian areas.

4.3 OBJECTIVES

The Open Space Program has set the following objectives in order to meet the wetlands management goal. The objectives are:

- Preserve and protect important wetland and riparian areas
- Restore or enhance suitable wetlands and riparian areas
- Monitor wetland and riparian conditions and processes

4.4 MANAGEMENT RECOMMENDATIONS

4.4.1 Objective #1: Preserve and protect important wetland and riparian areas.

Recommended Management Actions

- Avoid trail development and undesignated trail use through significant wetlands and riparian corridors.
- Where wetland crossings through identified wetlands are unavoidable, use elevated boardwalks or other appropriate means to minimize impacts to hydrology, vegetation, and wildlife habitat.
- Construct a fence around Suitts Pond and adjacent wetlands to exclude livestock.
- Establish fencing priorities to protect other wetlands and riparian areas susceptible to livestock disturbance.
- Protect Sombrero Marsh by acquiring property owned by Boulder Valley School District and private landowners.
- Work cooperatively with adjacent property owners to prevent land use activities (such as inefficient use of fertilizer or pesticides) adjacent to and within Sombrero Marsh which could adversely affect ecosystem functioning.
- Investigate the impacts from point and non-point water sources on water quality and plant communities of Sombrero Marsh.
- Work with Public Service Company to coordinate with Open Space prior to conducting maintenance on the headgate for the East Boulder Ditch. Historically, clearing and dredging of this structure have impacted the riparian and stream habitat.

- Reclaim social trails south of the end of the South Boulder Creek Trail to discourage public and livestock access to this reach of South Boulder Creek to minimize adverse impacts to natural resources.
- Fence South Boulder Creek to restrict cattle from the riparian area. Setbacks should vary depending on local conditions but in most cases should be a minimum of 100 feet from the channel bank. Grazing should only be permitted for specific management actions such as weed control. Grazing will be used only when other Integrated Pest Management methods are not practicable.
- Work with ditch companies to implement wetland Best Management Practices to minimize adverse natural resource impacts. Ditch clearing activities have significant negative visual impact on the wet meadows and riparian areas throughout the floodplain and may be prohibited by the City's wetlands protection ordinance. These activities may also adversely affect plant communities by creating disturbances that allow weeds to establish and spread. Wildlife habitat may also be directly destroyed, including Preble's meadow jumping mouse habitat.
- Conduct surveys in the Viele Channel for the presence of Ute ladies'-tresses orchid, Preble's meadow jumping mouse, plains topminnow, and other rare species and their habitats. If channel maintenance is proposed, work closely with the City of Boulder Public Works Department and Urban Drainage and Flood Control District to ensure resource impacts are avoided.
- Fence wetlands and riparian areas on the Klein, Cohagen, Lewis, and Methvin properties to exclude livestock.
- Draft an agreement with Flatiron Industrial Park for South Boulder Creek channel maintenance north of the Burlington Northern railroad bridge. This agreement should ensure wetland, riparian and wildlife habitat values are considered in further flood control and channel maintenance activities to ensure that Best Management Practices are implemented to avoid or minimize resource damage.
- Track floodplain management issues (e.g., University of Colorado Gateway property floodplain study) as they affect Open Space interests regarding riparian and wetland resource values.
- Ensure wetlands and riparian areas on the Short and Milne property are protected in the event Pearl Parkway is extended.
- Investigate the vegetation and ecological characteristics of the complex of alkali wetlands on Gallagher, Lousberg, Hart-Jones (located in the adjacent North Boulder Valley Management Area), and other Open Space properties. These wetland types are globally imperiled and of great ecological significance.
- Survey aquatic vegetation in the spring-fed pond on the Lousberg property.

4.4.2 Objective #2: Restore or enhance suitable wetlands and riparian areas.

Recommended Management Actions

- Use prescribed burns and grazing management to maintain or enhance wetland and riparian plant community diversity.

- Protect riparian and shrub communities and assist in the restoration of woody vegetation by adjusting grazing regimes, removing areas from grazing, fencing areas for one or more grazing periods, and/or manipulating the distribution of use through water source and salt block placement.
- Utilize Integrated Pest Management practices to control weeds and non-native vegetation in wetlands and riparian areas.
- Design and implement an instream flow and riparian management program for South Boulder Creek.
- Develop a formal planting and maintenance program through the Tributary Greenways Program to establish native riparian trees and facilitate efficient removal of hazard trees from the channel. Trees that are not deemed a hazard should be allowed to remain to provide aquatic and wildlife habitat.
- Remove the underdrain on the southern portion of the Andrus property (wetland #423) to improve wetland conditions.
- Consult with a fluvial hydrologist/engineer to evaluate the feasibility of reestablishing natural processes that lead to stream meandering on South Boulder Creek and implement projects to rejuvenate and maintain healthy riparian communities where feasible.
- Inventory streams and wetlands to identify degraded areas that may have restoration potential.
- Evaluate, design, and implement riparian restoration and management programs for Fourmile Canyon, Boulder, and Dry Creeks that flow through the Management Area. Activities should include, but are not limited to, fencing riparian corridors, locating livestock water sources outside of riparian and wetland areas to minimize disturbance, removing Russian olive and other non-native species, and planting native species such as coyote willows and cottonwood trees.
- Investigate the feasibility of relocating or removing existing trails out of wetlands and riparian areas and implement where practicable to protect sensitive areas.
- Utilize Colorado Natural Heritage Program natural communities descriptions to provide guidelines for the desired result of riparian and wetland restoration projects.

An Instream Flow and Riparian Zone Management Program for South Boulder Creek

An instream flow and riparian zone management program involves more than achieving minimum instream flow needs for the creek. A program consists of a series of stream-centered management activities that are designed to allow the fluvial and riparian system to operate as naturally as possible. Management actions are geared to facilitate or restore the operation of natural processes or to reverse or minimize adverse human impacts to the system. However, Open Space staff recognizes that South Boulder Creek has been highly modified by nearly 150 years of intensive human activities, that some of these changes are irreversible, and that some forms of intensive management are needed to prevent further deterioration of the fluvial and riparian system.

Accomplishing this program requires reversing or minimizing the effects of other human actions and includes restoring depleted stream flows, removing and controlling non-native weeds, or

managing recreation to minimize adverse impacts. Additionally, many actions fall under Best Management Practices aimed at avoiding or minimizing resource damage during the course of various land and water management activities.

The instream flow and riparian zone management program is a conscious interdisciplinary approach to managing the ecosystem. The coordination of activities through this planning effort is essential--perhaps the most essential element of the program--because it will help maximize the benefits of actions and simultaneously minimize adverse impacts. The riparian zone and instream flow management program will help prioritize actions for the overall benefit of the stream corridor. (See Appendix 4.1 for a list of management actions that contribute to achieving viable instream flow and riparian zone management program for South Boulder Creek.)

South Boulder Creek Instream Flow Needs

An important component of the instream flow and riparian zone management program for South Boulder Creek is to acquire water to meet the instream flow needs. Numerous municipal, industrial, and agricultural water diversions on South Boulder Creek affect the creek ecology during various times of the year. Preliminary minimum instream flow goals and the amount of water needed to meet those goals for South Boulder Creek are based on preliminary evaluations (Hydrosphere 1994).

Instream Flow Goals

<u>Stream Reach</u>	<u>Irrigation Season</u> (April 15 to October 31)	<u>Storage Season</u> (November 1 to April 14)
Upper Reach (Segments 1 and 2)	22.0 cubic feet/second	8.0 cubic feet/second
Lower Reach (Segments 2, 3, 4, 5, 6)	6.0 cubic feet/second	2.5 cubic feet/second

Enhancement Requirement to Meet Instream Flow Goals

<u>Stream Reach</u>	<u>Irrigation Season</u> (April 15 to October 31)	<u>Storage Season</u> (November 1 to April 14)
Upper Reach (Segments 1 and 2)	Minor amounts	8.0 cubic feet/second
Lower Reach (Segments 2, 3, 4, 5, 6)	6.0 cubic feet/second	2.5 cubic feet/second

4.4.3 Objective #3: Monitor wetland and riparian related issues.

Recommended Management Actions

- Monitor the occurrence and spread of weeds in wetlands and riparian areas.

- Support research to gain a more thorough understanding of the ecological functions of wetlands and activities which impact them.
- Monitor wetlands known to support breeding amphibian populations.
- Update wetland inventory in the Management Area.
- Establish protocols for long-term monitoring of wetland and riparian functions, values, vegetation, and wildlife.
- Monitor regulatory compliance that affects wetland and riparian values and function in the Management Area.
- Study the relationship between the local ground water system and native riparian trees and shrubs.
- Conduct an inventory of fish and aquatic macroinvertebrate populations in Fourmile Canyon Creek and Dry Creek, as well as various ponds and lakes in the Management Area, to determine the ecological condition of these waters. If needed, develop action plans to improve their ecological condition.
- Investigate water quality in ponds and lakes within the Management Area to determine if any specific management is needed to maintain or improve water quality.
- Monitor Schearer Ditch headgate wetland mitigation project and prepare mitigation report.
- Monitor wetland vegetation on the Burke II meadow to determine the long-term effects of the underdrain installed beneath Country Meadows Subdivision on wetland plant communities.
- Monitor non-native species in the enclosure area on the east side of the Burke II property. These species include the large headed yellow loosestrife (*Naumbergia=Lysimachia thrysiflora*), Queen of the meadow (*Filipendula ulmaria*), and tansy aster (*Tanacetum vulgare*). The persistence of these plants suggests that they may have the ability to spread farther in the floodplain.
- Monitor the spread of *Scirpus linearis*, a non-native bulrush, on the Burke II property south to U.S. 36 to determine whether it poses a threat to the biological diversity of floodplain wet meadows.
- Ensure wetland mitigation projects on the Lewis property and on South Boulder Creek north of Valmont Road are monitored in accordance with the City protection ordinance.
- Coordinate with County Transportation and Boulder's Development Review process on the Pearl Parkway bridge project to avoid impacts to wetlands on Open Space.
- Complete wetland fieldwork and data entry as detailed in Table 8.9 of the *Inventory Report*.
- Encourage research on the impact of fire and various grazing prescriptions on wetland productivity and diversity.
- Prioritize environmental education and outreach to increase public awareness of wetland functions and values.
- Conduct a more thorough investigation of wildlife use of wetlands in order to improve the understanding of the species of concern and the value of wetlands as wildlife habitat.
- Test the water and soils on the Hart-Jones salt marsh and other salt marshes for the occurrence of selenium and follow up as appropriate.

5. WILDLIFE

5.1 BACKGROUND

South Boulder Creek is a unique area comprised of riparian corridors, agricultural fields, short/mixed grass prairie, and tallgrass prairie. These habitats support at least 240 vertebrate species and a large number of invertebrate species. The South Boulder Creek riparian corridor within the Management Area supports the highest diversity of wildlife associated with this area. Hayfields provide habitat for a variety of ground-nesting birds and small rodent species, short/mixed grass prairie supports black-tailed prairie dog (*Cynomys ludovicianus*) populations, and the rare remnant tallgrass prairie in the area contributes to the overall environmental heterogeneity of the area. Because of the unique wildlife and vegetation in this area, the South Boulder Creek region has been registered as a Colorado Natural Area by the Colorado Natural Areas Council.

Riparian areas support a disproportionately large number of species compared to other habitats; for instance, more than 80% of birds in the West rely on riparian corridors for food, shelter, or breeding habitat during some portion of their lives. Riparian corridors are also important for smaller vertebrate species such as the Preble's meadow jumping mouse (*Zapus hudsonius preblei*). This species was recently listed as threatened under the Endangered Species Act, and the South Boulder Creek region supports one of the largest known populations in the Colorado Front Range. Its habitat requirements and behavior are not fully understood, but it is thought to depend on flowing water between May and November and shrubs such as coyote willow (*Salix exigua*). Habitat Conservation Plan planning and habitat needs assessments are still being conducted for the mouse. As a result, management actions that could affect the mouse and its habitat may need to be changed as the federal government develops rules designed to protect it. Management actions reflect best available information at the time this Plan was issued. The potential listing of the black-tailed prairie dog may also affect management actions relating to it. South Boulder Creek is also home to two fish species of special concern: the orange-spotted sunfish (*Lepomis humilis*) and the plains topminnow (*Fundulus sciadicus*).

Grassland birds are in serious decline across the United States, and the grassland habitats in the Management Area support a number of these declining species, including savannah sparrow (*Passerculus sandwichensis*) and bobolink (*Dolichonyx oryzivorus*). For example, ground-nesting birds rely on the hayfields of the Management Area for breeding sites, and many of these birds are site faithful, returning to the same breeding sites year after year to reproduce. A species of concern listed by the Colorado Natural Heritage Program is the bobolink, a grassland species at the southwestern extent of its range with isolated and restricted populations in Colorado. Irrigated hayfields in the Management Area are critical for the bobolink populations in Boulder County, and it is essential that the fields that serve as breeding grounds for these birds not be hayed until the young have completely fledged or are no longer dependent on their parents and are able to fly.

In addition to hayfields, short/mixed grass prairie occur in the Management Area. While not as extensive as the regions in North Boulder Valley, these areas support a variety of vertebrate species, including black-tailed prairie dogs. Prairie dog habitat in the United States has declined by approximately 98% in the last 95 years (see *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan* 1996c), and prairie dogs are considered a keystone species of grasslands because their presence supports a variety of other vertebrate species. Species such as the ferruginous hawk (*Buteo regalis*), the bald eagle (*Haliaeetus leucocephalus*), and burrowing owls (*Athene cunicularia*) rely on prairie dog colonies and are designated as species of concern (rare species) by the Colorado Division of Wildlife.

South Boulder Creek supports approximately 17 fish species and at least 96 macroinvertebrate taxa (Bestgen 1997). While the majority of fish species in South Boulder Creek are native (indigenous) species, introduced species also occur in the stream reaches within the Management Area. Two native species, the orange-spotted sunfish (*Lepomis humilis*) and the plains topminnow (*Fundulus sciadicus*), are designated species of special concern by the state and have been recorded in South Boulder Creek. Because water flow during the winter months in some areas of the creek is insufficient to support aquatic life, the acquisition of water rights is currently being pursued.

In addition to providing excellent habitat for wildlife, the Management Area offers the public a variety of recreational activities. These may be designated to include hiking, biking, fishing, horseback riding, and dog-off-leash activities. These activities may have impacts on the landscape and on the wildlife associated with these areas.

This variety of sensitive fauna and flora found in this region and the range of human activities in the South Boulder Creek area make it challenging to coordinate management activities. Agricultural activities (that is irrigated hayfields and grazing) have been the dominant land use in the Management Area for more than 100 years. Wildlife management concerns must be evaluated and balanced with maintaining traditional agricultural practices. This area also supports rare plant species such as the Ute ladies'-tresses orchid (*Spiranthes diluvialis*), and management activities which negatively impact this orchid may be beneficial for avian species such as the bobolink. Finally, many of the natural processes in the area have been altered through human activities. For example, suppressing and using fire as a management tool require staff coordination to determine the timing and extent that may best benefit both plant and animal communities.

5.2 GOAL STATEMENT

This chapter provides recommendations for managing wildlife in the South Boulder Creek Management Area and focuses on wildlife resources and the wildlife management goal approved by the Open Space Board of Trustees:

Preserve wildlife and wildlife habitat through proper land stewardship that incorporates strategies of habitat enhancement and minimizes the impacts of land use harmful to wildlife.

5.3 OBJECTIVES

The Open Space Program has set the following objectives in order to meet the wildlife management goal. The objectives are:

- Inventory wildlife species to establish accurate and replicable monitoring and evaluate effectiveness of land management techniques
- Maintain and/or restore wildlife habitat and/or populations at risk, based upon the results of ecological research and site specific monitoring
- Coordinate wildlife management in South Boulder Creek with other resource management plans (e.g., *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan, North Boulder Valley Area Management Plan*) and agencies
- Integrate wildlife population and habitat protection/enhancement into other resource management actions
- Provide appropriate educational activities in order to convey information to the public on research, wildlife habitat requirements, land protection strategies, and other related material
- Provide volunteer opportunities for research, inventory, management, and education as appropriate

5.4 MANAGEMENT RECOMMENDATIONS

5.4.1 Objective #1: Inventory wildlife species to establish accurate and replicable monitoring and evaluate effectiveness of land management techniques.

Inventory work provides the foundation for responsible land stewardship and management practices. Baseline information directs initial management efforts, and continued monitoring measures the effectiveness of these efforts and allows for management techniques to be adapted when needed.

Recommended Management Actions

- Conduct surveys for mammals, fish, birds, reptiles, amphibians, and invertebrates, in coordination with system-wide survey efforts.
- Conduct and coordinate surveys for Preble's meadow jumping mouse (*Zapus hudsonius preblei*), a federally threatened species under the Endangered Species Act, in the following locations: South Boulder Creek, Dry Creek, Straty-Cline, Short and Milne, Viele Channel,

Lousberg, and any other properties which might contain suitable habitat.

- Conduct and coordinate surveys for the rare orange-spotted sunfish and plains topminnow in appropriate stream reaches.
- Conduct and coordinate surveys for amphibians in Suitts Pond, Sombrero Marsh, and other appropriate wetland sites.
- Encourage and conduct research targeting inventories of vertebrate and invertebrate wildlife species and assess impacts of land uses (e.g., recreation, urban development, grazing, haying) on wildlife populations and habitat through the City of Boulder Open Space/Mountain Parks Research Program.
- Coordinate efforts with local agencies and volunteer groups to make sure that wildlife sightings and information are shared on an annual or biannual basis. These efforts include annual deer, goose, heron, and bat counts conducted in conjunction with City of Boulder Mountain Parks, Boulder County Parks and Open Space, and the Division of Wildlife.
- Maintain a wildlife database as a usable repository for information and for analyses and make results available to the public and land managers.

5.4.2 Objective #2: Maintain and/or restore wildlife habitat and/or populations at risk, based upon results of ecological research and site-specific monitoring.

Incorporation of research pertaining to habitat requirements, population distribution and status, and current threats is vital in developing a management plan for the various resources in the Management Area. Many data gaps exist with reference to aquatic resources, in particular.

Recommended Management Actions

- Evaluate the ecological conditions that support rare fish with the Division of Wildlife and other interested agencies and coordinate aquatic resource restoration activities.
- Evaluate water quality conditions with appropriate staff to determine where wetland restoration activities may most benefit amphibian populations (such as Sam's Lane and West Church).
- Create and/or enhance suitable habitat for Preble's meadow jumping mouse following future recommendations set forth by the U.S. Fish and Wildlife Service.
- Enhance natural habitat or create artificial habitat on a species-specific basis to encourage species of concern (e.g., barn owls, bank swallows, cavity-nesting birds).
- Identify and provide natural and/or artificial habitat on a species-specific basis for wildlife species to assist with Integrated Pest Management (e.g., bat roosts to assist in controlling mosquitoes).
- Enhance native plant communities (see Vegetation chapter) to increase wildlife species diversity (e.g., invertebrates).

5.4.3 Objective #3: Coordinate wildlife management in the Management Area with other resource management plans and agencies such as the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan*.

System-wide resource management plans are essential to provide management guidelines for species and habitats extending beyond management area boundaries. It is critical that these plans (e.g., *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan*, *North Boulder Valley Area Management Plan*) be incorporated into the South Boulder Creek Management Plan.

The *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan* designates prairie dog colonies as either Habitat Conservation Areas, Transitional Areas, or Removal Areas (Figure 5.1). In order to designate Habitat Conservation Areas, factors such as size of the colony and proximity to other colonies are considered. While many Habitat Conservation Area colonies are large colonies that are relatively close to other colonies, isolated colonies may be equally important to the persistence of the regional population because isolated colonies may survive sylvatic plague epizootics and thus serve as source populations for recolonization of suitable habitats. Transitional Areas are those that may not be suitable Habitat Conservation Areas at the time of review due to factors such as size, connectivity with other colonies, or adjacent landowner conflicts. These Transitional Areas may be either designated as Habitat Conservation Areas, Removal Areas, or they may remain Transitional Areas until further review. Removal Areas are those in which the prairie dogs are relocated to suitable areas; relocation to suitable areas is greatly preferred over extermination.

Recommended Management Actions (General)

- Enforce the dog leash management recommendations as outlined in the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan* (see Recreation, Education, and Public Safety).
- Follow the recommendations of the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan* for designation of prairie dog colonies on existing properties or new acquisitions that occur outside of identified Habitat Conservation Areas (Appendix 5.1 details the prairie dog colony designations and boundary changes for the Management Area).

Recommended Management Actions (Habitat Conservation Areas)

- Promote trail-free Habitat Conservation Areas where practicable; if not practicable, place/move trails to the perimeters of the colonies (see Passive Recreation chapter).
- Designate the Klein and Suitts North colonies as the Dry Creek Habitat Conservation Area due to their isolation from other colonies.

Figure 5.1: Prairie Dog Habitat Conservation Areas and Transitional Areas South Boulder Creek Management Area

Map Key

Grassland Management Plan Designation

Prairie Dog Habitat Conservation Area

■ New

▨ Existing

Prairie Dog Transitional Area

▤ New

▥ Existing

▧ South Boulder Creek Management Area

■ City of Boulder Open Space

Hydrology

~ Creek

□ Lake

Roads

≡ Arterial

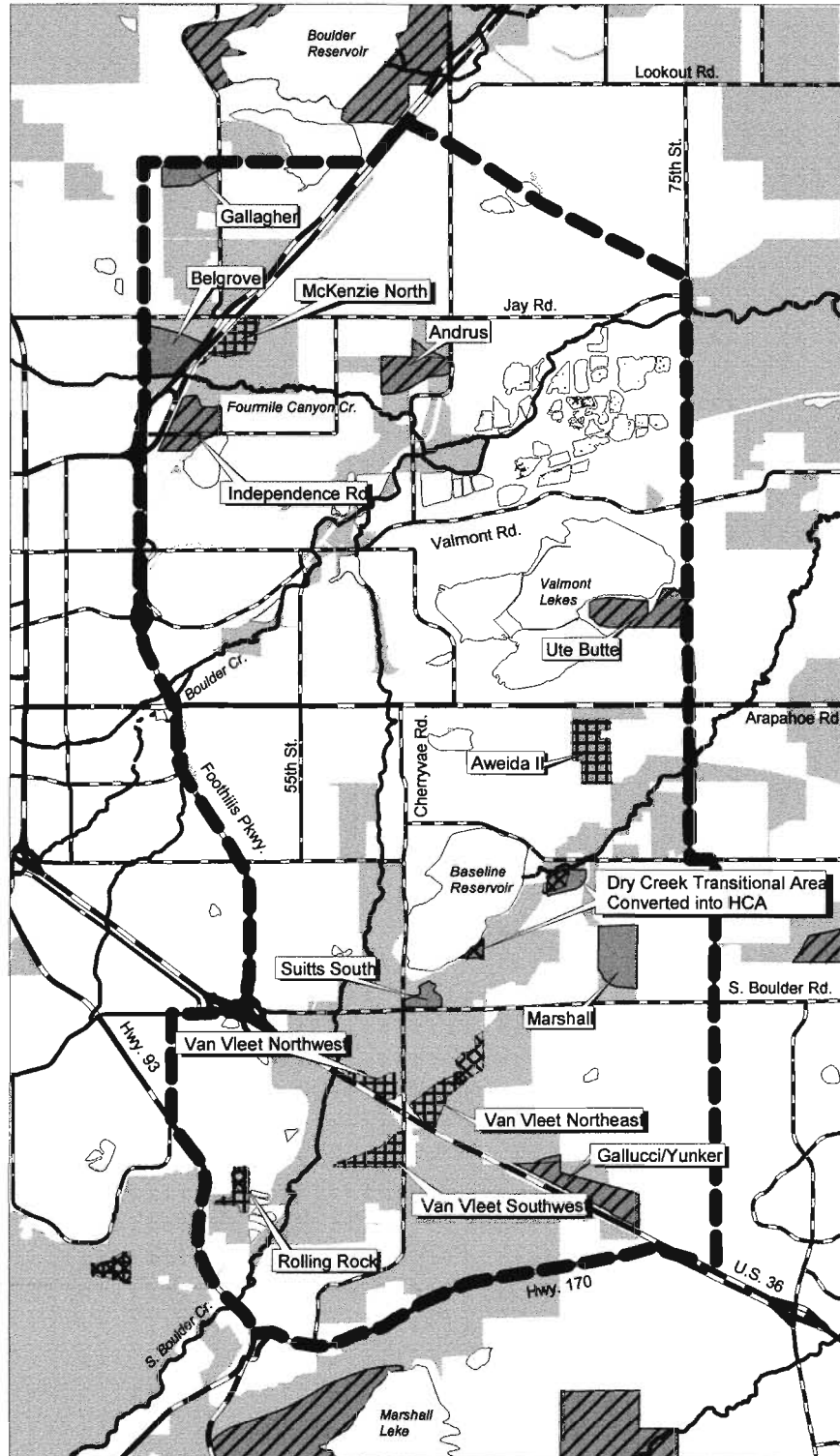
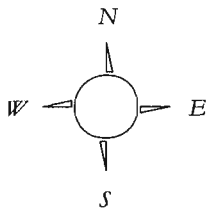
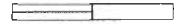
≡ Highway

Scale

0 0.5 1 Kilometers



0 0.5 1 Miles



Map produced by the City of Boulder Open Space GIS Lab, May 1998.
Cartography by Sean Metrick
Copyright 1998, City of Boulder

- Designate the newly acquired Marshall colonies as a Habitat Conservation Area due to their large size.
- Designate the Suits South colony as a Habitat Conservation Area due to the isolation of the colony.
- Designate the Gallagher colony as a Habitat Conservation Area due to its large size.
- Designate the Belgrove colony as a Habitat Conservation Area due to its proximity to the Independence Road Habitat Conservation Area.
- Designate the McKenzie North colony as a Transition Area.

Recommended Management Actions (Transitional Areas)

- Extend the Transitional Area designation of Rolling Rock Ranch.
- Extend the Transitional Area designation of Van Vleet Northeast until natural barriers (specifically coyote willow, tallgrasses) are established; once they are in place, reevaluate designation.
- Designate the Van Vleet Southwest colony as a Transitional Area due to burrowing owl activity and proximity to Colorado Tallgrass Prairie Natural Area.
- Designate the Van Vleet Northwest horse pasture colony as a Transitional Area until further evaluation.
- Designate the Aweida II colony as a Transitional Area due to possible conflicts with reclamation efforts on the property.

Recommended Management Actions (Boundary Changes)

- Extend the north boundary of the Gallucci/Yunker Habitat Conservation Area to the Davidson Ditch.
- Extend the northeast corner of the Andrus Habitat Conservation Area to the ditch.
- Change the boundaries of the Rolling Rock Transitional Area to the northwest, north and east fences, the ditch to the west, and the South Boulder Creek trail to the south.
- Change the boundaries of the Van Vleet Northeast Transitional Area to the fence to the east/northeast, the fence/U.S. 36 to the south, and the fence/Marshallville Ditch to the west/northwest.

5.4.4 Objective #4: Integrate wildlife population and habitat protection/enhancement into other resource management actions.

In order to provide proper stewardship of wildlife habitat and populations, coordinated management with other resource objectives and activities is critical. General guidelines need to be followed in order to protect, preserve, or enhance wildlife populations and habitat.

Recommended Management Actions

- Design grazing management objectives to minimize impacts to or enhance wildlife populations and habitat (e.g., provide a mixture of grazed and ungrazed pastures on an annual basis).

- Encourage agricultural activities (specifically haying) to occur after July 15 to protect sensitive grassland bird species (e.g., the bobolink) and coordinate site-specific haying schedules with the plant ecologist in order to help with Ute ladies'-tresses orchid (*Spiranthes diluvialis*) management.
- Encourage the protection of large tracts of relatively unfragmented land, undisturbed from the effects of recreational trails (e.g., Klein and Suits; see Miller et al. 1998). This maximizes available undisturbed habitat and minimizes impacts from trails. If future decisions are made to construct additional trails in these areas, these trails should be located to minimize habitat fragmentation and potential negative environmental impacts (Richardson and Miller 1997).
- Protect critical breeding and winter habitat of raptors through protection of large tracts of relatively unfragmented land (Richardson and Miller 1997).
- Protect wildlife from short-term activities such as utilities construction/maintenance through cooperation with the appropriate agencies.
- Use seasonal closures to protect sensitive wildlife species where appropriate (e.g., voluntary temporary closure of bobolink breeding areas).
- Identify weed management areas to benefit wildlife populations on an annual basis. Provide this information to the Integrated Pest Management coordinator for use in prioritizing annual work plans.
- Design fire management plans cooperatively with appropriate staff to enhance wildlife habitat or minimize negative impacts to wildlife.
- Work on a long-term fire management plan with specific resource objectives (see Vegetation chapter).
- Develop and implement an instream flow program during low-flow winter months to enhance fish and wildlife habitat.
- Identify parcels of land for potential acquisition to increase the amount of unfragmented wildlife habitat.

6. CULTURAL RESOURCES

6.1 BACKGROUND

City of Boulder Open Space lands have played a significant role in the cultural heritage of the Boulder Valley and within the South Boulder Creek Management Area. The natural and cultural resources of these lands contribute to a better understanding of humankind and its environment. Cultural resources may include buildings, structures, sites, areas, or objects having scientific, historic, prehistoric, archaeological, or social values. Only cultural manifestations over 50 years old will be considered for the purposes of this document. Many of these resources are considered irreplaceable, and every effort will be made to preserve and protect significant cultural resources whenever possible and reasonable. Interpreting, protecting, and preserving significant and fragile archaeological and historical resources are major management challenges.

6.2 GOAL STATEMENT

The following broad goal statement was developed to guide cultural resource management for South Boulder Creek:

Preserve and interpret historic sites, landscapes, and themes of the area.

6.3 OBJECTIVES

The Open Space Program has set the following objectives in order to meet the cultural resource management goal. The objectives are:

- Identify, document, and evaluate significant national, state, and local cultural resource sites, landscapes, and themes within South Boulder Creek
- Protect and preserve significant national, state, and local cultural resources within the Management Area
- Interpret sites and educate visitors to understand and appreciate cultural resources

6.4 MANAGEMENT RECOMMENDATIONS

6.4.1 Objective #1: Identify, document, and evaluate significant national, state, and local cultural resource sites, landscapes, and themes within South Boulder Creek.

Cultural resource themes represented in South Boulder Creek include: (1) water and irrigation systems, (2) agriculture, (3) mining and extractive industries, and (4) transportation. Fifty-six

sites and 11 isolated finds have been documented in South Boulder Creek. Some of the cultural resource sites in the Management Area include a mine office, a stone building, farms, barns, foundations, and agricultural ditches. The Fox Mine Office and the Fox/Hogan Stone Barn have been listed on the National Register of Historic Places. A 19th century stone building is eligible for the State Register of Historic Properties as an example of early stone construction in Colorado. The Viele Farmstead is a City of Boulder Historic Landmark. Lewis/Stengel farm and Hogan farm may be eligible for Boulder County landmarking. Several sites need additional data to evaluate their eligibility for the National Register of Historic Places for their archaeological potential.¹

Several irrigation ditches crossing Open Space were the first ditches in the Valley and are key to the early and sustained agricultural success of the area. The Davidson Ditch and Reservoir Company, Boulder and White Rock Ditch, segments of the Howard Ditch, East Boulder Ditch, Enterprise Ditch, McGinn Ditch, and the New Dry Creek Carrier Ditch are considered eligible for listing on the National Register of Historic Places because of their association with the development of water storage and irrigation in Boulder County. The Bear Creek Ditch, Cottonwood No. 2 Ditch, Dry Creek Davidson Ditch, North Boulder Farmer's Ditch, Green Ditch, and the Boulder and Left Hand Ditch may also be eligible for their associational values.

Recommended Management Actions

- Evaluate local significance and how various outbuildings and sites contribute to historic themes and landscapes within the Management Area. Structures to be evaluated include the Lewis residence and associated outbuildings, Suitts silo, the ruins at the Hogan residence, the ruins at Richardson I (two locations), and the Abernathy farmstead.
- Conduct inventories on new properties, including Lousberg, Gallagher, Marshall, and Lentsch, to ensure cultural resources are identified, documented, and evaluated for national, state, and local significance. Comprehensive inventories of new properties will be completed when the majority of surrounding acquisitions have been purchased. Interim priority for inventory will be given to new properties that may have projects that could potentially affect cultural resources (e.g., ground-disturbing projects and increased recreational access).

6.4.2 Objective #2: Protect and preserve significant national, state, and local cultural resources within the Management Area.

Although cultural resources are protected under the authority of various federal, state, and City laws, additional management actions may be required to protect cultural resources on Open Space lands. These measures will vary with individual situations but may include: (1) physical protection such as fences, grills, barriers, and other structures; (2) increased patrol of properties which are especially vulnerable to vandalism or other damage; (3) use of signs, where they will not attract attention to otherwise inconspicuous sites; (4) development of measures which

¹Refer to Gleichman and Phillips (1997) for more complete information.

consider cultural resource management in other resource management and development programs; (5) avoiding publicity about resources susceptible to vandalism; anonymity of sites, where necessary for their preservation, should be furthered by denial of any requests from the public for locational information; (6) increase public understanding and support through educational and interpretive efforts; (7) closure of sites or areas; and (8) development of historic structure reports for historically/architecturally significant properties and the development of preservation plans which address recommended treatments and management of historic resources. Historical structures should be maintained and used for Open Space purposes.

It is unlawful to destroy or remove any cultural resource from Open Space lands without permission (Boulder Revised Code 1981 §5-4-2 “Damaging Public Property”). Permission to remove these resources will be granted only after it has been determined that such removal will not adversely affect social, historical, archaeological, or scientific values. This determination will be made by the Open Space director based upon recommendations from staff, the Open Space Board of Trustees, and the advice of a cultural resource specialist. In emergencies, Open Space staff members or individuals acting under the authority of the Program may remove cultural resources to avoid imminent loss or destruction. Records will be made of the nature and location of such resources. Once the decision to recover cultural resources has been made, all materials collected will be stored and maintained in an authorized repository except when being used for display, research, evaluation, or other educational purposes.

Standing buildings and structures that are not considered to be significant and pose significant safety hazards will be evaluated for removal on a case-by-case basis. These structures will be evaluated by Open Space staff, a cultural resource specialist, and the appropriate government entity (the City Landmarks Preservation Advisory Board on structures within the City limits of Boulder and the Boulder County Historic Preservation Advisory Board on Open Space lands within Boulder County) prior to any demolition of such structures. Careful consideration will be given to the relationship of the individual structure to the overall cultural significance of the site. Structures that may not be individually significant (e.g., outbuildings such as silos, barns, outhouses) but collectively contribute to the overall importance or understanding of the site should be preserved whenever possible and reasonable. Appropriate documentation of structures and all necessary permits will be obtained prior to any removal of standing structures.

Remnant plantings, vegetation, and field patterns may also be important cultural resources and could contribute to the overall importance or understanding of a site. These types of cultural resources will be preserved whenever possible and reasonable unless conflicts develop with management of native plants or agricultural practices.

Due to the significant amount of time and resources required to pursue designation of sites eligible to national, state, and local registers, designation will be pursued on a case-by-case basis. These sites are protected under general Open Space policies and the procedures outlined above. Priority for pursuing designation will be given to sites that require intensive management and where additional public recognition and funding are needed.

Recommended Management Actions (see the Facilities chapter for further recommendations on facilities)

- Interpret suitable sites (see Objective 6.4.3).
- Discourage public access in areas susceptible to damage and vandalism (e.g., signs, field contacts).
- Notify Open Space staff of existing cultural resource sites and patrol them on a routine basis.
- Train Open Space staff to identify potential cultural resources.
- Remove vegetation around the foundation of the Fox Mine Office to prevent foundation damage. Make repairs necessary to secure the building and prevent deterioration of the structure.
- Repair roof at the Fox/Hogan Stone Barn and improve drainage around the structure.
- Stabilize and maintain the exterior of the Viele house and buildings. The remaining outbuildings will be maintained (repairs should maintain historical integrity) and used for agricultural purposes.
- Evaluate potential uses of the Viele house and pursue grant funding to restore and use the building for appropriate Open Space functions.
- Stabilize the sod-roofed building on the Suits property. Research the history of the building and interpret if a trail is built in this proximity.
- Continue to maintain the Doran barn, the Hogan residence, and the Harf barns (repairs should maintain historical integrity) and use for agricultural purposes.
- Stabilize structures determined to be locally significant and incorporate into the Open Space caretaker or agricultural program. Structures to be evaluated for local significance include the Lewis residence and associated outbuildings, Suits silo, the ruins at the Hogan residence, the ruins at Richardson I (two locations), and the Abernathy farmstead.
- Review future caretaker and agricultural leases to ensure significant cultural resources are identified and managed appropriately.

6.4.3 Objective #3: Interpret sites and educate visitors to understand and appreciate cultural resources.

Gaining public understanding and support through education and interpretation efforts is one of the most effective ways to protect cultural resources. Suitable cultural resource sites will be identified and interpreted while visitor use will be discouraged or restricted in sensitive areas. Suitable cultural resource sites for education are generally sites which are well known and that are not susceptible to vandalism. Interpretive signs will only be used where they will not attract attention to an otherwise inconspicuous site.

Recommended Management Actions (see Education and Outreach chapter)

- Interpret suitable sites. An interpretive sign for the Viele farmstead should be placed near the adjacent trail explaining the role of this complex in the agricultural development of the area.
- Research and document the history of the sod-roofed building on the Suits property and incorporate into the general history of the area.

- Work with volunteers to assist in the interpretation of suitable sites.
- Cultural resource interpretive themes will focus on mining, agriculture, and water resources (as identified in the *Inventory Report*). Interpretive cultural resource programs should be developed and provided on a routine basis.
- Discourage access in areas susceptible to vandalism.

7. PROPERTY

7.1 BACKGROUND

The acquisition of Open Space in the South Boulder Creek Management Area began in 1968. The first purchase was the Gallucci property located next to the scenic overlook on U.S. 36 on Davidson Mesa. At the time of this writing 96 individual property acquisitions have been completed in the Management Area (Figure 7.1*). Negotiation for additional properties is ongoing and expected to continue for several years. Presently, the total acreage of property acquired for Open Space purposes in the Management Area is approximately 3,800 acres.

The set of property rights owned by the City is different on each property acquired in the Management Area. Approximately 91% of the total land area acquired to date has been acquired in the most complete type of ownership called fee simple ownership. The other types of ownership are conservation easements, development rights agreements, and access easements. Even the properties the City owns in fee simple have easements to other entities (e.g., Public Service Company) that gives them a legal right to use a certain portion of the City's Open Space land. The exercise of those rights by the holder of those rights usually affects the physical condition of Open Space property.

Many of the Open Space properties were acquired in conservation easements, the second most frequent category of ownership. A conservation easement generally means that the seller, not the City, retains the ownership and daily use and operation of the property but has contractually agreed to certain limitations on the use of the property. Each conservation easement in the Management Area contains a unique set of limitations and agreements about the use of the property. The details contained in each conservation easement deed affect management of the property.

The purchase of a property's development rights is the third type of ownership for preservation purposes used in this Management Area. Development rights purchased by City Open Space eliminate or reduce the landowner's right to develop the property in the future but usually do not define or limit the present uses of the property.

The final category of ownership the City has in the Management Area and the least frequent is an access easement. An access easement gives the easement holder the right to enter, access, and go across and return on someone else's property, usually in a certain described geographic location for vehicular or pedestrian uses.

A complete inventory of each property and its ownership type is contained in *the South Boulder Creek Management Area Inventory Report*. The set of rights the City owns and the rights the City does not own on each Open Space parcel is described in the *Inventory Report*.

7.2 GOAL STATEMENT

The following broad goal statement was developed to guide property acquisition and management for the South Boulder Creek:

Pursue acquisition of lands consistent with the Open Space Charter and the area management plan goals and ensure proper management of easements and Open Space properties.

7.3 OBJECTIVES

The Open Space Program has set the following objectives in order to meet the property acquisition and management goal. The objectives are:

- Acquire lands surrounding and within the Management Area that meet Open Space Charter and area management goals
- Research and document all easements and mineral and water rights in the Management Area
- Monitor existing Open Space conservation and other easements for compliance
- Work with adjacent landowners and agencies on cooperative management issues
- Establish appropriate leases to meet management goals
- Coordinate and integrate reviews of new acquisitions

7.4 MANAGEMENT RECOMMENDATIONS

7.4.1 Objective #1: Acquire lands surrounding and within the Management Area that meet Open Space Charter and area management goals.

Acquisition in the South Boulder Creek area is an ongoing process, including the acquisition of certain property interests, water rights, and mineral rights. Acquisition of properties will be based on meeting Open Space Charter and area management goals, availability, purchase price, and terms, and will be considered within the property acquisition needs for other parts of the Open Space system.

Recommended Management Actions

- Incorporate resource management needs and significant environmental values (including mineral rights, water rights, or other real property interests) into future acquisitions.
- Pursue individual acquisitions based on meeting Open Space Charter and area management goals, availability, price, and purchase terms.
- Consolidate Open Space lands by acquiring private inholdings, such as Warreburg,

Straty/Cline, Fancher, Walker, and Sombrero Marsh.

- Reduce impacts from development of adjacent areas by reviewing City of Boulder and Boulder County development applications for environmental protection, recreational access, and real estate management needs (applications are referred through the City's Development Review process and through the County's referral process). Determine if resource management goals can be met through this process without actual purchase of a property interest.
- Assess trail access and development issues related to existing Open Space properties and future acquisitions.

7.4.2 Objective #2: Research and document all easements and mineral and water rights in the Management Area.

Existing utility and other easements, because of their location, may cause substantial damage to the resources that are being protected through acquisition. Establishing the location of the easement and a procedure for working with the easement owner may reduce negative impacts to the property through negotiation of a new easement location or possible abandonment of easements.

Recommended Management Actions

- Describe, locate, and document existing easements and right-of-ways.
- Establish procedures for managing existing utility easements.
- Review existing easement request policy.
- Eliminate or revise burdening easements that have been abandoned or have expired.
- Abandon utility easements which are no longer in use or that have been revised.
- Renegotiate easements which do not meet Open Space management needs.
- Resolve ownership and maintenance issues on roadways within the Management Area.
- Inventory mineral interests on existing properties and determine mineral interests of new acquisitions.
- Inventory water rights on existing properties and determine water rights of new acquisitions.

7.4.3 Objective #3: Monitor existing Open Space conservation and other easements for compliance.

Conservation easements or development rights need to be monitored for compliance on a routine basis. A uniform understanding of these easement agreements and a procedure for monitoring are critical to protect the property right purchased.

Recommended Management Actions

- Determine responsible staff and establish procedures for easement compliance.
- Disseminate information on easements to staff and monitor for compliance.

7.4.4 Objective #4: Work with adjacent landowners and agencies on cooperative management issues.

Working with adjacent landowners is important to protect the resources of the properties in the Management Area. It is not efficient to manage City-owned land if efforts are not coordinated with adjacent landowners (e.g., controlling weeds on a property boundary). Acquisition staff will coordinate resource management efforts with adjacent landowners and Open Space staff (as it relates to encroachments, access, easements, weed control, prairie dog plan implementation, and agricultural concerns).

Recommended Management Actions

- Continue to work with adjacent landowners and agencies to improve water quality for Open Space and surrounding areas.
- Work with Boulder County and other departments within the City to provide trail linkages that meet regional recreational needs. Assist negotiations with other agencies for trail connections.
- Work closely with City of Boulder Planning and Boulder County Land Use to ensure proper access and natural resource protection concerns are addressed as surrounding lands develop.
- Work with the City of Boulder Planning and Boulder County Land Use to ensure that surrounding land uses are compatible with Open Space management (see Objective 7.4.1).
- Contact adjacent landowners and agencies on coordinated weed control efforts and other resource management needs.
- Continue to coordinate with City Public Works Department about contamination management at the Marshall Landfill site.
- Monitor Western Mobile's long-term use of the asphalt plant near the Valmont townsite.
- Evaluate potential land trade opportunities with other public agencies, such as Sawhill Ponds.

7.4.5 Objective #5: Establish appropriate leases to meet management goals.

Recommended Management Actions

- Revise agricultural leases to reflect current management direction.
- Revise and monitor leases for caretaker and lessee facilities.

7.4.6 Objective #6: Coordinate and integrate reviews of new acquisitions.

New properties will continue to be acquired in South Boulder Creek and in other Open Space management areas. Coordination with resource managers prior to and immediately after closing on a new property provides the opportunity to identify immediate management needs, incorporate them into acquisition costs, and integrate the property with the goals of the South Boulder Creek Area Management Plan.

Recommended Management Actions

- Coordinate acquisition of new Open Space lands with resource management needs. Establish management needs prior to acquisition, incorporate resource management requirements into purchase agreement, and incorporate major capital improvement costs into the acquisition whenever possible.
- Inventory new properties and evaluate management needs based on the goals of the South Boulder Creek Area Management Plan.

8. FACILITIES

8.1 BACKGROUND

Facilities are considered to be structures or buildings which serve residential, office, or agricultural operations (see Passive Recreation chapter for information on other types of Open Space facilities). Several existing buildings and structures have been purchased incidental to land acquisition, and the Open Space Program has constructed other facilities for land management purposes, primarily passive recreational use. Existing facilities in the South Boulder Creek Management Area include: two Operation Center Office complexes, Rocky Mountain Riding for the Disabled, four houses, barns, sheds, silos, and historic structures and their associated outbuildings. Each facility needs to be evaluated for its potential Open Space use and managed accordingly.

8.2 GOAL STATEMENT

The goal of facility management is to:

Ensure safe, responsible, and efficient use and maintenance of all structures or buildings owned by the City of Boulder Open Space Program.

Facilities with local, state, or national historical significance should be preserved, whenever possible, depending on associated costs and appropriate provisions for public safety. Facilities that can be used for Open Space purposes will be maintained, while others which do not serve Open Space purposes should be removed or relocated.

Uses and functions may include but are not limited to:

- Maintenance and management of structures for public use and education
- Leasing for uses and occupancies related to Open Space Program needs
- Securing and maintaining the structures for future Open Space Program needs
- Maintenance and management of structures associated with agricultural needs
- Removal of structures that cannot be made structurally sound or otherwise appropriate for Open Space Program needs (see Cultural Resources chapter for evaluating and removal of structures)

8.3 OBJECTIVES

The Open Space Program has developed the following set of objectives in order to meet the facilities management goal. The objectives are:

- Ensure proper management of existing buildings and structures
- Develop policies for the use of facilities

8.4 MANAGEMENT RECOMMENDATIONS

8.4.1 Objective #1: Ensure proper management of existing buildings and structures.

Proper management of facilities will determine each structure's relationship to Open Space Program needs and evaluate each structure's potential use. Associated costs and safety concerns will be an important consideration in determining uses. Facilities with local, state, or national historical significance will be preserved and stabilized whenever possible (see Cultural Resources chapter).

Recommended Management Actions

- Maintain Open Space Operations Center as office space and provide maintenance as needed. Designate appropriate contact person for grounds and building maintenance.
- Maintain the Operations Annex as office space and storage for equipment and supplies. Designate appropriate contact person for grounds and building maintenance.
- Maintain Rocky Mountain Riding for the Disabled as a leased facility and provide maintenance as needed. Designate appropriate contact person for grounds and building maintenance.
- Maintain Hawkins residence as an occupied caretaker facility and provide maintenance as needed.
- Evaluate potential uses of the Viele house.
- Evaluate costs and need for improving structural integrity of the Viele house and associated outbuildings (see Cultural Resources chapter).
- Repair and maintain Fox/Hogan Stone Barn for historical significance (see Cultural Resources chapter).
- Repair foundation and maintain Fox Mine Office for historical significance (see Cultural Resources chapter).
- Evaluate historical significance for all buildings on the Suitts property (see Cultural Resources chapter).
- Maintain existing structures in the Harf complex for agricultural purposes.
- Repair Harf pump house for agricultural needs.
- Maintain barn and outbuildings at the Doran complex for historical significance and maintain for agricultural purposes (see Cultural Resources chapter).
- Evaluate historical significance and habitability of the Lewis house and maintain barn and hay shed for agricultural purposes.
- Maintain Hogan house as an occupied facility and provide maintenance as needed.
- Maintain barns and sheds at the Hogan complex for agricultural purposes.
- Remove abandoned box cars from Merle-Smith.

- Remove Lousberg garage as recommended by the Open Space Board of Trustees.
- Remove pump house on Klein.
- Evaluate potential uses for wells and pump house on Klein and either secure or remove.

8.4.2 Objective #2: Ensure all facilities are safe and maintained to an acceptable standard.

Recommended Management Actions

- Inspect each facility annually or as needed for safety concerns.
- Test well water for contaminants annually at all occupied facilities.
- Inspect heating systems annually in all occupied facilities.

8.4.3 Objective #3: Develop policies for the use of facilities.

Recommended Management Actions

- Implement caretaker and facilities policy once completed and approved by the Open Space Board of Trustees.
- Define acceptable standards for all occupied facilities.

9. AGRICULTURE

9.1 BACKGROUND

Agricultural production within the South Boulder Creek Management Area dates back almost 140 years. While historic agricultural operations have included irrigated crop production, beef production, poultry production, and horse boarding, current operations consist (primarily) of dormant season cattle grazing and harvesting of irrigated forage. Agricultural leases are held by local farmers and ranchers to help maintain viable agricultural operations and accomplish integrated natural resource management.

Grazing is the largest component of the agricultural program, and grazing prescriptions are the principal tool used to integrate and balance natural resource conservation and agricultural production. Current agricultural practices assist in the maintenance of native plant communities and species and wildlife habitats. Irrigation provides the water needed for agriculture while simultaneously supporting wetlands and wildlife habitat that would disappear due to extensive modifications of creeks in the area. Fields are tilled only when there is a need to reestablish desirable vegetation. Agricultural operations in the southern end of the Management Area have helped to eliminate the use of chemical fertilizers, reduced the introduction of new exotic seed sources from outside the Management Area, and assisted in the control of some weed species such as Canada thistle. Adaptive management of the agricultural operation using prescribed fire, new or realigned fences, grazing prescriptions, and monitoring and improving irrigation practices will sustain the natural environment and traditional agricultural operations.

The Open Space properties in the Management Area are some of the largest remaining contiguous properties under forage production or grazing in the southern end of the Boulder Valley. These properties have a combination of soils, irrigation potential, climate, historic land use, and/or geographic location which contribute to the viability of the local agricultural industry (Soil Conservation Service 1982). The principal agricultural management issues are refining and implementing sustainable agricultural operations in light of growing demands for competing land uses and fewer full-time farmers and ranchers who can lease the property.

9.2 GOAL STATEMENT

Agricultural management plans require careful preparation to ensure adequate flexibility to meet management objectives for Open Space as well as lessees. Individual property characteristics greatly influence which management practices will meet the stated objectives. Evaluation of each property's ecological characteristics, as well as how those characteristics fit into the larger landscape context, will determine its agricultural potential and management. Actions will be prescribed accordingly. Agricultural management should strive to assure sustainability. Sustainable agricultural management emphasizes efficiency and enhancement of the quality of life and economic viability, and ensures long-term productivity by balancing annual production

with resource protection. Agricultural practices will be favored that help maintain biological diversity and the functions and processes of the natural systems upon which we rely. The natural carrying capacity of the environment will be used to identify grazing and haying quotas and will be adjusted through the annual plans and leases.

This chapter provides management direction for agricultural operations in the South Boulder Creek Management Area. An integrated planning approach will guide agricultural management toward the following goal:

Refine, focus, and implement sustainable agricultural practices which enhance multiple resource management objectives.

9.3 OBJECTIVES

The Open Space Program has developed the following objectives to meet its agricultural management goal. The objectives are to:

- Enhance the balance between natural resources and agricultural practices
- Use agricultural facilities as appropriate and make improvements to the facilities so that benefits will be maximized
- Use water rights and irrigation infrastructure to accomplish sustainable, integrated resource management.

9.4 MANAGEMENT RECOMMENDATIONS

9.4.1 Objective #1: Enhance the balance between natural resources and agricultural practices.

Coordinating management between lessee and Open Space staff, revising leases, evaluating grazing prescriptions, building new or realigning existing fences, coordinating vegetation management, using prescribed fire, and monitoring and improving irrigation practices can sustain the natural environment and traditional agricultural operations in South Boulder Creek. This practice should continue and be expanded to additional properties, where appropriate, within the Management Area.

Recommended Management Actions

Coordinate Resource Management Planning with Lessee Agricultural Planning

- Evaluate existing leases as they expire and, if necessary, modify language to stipulate specific compliance with resource goals and objectives (weed management, natural grass communities, etc.) on specific properties.
- Hold an annual meeting with resource staff, between November 1 and November 30, before the lessee meetings to establish coordinated natural resource management objectives for

agricultural management.

- Hold an annual meeting with each of the agricultural lessees between December 1 and February 15, before field season, to coordinate resource management activities and agricultural activities on Open Space.
- Hold an annual meeting with lessees who have operations on the properties along the South Boulder Creek floodplain. The meetings should be held during the first 2 weeks of June to coordinate their specific haying times and locations with the efforts to protect the Ute ladies'-tresses orchid, bobolink, and other sensitive species.

Lease Reviews

- Evaluate the potential options for operating Lousberg and Gallagher as a single operating unit. Leases for these properties are effective until 1999.

Specific Grazing Prescriptions

- Adjust management scheme for the West Van Vleet property (the Dorn barn field/posie patch). Include spring grazing prescriptions and prescribed fire and investigate the feasibility of repairing the well adjacent to the Dorn barn so that it can be used as an alternate water source for livestock. Spring grazing should be complete by mid-May. Prescribed burns should be conducted in late winter/early spring (after grazing is complete) and should result in the creation of a mosaic of small patches of burned and unburned vegetation throughout the property.
- Review and evaluate grazing practices used by Rocky Mountain Riding for the Disabled. Work with them to establish more sensitive grazing prescriptions as part of the Cherryvale/Van Vleet operation.
- Develop management strategy for hay field south of U.S. 36 and west of South Boulder Creek. Management should include prescribed fire, grazing for Canada thistle control, aftermath grazing, and haying to improve vegetation condition.
- Prepare grazing prescriptions for Jirkovsky and City on the Hill that will benefit reclamation and native vegetation management.
- Prepare Rolling Rock Ranch (rocky area) grazing prescription that includes prescribed fire or mowing and grazing schedule.
- Prepare grazing prescriptions similar to those used in the Van Vleet area for the Suitts and St. Walburga properties (Figure 9.1.A).
- Exclude grazing (except for weed management) from the northern portion of the Klein property (along Dry Creek and the prairie dog Habitat Conservation Area).
- Develop alternative routes of moving cattle around and over Davidson Mesa (in the spring) between winter pastures (Van Vleet properties) and the summer pastures (Stengel and other southern properties). Alternate routes are necessary to provide rest for short- and mixed-grass vegetation that is influenced by annual grazing in the same way.

Fencing

- Install or realign fences to protect resources and better manage grazing in or near riparian areas along the South Boulder Creek, Dry Creek, and Fourmile Canyon Creek floodplains.

- Fence the riparian area (corridor) of South Boulder Creek from South Boulder Road to U.S. 36. Locate the fence between the trail and creek.
- Fence the riparian area (corridor) south of U.S. 36 to Fancher on the east side of the creek (Figure 9.1.B).
- Fence Suitts pond to help manage cattle grazing in the area.
- Install a fence on Fancher to exclude grazing which will facilitate vegetation recovery and to protect Preble's meadow jumping mouse habitat.
- Evaluate the existing fence alignments on Gallagher and Lousberg. Identify ways to reference the properties to maximize cropland production and wetland protection.
- Evaluate the Gallagher and Nu-West properties for new fencing alignments that will enhance rotational grazing and haying opportunities ($\frac{1}{3}$ hayed and $\frac{2}{3}$ grazed).
- Evaluate other properties such as Colorado Open Lands, Short and Milne, Straty/Cline, Jirkovsky, City on the Hill, and others for needed fencing to facilitate improved natural resource management.
- Fence the boundary of the Clough property and the Aweida II property.
- Evaluate the Lewis, Cohagen, and Methvin properties for new fencing alignments that will enhance grazing and haying opportunities. In conjunction with fencing alignments, re-ditch field laterals to make the irrigated fields consistent with the fenced fields.
- Construct fence on the McKenzie property after seeking to accommodate agriculture, wildlife (prairie dogs), and passive recreational needs with new alignments.
- Realign fences on Suitts and St. Walburga properties.
- Remove north-south boundary fence between the Suitts and St. Walburga property.

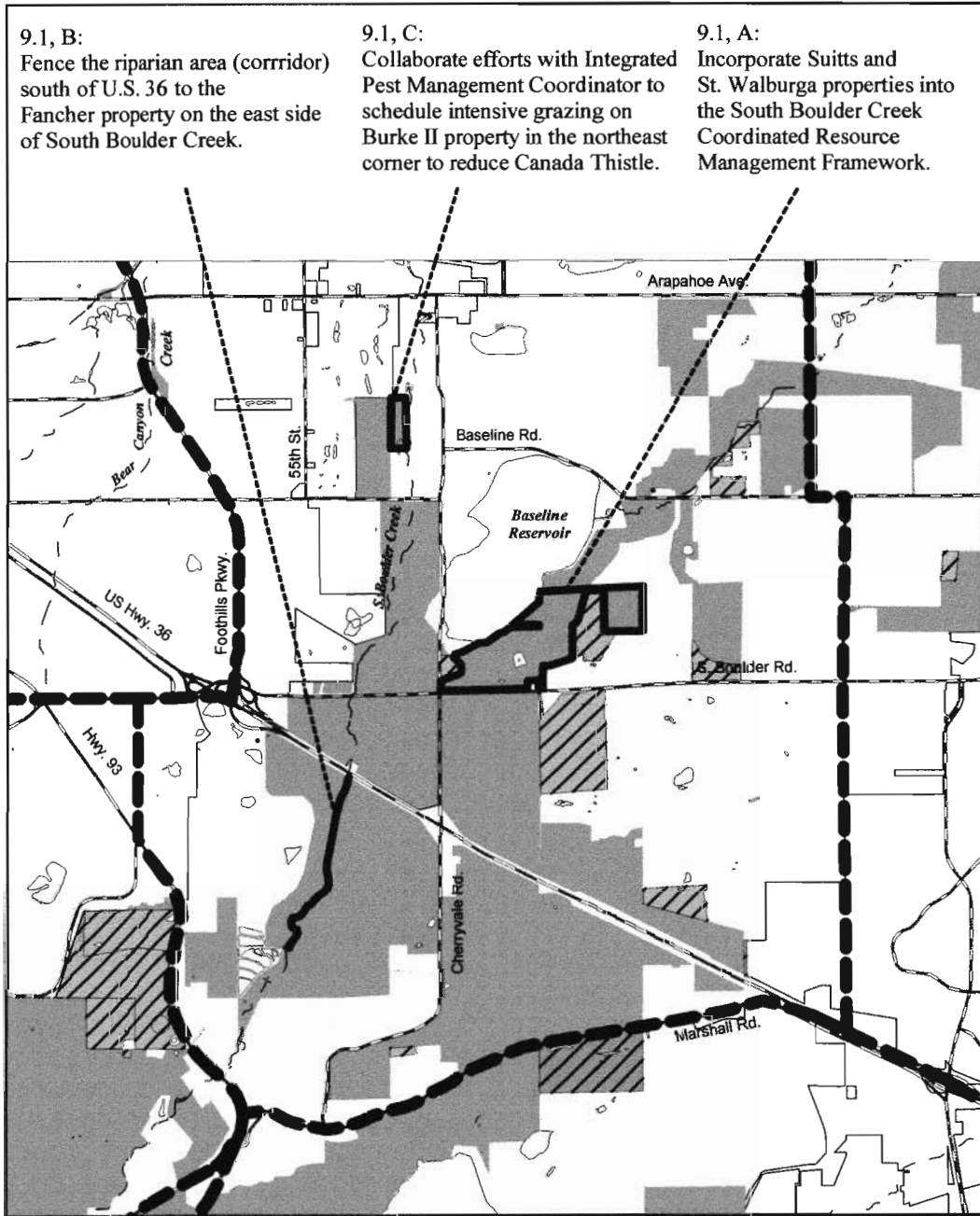
Vegetation Management

- Continue prescribed grazing to assist with control of non-native weed management and to reduce the buildup of thatch, to improve potential Ute ladies'-tresses orchid habitat, and to maintain current orchid habitat. Carefully monitor the use of grazing to control the infestations of non-native weeds, and reduce grazing pressure whenever such reduction seems wise and appropriate in the interests of better habitat management.
- Maintain irrigated grasslands to support the populations of the Ute ladies'-tresses orchid.
- Maintain irrigated grasslands to support tallgrass communities and irrigated hay pastures.
- Continue to coordinate and evaluate the effectiveness of the timing of haying to protect ground-nesting birds and the reproduction of Ute ladies'-tresses.
- Seed the Clough and East St. Walburga properties to native grass.
- Work with lessees to evaluate the feasibility of excluding grazing for 3 years from the second field south of U.S. 36 on the Van Vleet property.

Exotic Plant Species and Insect Pests

- Adjust grazing schedules to assist with Integrated Pest Management.
- Collaborate efforts with Integrated Pest Management to schedule short-term, intensive grazing on Burke II in the northeast corner to reduce Canada thistle (Figure 9.1.C).
- Encourage alternative, non-chemical control of weeds and insect pests on irrigated crop

Figure 9.1 A, B, C: Selected Agricultural Management Changes South Boulder Creek Management Area



9.1, B:
Fence the riparian area (corridor) south of U.S. 36 to the Fancher property on the east side of South Boulder Creek.

9.1, C:
Collaborate efforts with Integrated Pest Management Coordinator to schedule intensive grazing on Burke II property in the northeast corner to reduce Canada Thistle.

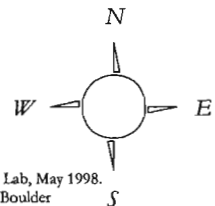
9.1, A:
Incorporate Suits and St. Walburga properties into the South Boulder Creek Coordinated Resource Management Framework.

Map Key

- City of Boulder Open Space
- Owned by Open Space
- Easement Held by Open Space
- Closed to Public
- South Boulder Creek Management Area Extents

- Boulder City Limits
- Major Lakes
- Roads**
- Arterial
- Highway

- Scale**
- 0 0.5 Miles
 - 0 0.5 Kilometers



Map produced by the City of Boulder Open Space GIS Lab, May 1998.
Cartography by Sean Metrick. Copyright 1998, City of Boulder

lands, particularly on the McKenzie and Baseline 75 properties which produce annually-harvested crops.

- Coordinate with Integrated Pest Management to develop and implement a rotational system of haying and grazing for the Nu-West and Andrus properties that will reduce teasel and Canada thistle infestations.
- Continue to maintain spray-free buffers around schools and other sensitive areas.

Research Needs

- Continue to research and evaluate the feasibility of developing organic/natural farming opportunities in the Management Area including the Baseline 75 property. Review the report *Feasibility of Converting City of Boulder Open Space Agriculture Properties to Organic and Natural Production Operations* (Leleiwi 1994). Prepare recommendations for additional research based on data gaps.
- Work with Boulder County Parks and Open Space on efforts to develop a grassland inventory and monitoring program that will help track the health of the vegetation in the region.
- Complete an inventory of existing and potential livestock watering locations. The results of this analysis should be analyzed in conjunction with the completed fence inventory and recommendations.

9.4.2 Objective #2: Use agricultural facilities as appropriate and make improvements to the facilities so that benefits will be maximized.

All of the agricultural properties in the Management Area have been used for agricultural purposes for many years. Some facilities have become degraded due to extended use and are in need of repair if they continue to be used. Good examples of this include facilities on the Lewis property and the Hogan barn and the corral facilities. Other agricultural facilities located on properties leased by the Hogans are currently used but lead to inefficient agricultural operations. Agricultural management must be efficient and cost effective to maintain sustainable agricultural operations. Open Space staff recommends that unused facilities which are not historically significant be removed and currently-used facilities be repaired to the appropriate standard.

Recommended Management Actions

- Improve hay storage facilities, corrals, irrigation infrastructure, fences, and gates as needed (Rolling Rock Ranch calving shed, Harf barn).
- Evaluate potential for livestock water development, particularly the wells located on the Merle-Smith, Suitts, West Church, Van Vleet (southeast of the Harf barn), Church of Christ, Lousberg, and Gallagher properties. It is possible that some of these well sites can be utilized for livestock watering where riparian fencing is used to exclude livestock.
- Evaluate the feasibility of reactivating domestic wells on Jirkovsky and/or City on the Hill to assist with prescriptive grazing objectives.
- Provide livestock water development on the Lewis, McKenzie, Aweida II, and Merle-Smith properties.

- Evaluate the potential of establishing a pipeline and stock tank from the Merle-Smith property to the Aweida II property to create a new water source.
- Maintain and protect historic (stone barn) structures.
- Build new corral, hay storage, or calving structures where needed (Rolling Rock Ranch).

9.4.3 Objective #3: Use the City's adjudicated water rights effectively and efficiently to sustain the natural values of the area.

Water is a key component of the management within South Boulder Creek. Water supply is critical for agricultural operations, and irrigation is essential for growing most crops because the climate of Boulder Valley is semi-arid. Irrigation supports numerous native plants and habitat for wildlife that would not otherwise be present because human activities have altered the natural hydrologic cycle of local streams. The ditches that deliver water often support riparian zone vegetation such as cottonwood trees and coyote willows that provide important habitat for raptors and the Preble's meadow jumping mouse. Consequently, Best Management Practices for water management simultaneously provide for the needs of agricultural operations while supporting the wildlife and vegetation management goals.

The focus of water management is similar to agricultural management--to use water in a sustainable manner. Long-term agricultural benefit and using water in a manner that does not diminish the status and function of the ecological systems are important considerations. The sustainable use of water resources implicitly recognizes a holistic or multi-objective approach. Sustainable water system management accounts for human needs, hydrologic characteristics, and ecological limits. Within the Management Area, sustainable water use implies designing water infrastructure improvements to enhance or maintain all of the resources.

An adaptive management approach should be used to improve the irrigation systems to best meet agricultural goals. Adaptive management of irrigation systems includes monitoring water use and modifying operations as information, knowledge, and experience are developed. Integrating new Open Space purchases into agricultural use by upgrading facilities, acquiring additional water rights, or changing cropping patterns to achieve a fully integrated system is also part of adaptive management.

Many water delivery components are nearing the end of their useful service life and are in poor physical condition resulting in inefficient water use and delivery. The main focus of work will be to maintain or replace irrigation structures that are beyond repair. Because Open Space has acquired adjacent farms that were managed separately, opportunities now exist to consolidate irrigation infrastructure resulting in increased water use efficiency.

Open Space owns rights and shares in various irrigation ditches that divert water from their main headgates on creeks within the Management Area. Some of these headgates act as impediments to fish migration on the streams. Although many of these headgates are in relatively good

physical condition, several may need major maintenance or replacement within the next 10 years. The maintenance and replacement of these structures are the responsibility of the individual ditch company that owns the structure. When major maintenance or replacement is needed, Open Space should work closely with the ditch company to ensure that, if appropriate, headgates that are installed or retrofitted allow fish passage.

Initial implementation will focus on laterals and diversion structures that are in an advanced state of disrepair or will need replacement within the next 5 years. Improvements should increase efficiency. Improvements should be monitored and considered in any decision to purchase supplemental agricultural water rights for this area.

Recommended Management Actions

- Utilize water rights or ditch company shares to ensure sustainable agricultural operations or to maintain or enhance instream flows and high-quality wetlands and sensitive species.
- Acquire additional water rights or ditch company shares where needed to ensure sustainable agricultural operations or to maintain or enhance instream flows and high-quality wetlands, and sensitive species and plant communities.
- Work with ditch companies to implement Best Management Practices to ensure that ditch maintenance activities do not adversely affect natural resource values.
- Work with the ditch company to ensure that the new headgate is designed and built to accommodate fish passage, if appropriate, when a ditch company that is either partially owned by Open Space or has a main headgate located on Open Space needs to be replaced.
- Coordinate and communicate with the Water Quality Division of the City Utilities Department to identify and implement agricultural Best Management Practices to prevent water quality degradation.
- Identify and monitor sources of water quality impairment.
- Track Gross Reservoir relicensing to help ensure that reservoir operations avoid adverse impacts to the City's Open Space water resources and natural resource interests.
- Track the development of the University of Colorado Gateway property to ensure that development does not adversely affect water flows and natural resources on adjacent Open Space properties.
- Coordinate irrigation schedules with weed management and native plant and wildlife management schedules.

Maintain and Replace Water Supply Facilities to Allow Efficient Water Delivery Consistent with Natural Resource Protection Goals

- Use the water resources inventory to prioritize water infrastructure improvements to increase long-term irrigation efficiency consistent with natural resource management goals.
- Design and build headgates and field laterals to reestablish irrigation on the Andrus property and the north side of Colorado Open Lands.
- Design and build a new headgate on the McGinn Ditch along with appurtenant facilities to provide for more efficient irrigation on the east side of the St. Walburga property.

- Evaluate and build the irrigation system improvements at the Suitts/Klein/St. Walburga properties to integrate and improve water efficiency and management.
- Evaluate Suitts pond and the lateral that supplies water to it for infrastructure and maintenance improvements, including the installation of pond level regulator.
- Evaluate the water quality of the Church Mine No. 1 and No. 2 to determine its continued suitability for long-term agricultural uses.
- Construct a headgate at the Ute Industrial Park property to support the reclamation of the area.
- Construct a headgate at the Burke I property on Enterprise Ditch to reestablish irrigation at that location.
- Evaluate the use of East Boulder Ditch for irrigating the Burke I property.
- The headgates that serve the Lousberg, Gallagher, and Nu-West properties from Farmers Ditch are in an advanced state of disrepair and should be replaced.
- Design/construct the appropriate facilities to irrigate Lousberg and Gallagher as a single operating unit. Replace appropriate irrigation structures on these properties.
- Evaluate the use of the Orcine Ditch on the Gallagher property for wetland enhancement and livestock watering.
- Line lateral on the Belgrove property with concrete or construct several drop structures to control erosion at the site.
- Install gated pipe to irrigate the Baseline 75 property to improve irrigation efficiency and reduce soil erosion in field laterals at the site.
- Design and build a water division structure in the Enterprise Ditch on the Aweida II property to improve water delivery efficiency to the Lewis property.
- Work with the Dry Creek No. 2 Ditch Company to ensure that development of the University of Colorado Gateway property does not adversely affect water distribution through and from the ditch.
- Evaluate needs to improve irrigation via the Dry Creek No. 2 Ditch, particularly on the Mary Clyncke property.
- Perform routine maintenance, such as periodic re-ditching, on field laterals to ensure efficient water delivery.
- Complete inventory of wells, stock ponds, seeps, and springs for properties in the Management Area.
- Collect hydrologic data for Dry Creek to support resource management planning.

Protect the City's Adjudicated Water Rights and Investment in Ditch Companies

- Monitor the effectiveness of the irrigation improvements and the reduction in crop area and modify water management.
- Diligently protect irrigation facilities by performing routine maintenance and care (e.g., ditch burning, emergency repairs, headgate repair).
- Maintain, upgrade, and replace water structures (wells, springs, stock tanks) or add new structures.
- Utilize irrigation facilities inventory for the Management Area to prioritize capital improvement projects.

- Design and implement a program of water measuring for agricultural properties to improve irrigation efficiency consistent with natural resource management goals.
- Continually evaluate the effects of irrigation improvements on quality wetlands in the Management Area (that is, use adaptive management).
- Monitor water rights issues to determine the effects of planned infrastructure improvements.
- Determine best location for use for water from Enterprise Ditch and construct headgates and appurtenant facilities for its use.
- Evaluate, design, and build irrigation facilities to assure a viable, long-term agricultural operation and improve water distribution.
- Evaluate, design, and build irrigation facilities serving the Lousberg and Gallagher properties. (These properties were operated separately prior to Open Space purchase.)
- Utilize irrigation infrastructure inventory to schedule maintenance and replacement of irrigation facilities.
- Conduct an inventory of all wells, ponds, springs, and other water sources in the Management Area.
- Represent Open Space interests at ditch company annual shareholder and other related meetings.
- Track ditch companies and ditch maintenance activities to ensure that the City of Boulder Open Space Program receives its allocation of water and to help ensure that ditch company maintenance activities do not adversely affect natural resource values on Open Space.

10. PASSIVE RECREATION

10.1 BACKGROUND

South Boulder Creek is a popular recreation area, receiving more than 720,000 visits annually. Much of this recreational use occurs along trails which are managed by the City of Boulder Tributary Greenways Program. Four miles of developed trails in the area are managed by the City of Boulder Tributary Greenways Program, and an additional 6 miles of designated Open Space trails are located within South Boulder Creek. These trails are easily accessed by four designated trailheads and five access points. Common activities on Open Space trails include jogging, bicycling, exercising pets, and hiking.

In addition to providing passive recreational opportunities, the Open Space lands located within South Boulder Creek serve as an important aesthetic visual resource. The rolling grasslands provide excellent views and serve as a natural visual buffer between nearby communities.

The principal focus of passive recreation management in past years has been to inventory and maintain designated trails and access points. Future passive recreation management will focus on providing appropriate visitor uses, maintaining designated trails and access points, evaluating undesignated trails and accesses, and prioritizing potential new trail connections.

10.2 GOAL STATEMENT

The following broad goal statement was developed to guide passive recreation management for South Boulder Creek:

Manage and preserve land for passive recreational use, its aesthetic or passive recreational value, and its contribution to the quality of life of the community.

The *Long Range Management Policies* state “Open Space will be managed in a way that provides for aesthetic enjoyment, minimizes cumulative impacts to the natural ecosystems and conflicts between users, considers user safety, preserves responsible agricultural use, provides for a quality recreational experience, and protects natural areas.” A new trail was completed in the spring of 1998 which connects South Boulder Creek Trail to Marshall Road. This new trail connection provides future opportunities to connect trails in South Boulder Creek to other management areas to the west (South Mesa/Shanahan and Eldorado Mountain Area Management Plans). Visitors will be encouraged to use existing trails and avoid uses in sensitive natural areas. Priority areas for evaluating potential new trail connections will include connecting South Boulder Creek Trail to Dry Creek Trail and connecting Dry Creek Trail northeast to the East Boulder Trail.

An extensive network of undesignated trails has developed in the South Boulder Creek Management Area. Undesignated trails develop from informal use and result in impacts to soils, fragmentation of plant and animal communities, and the creation of corridors for the invasion of non-native species. Undesignated trails have developed primarily in areas where no designated trails or access points have been established. Creating new trails in these areas and encouraging use of these trails will focus recreational use to appropriate areas and reduce conflicts with other resource goals.

10.3 OBJECTIVES

The Open Space Program has set the following objectives to meet the passive recreation management goal:

- Provide a variety of appropriate quality passive recreational activities, outdoor education opportunities, and visitor services where consistent with overarching environmental values
- Preserve scenic vistas and undeveloped views
- Provide trails, access points, and passive recreational facilities to accommodate appropriate uses and to connect with adjacent trail systems
- Provide safe passive recreational experiences
- Minimize passive recreational impacts to natural, cultural, and agricultural resources

10.4 MANAGEMENT RECOMMENDATIONS

10.4.1 **Objective #1: Provide a variety of appropriate quality passive recreational activities, outdoor education opportunities, and visitor services where consistent with overarching environmental values.**

In the City of Boulder Charter, passive recreation is listed as one of the purposes of Open Space, and certain activities are listed: hiking, photography or nature studies, and, if specifically designated, bicycling, horseback riding, or fishing. “Recreation” is often defined as activities that offer a contrast to work-related activities and that offer the possibility of constructive, restorative, and pleasurable benefits (Hammitt and Cole 1987). “Passive recreation” is generally considered to be those activities that occur in a natural setting which require minimal development or facilities, and the importance of the environment or setting for the activities is greater than in developed or active recreation situations.

Opportunities have been provided throughout the planning process to ensure public input on the type of passive recreational activities desired within South Boulder Creek. A broad range of passive recreational opportunities are provided on Open Space lands and within South Boulder Creek. Outdoor education opportunities and trails are provided to significant natural and cultural features of the area as appropriate. American Disabilities Act standards will be incorporated into

existing trails and the design of new passive recreational facilities whenever possible and reasonable. Passive recreational activities and opportunities will be reevaluated periodically to meet public and environmental preservation needs.

The quality of the visitor experience will be an important consideration when developing additional passive recreational opportunities but must be carefully balanced with other resource goals. Careful consideration of potential recreational impacts will ensure natural resources are protected and preserved, enhancing the long-term quality of the user experience.

Visitor services discussed in this section include resources and staff that are needed for facility development and maintenance. Education and outreach, law enforcement, emergency response, and visitor safety issues are discussed in the following chapters of this Plan.

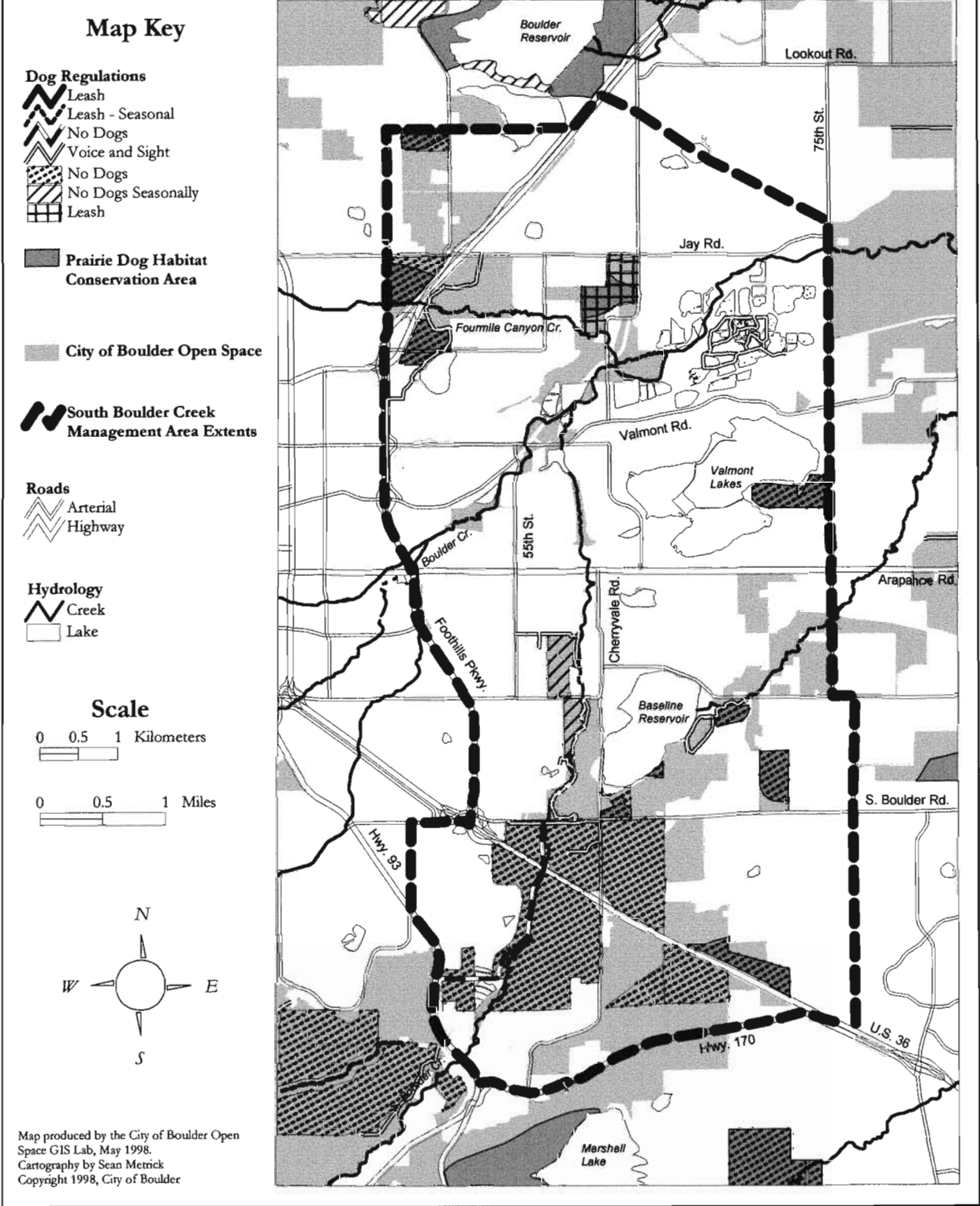
Recommended Management Actions

- Provide opportunities for a variety of passive recreational activities in appropriate areas and continue to encourage on-trail use. Mountain biking will be allowed only on trails designated with the international bike symbol (South Boulder Creek Trail, Cottonwood Trail, and trails provided by the Tributary Greenways Program). Hiking and jogging will be allowed on all trails in South Boulder Creek. Equestrian use will be allowed on all trails in South Boulder Creek except for a short section of South Boulder Creek Trail south of Bobolink Trailhead where there is an alternative path.
- Evaluate and designate appropriate activities on any new trails constructed within South Boulder Creek. If future trail connections are determined to be feasible from Dry Creek Trail to Teller Farm and/or South Boulder Creek Trails, these connections will be constructed as multi-use trails (open to hiking, jogging, mountain biking, and equestrian use.)
- Provide a trail system for appropriate passive recreational activities within South Boulder Creek (see Objective 10.4.3 for further information on specific trails). The quality of the visitor experience will be carefully balanced with other resource goals.
- Designate appropriate fishing areas within South Boulder Creek. Designated fishing areas within South Boulder Creek include KOA Lake, Pit D on Colorado Open Lands, Boulder Creek, and South Boulder Creek. Fishing will not be allowed at the pond on the Suitts property because of the sensitive resources in the area. Monitoring should occur to determine if conflicts develop with native fisheries management or if vegetation impacts develop in these riparian areas. Newly acquired Open Space lands with water bodies will be evaluated for sport fishing opportunities and either designated or restricted. Open Space staff will work with the Colorado Division of Wildlife to determine appropriate fishing regulations for designated fishing areas.
- Work with model glider pilots to minimize impacts until formal policies are developed in the Visitor Use Plan.
- Integrate appropriate management actions from a system-wide visitor use plan when completed (the visitor use plan for the Open Space system will include policies on trails, dog management, access, special uses, and commercial activities).
- Implement provisions of the City's Dog Management Plan applicable to South Boulder

Creek. New recommendations to the City's dog management for South Boulder Creek are include (see Figure 10.1 for a map depicting these provisions):

- Continue the prohibition of dogs on the section of South Boulder Creek Trail south of South Boulder Road. Continuation of this dog regulation will protect the significant natural values of this riparian corridor and tallgrass area, minimize conflicts with other visitors and existing agricultural uses, and provide an area without dogs for visitors. Rocky Mountain Riding for the Disabled frequently uses this trail corridor, and uncontrolled dogs could create a safety concern for riders.
- Allow dogs in voice and sight command on Cherryvale Trail and the access trail along the south side of South Boulder Road (currently inside the City limits and technically a leashed area). This exemption to the existing policy that dogs must be on a hand-held leash within City limits allows visitors with pets convenient access to Cherryvale Trailhead, the frontage road along the south side of South Boulder Road, and South Boulder Creek Trail north of South Boulder Road.
- Revise existing dog regulations in prairie dog Habitat Conservation Areas within South Boulder Creek to reflect management direction from the City's Dog Management Plan and the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan*. These revisions include prohibiting dogs in the Habitat Conservation Areas and some immediate surrounding areas on Ute Industrial Park, Gallagher, part of Klein (Dry Creek), Belgrove, Suitts South, Marshall, and Gallucci properties since there are no designated trails in these areas. Sections of the designated trails at Dry Creek and Cottonwood will be rerouted to the perimeter of the Habitat Conservation Areas and fenced to separate passive recreational use from the prairie dog areas. Dogs will be required to be on a hand-held leash in the Habitat Conservation Area and immediate surrounding areas on Andrus and James properties. When necessary, these dog restrictions will be applied to small surrounding areas outside Habitat Conservation Areas in order to effectively post restrictions on existing barriers and fences, eliminating the need for additional fencing and expense. Dogs will continue to be allowed in voice and sight control on the trail corridors near the Habitat Conservation Areas at Dry Creek (the first part of Dry Creek Trail) and McKenzie (the first part of the Cottonwood Trail just north and south of Independence Road) but will not be allowed outside designated trail corridors in these areas. Dogs will continue to be allowed in voice and sight control on the northern portion of the Cottonwood Trail (near Jay Road), but will be separated from the prairie dog Transitional Area with fencing. Comprehensive dog regulations (current and proposed) for the South Boulder Creek Management Area are shown in Figure 10.1.
- Work with volunteers and user groups to ensure compliance and monitor the effectiveness of the proposed dog management policies. Results of monitoring and future studies will be incorporated into the City's Dog Management Plan and reviewed on a semi-annual basis. Adjustments will be made accordingly.
- Develop surveys or public involvement processes to determine the types and quality of passive recreational experiences desired.
- Establish and provide appropriate levels of service for facilities such as trailheads and dog excrement pick-up stations. Monitor service levels provided and visitor use patterns to meet

Figure 10.1: Dog Regulations South Boulder Creek Management Area



changing needs.

- Incorporate American Disabilities Act standards into existing and new passive recreational facilities (trails, trailheads, benches, signs, etc.) whenever possible and reasonable.

10.4.2 Objective #2: Preserve scenic vistas and undeveloped views.

Scenic vistas enhance recreational experiences on Open Space and provide aesthetic values for many people who never visit these lands (e.g., many people enjoy the beauty of these lands while not actually visiting them). Facilities should be located to minimize impacts to scenic views. New facilities should be designed to blend into the natural environment, and existing facilities should be modified as needed.

Recommended Management Actions

- Design and locate new trails to provide scenic vistas and minimize their visual impacts to surrounding lands.
- Use natural trail surfacing whenever possible to minimize the visual impacts of trails.
- Continue to acquire lands that provide scenic vistas and urban buffers. Entry points into the Management Area should be the primary focus of acquisition efforts. These entry points provide expansive views of Open Space and the Boulder Valley and every effort should be made to protect these vistas from development. These areas within South Boulder Creek include, but are not limited to, private lands along the Boulder-Longmont Diagonal Highway, private lands along U.S. 36 near Louisville and Davidson Mesa, and private lands along South Boulder Road.

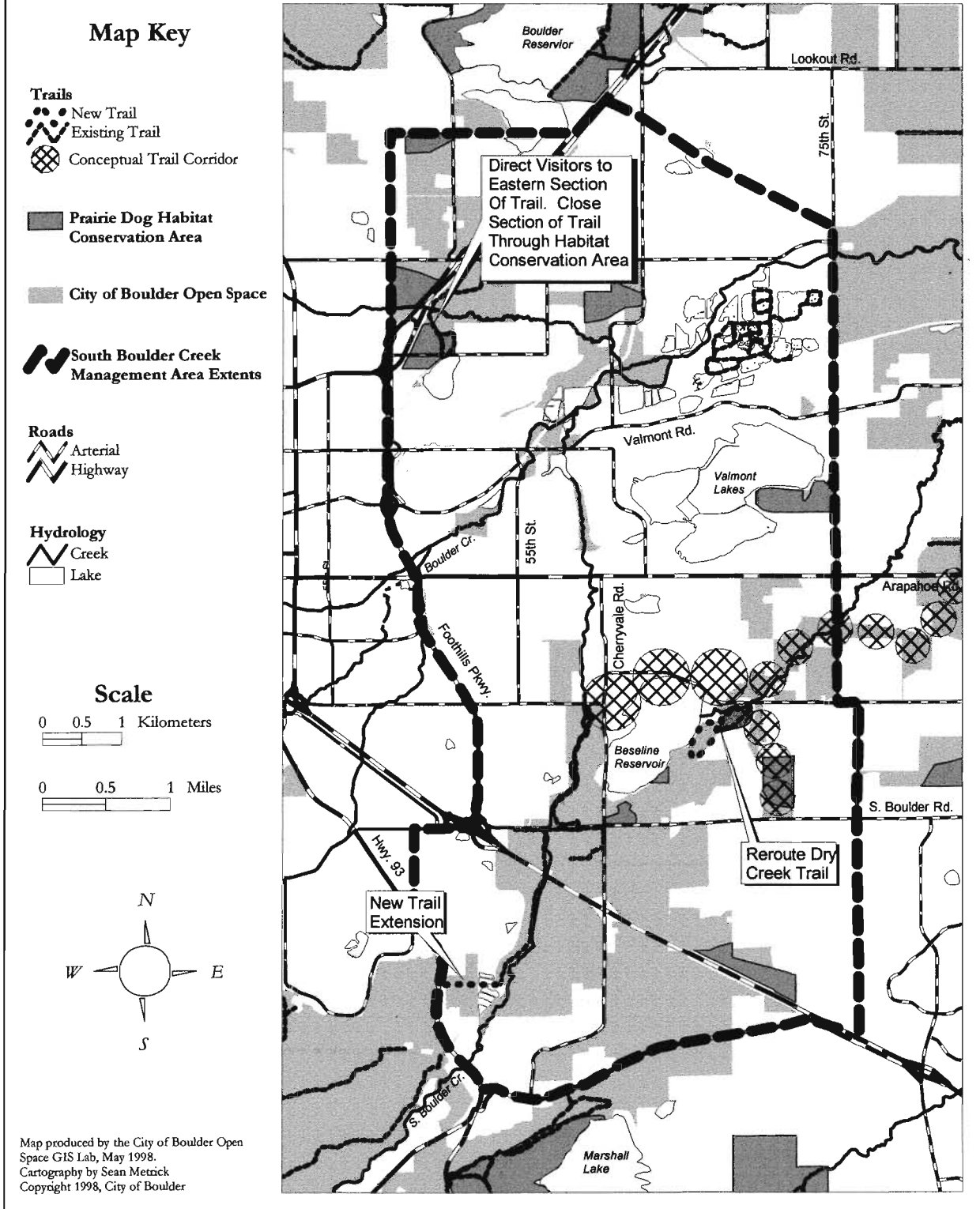
10.4.3 Objective #3: Provide trails, access points, and passive recreational facilities to accommodate appropriate uses and to connect with adjacent trail systems.

Designated trails and access points (trails and trailheads which are signed, shown on public trail maps, and maintained by Open Space staff) will be provided to access appropriate natural and cultural features of the area. Carefully designed and constructed trails provide corridors for passive recreational opportunities and minimize the negative impacts of such activities. Designated trails and access points will be maintained, and appropriate uses will be designated to minimize visitor conflicts and ensure resource protection.

The focus of trail management within South Boulder Creek will be to correct existing problems on designated trails, designate appropriate undesignated trails, close remaining undesignated trails, and complete new trail projects (see Figure 10.2 for a map depicting trail proposals).

The Open Space Program will continue to work with surrounding agencies to meet public needs. Future passive recreational needs will be evaluated on a periodic basis.

Figure 10.2: Trail Proposals South Boulder Creek Management Area



Recommended Management Actions

- Encourage visitors using South Boulder Creek Trail to park at Cherryvale Trailhead. Parking will be discouraged along the east and west sides of Marshall Road (at the southern terminus of the newly completed section of South Boulder Creek Trail) to prevent vehicles from blocking emergency access gates and minimize conflicts with adjacent landowners. Signs will be placed at this access point encouraging visitors to use Cherryvale Trailhead. Open Space staff will work with Boulder County Transportation to post no parking signs in these areas.
- Reroute the existing Dry Creek Trail to the northern perimeter of the Habitat Conservation Area (in the front or eastern field) and formally designate and improve a portion of the undesignated loop trail to provide trails and appropriate dog activities (in the second or western field).
- Designate a loop trail in the western field that provides a 1/4 mile buffer (Richardson and Miller 1997) for perching and nesting raptors in the cottonwood trees to the southwest (see Figure 10.2 for a map depicting trail proposals). Use of this designated trail will be encouraged through trail improvement, directional fence, and signs encouraging visitors to voluntarily limit their use of the raptor buffer area. Monitor raptor activity and undesignated trail use within the 1/4 mile raptor buffer. If there is a decline in the use of the perches by raptors likely related to recreational activity in the buffer area, staff will make further recommendations to the Open Space Board which may include closing the raptor buffer area.
- Use the designated trail to the eastern perimeter of the Habitat Conservation Area and close and reclaim the southwest section the Cottonwood Trail (just north of Independence Road and the Cottonwood Trailhead) to separate passive recreational use from the prairie dog areas. This trail reroute will minimize conflicts with dogs and wildlife within the Habitat Conservation Area and allow dogs to remain in voice and sight control. Monitor the northern portion of Cottonwood Trail (near Jay Road) for wildlife harassment from dogs and if needed, place fence to separate the trail from the prairie dog Transitional Area.
- Further evaluate potential options for trail connections from South Boulder Creek Trail to Dry Creek Trail (Figure 10.3*). The current Open Space lands south and west of Dry Creek Trailhead (the Suits and St. Walburga properties) are not suitable for trail development because of potential impacts to wintering bald eagles, raptors, Preble's meadow jumping mouse, extensive wetlands, tallgrass areas, and Ute ladies'-tresses habitat. Open Space will evaluate the feasibility of acquiring easements or fee ownership of lands north of Baseline Reservoir to provide a trail from Dry Creek to South Boulder Creek Trail connecting somewhere in the vicinity of Baseline and Cherryvale Roads. If these lands are unavailable or the alignment has to be placed adjacent to the road, additional analysis of trail options south of Dry Creek Trailhead will be conducted. If impacts from various alignments on Open Space are determined to be unacceptable, this connection may not be completed, or an already existing on-street route on Baseline may be used.
- Further evaluate potential options for a trail which would provide a connection from Dry Creek Trail northeast to East Boulder Trail. This trail proposal, if determined to be suitable, should be constructed in its entirety from Dry Creek Trailhead to South Teller Trailhead to avoid the need for a new trailhead along 75th Street. A suitable conceptual alignment is

currently available on the Open Space lands west of 75th Street to Dry Creek Trailhead. The Open Space lands east of 75th Street are not a part of this Management Area and have not been thoroughly evaluated. The remainder of this potential route should be evaluated in the near future and construction completed after existing uses and future connections at Dry Creek have been resolved (see actions above). If impacts from various alignments on Open Space are determined to be unacceptable, this connection may not be completed, or additional lands may need to be acquired, or mitigation actions may need to be taken before trails can be constructed.

- Do not pursue further evaluation of other trail alternatives identified in the South Boulder Creek planning process at this time. The priority for trail projects within South Boulder Creek is to correct existing problems with designated trails and further evaluate connections from Dry Creek to South Boulder Creek Trail and Dry Creek to East Boulder Trail. Other trail alternatives identified in the South Boulder Creek planning process and a brief analysis of why they are not being further evaluated at this time are listed below.

Dry Creek Trail South to Trails Around Marshall Mesa

(Dry Creek, Clough, Marshall, South Boulder Road, Van Vleet, U.S. 36 underpass, Yunker, Damyanovich/Hogan to South 66th Street). Further evaluation of this trail alignment is not planned at this time because there are currently no trails or plans for trails in the area of South 66th Street where this proposed trail would end. If a suitable trail alignment is developed from Dry Creek Trailhead to South Boulder Creek Trail, Marshall Road (at the southern terminus of South Boulder Creek Trail) could be used to connect South Boulder Creek Trail to the Marshall Mesa Area eliminating the need for an easterly trail connection in this area.

Dry Creek Trail East and North to Trails Around Louisville

(Dry Creek, Clough, Marshall, private land, 76th Street, O' Conner/Steinbach, Louisville). The *Boulder Valley Comprehensive Plan* currently shows conceptual trail connections to Louisville using the Burlington Northern railroad grade and/or City of Boulder Open Space south of Teller Farm (Autrey, Watt, Louisville trail easement to O'Connor-Hagman, Steinbach to existing Louisville trails). This trail proposal and the trail connections proposed in the *Boulder Valley Comprehensive Plan* will be further evaluated in the development of the East Boulder Area Management Plan where most of these lands are located.












Cottonwood Trail North and West to Trails Around North Boulder Valley

(McKenzie/Belgrove, Lousberg/Nu-West, Gallagher, private land, Boulder Valley Ranch). The current priority for trail connections in this area is to connect existing trails to the east (Cottonwood Trail to Twin Lakes, Twin Lakes to IBM, and East Boulder Trail to IBM) with existing trails around Boulder Reservoir by using the new IBM Open Space purchase located along the Boulder-Longmont Diagonal Highway. Other trail connections in this area should be further evaluated once these higher priority connections are made and potential acquisitions have been explored.

- Determine appropriate accesses for private subdivisions.
 - Work with residents of Greenbelt Meadows Subdivision to designate a trail which would provide access from the east side of their subdivision to the surrounding Open Space lands and to designated trails in the area (Figure 10.4). Conduct education for homeowners and the general public about the trail, riparian area, and natural values in the

Figure 10.4: Greenbelt Trail Access South Boulder Creek Management Area

Map Key

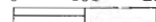
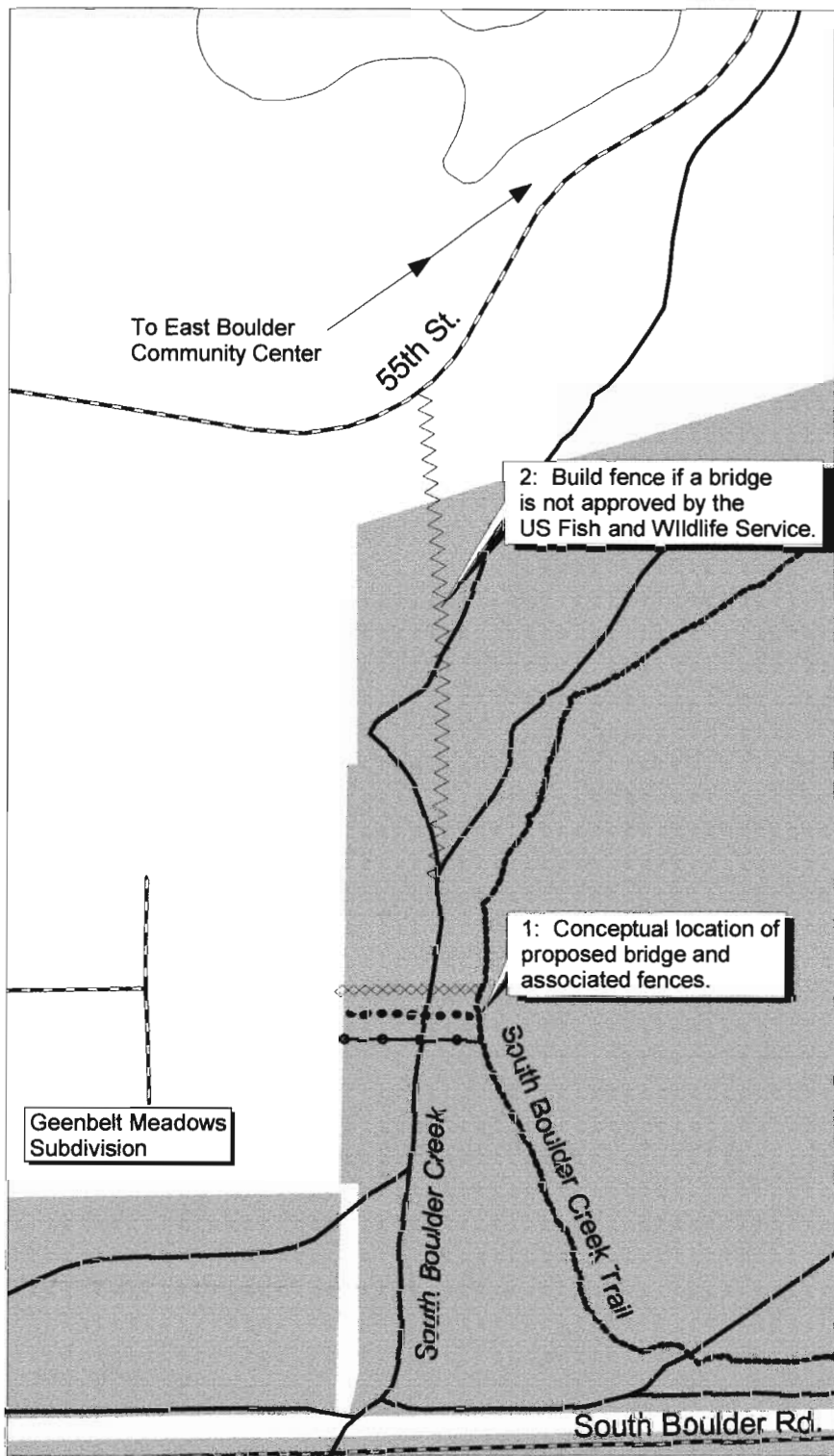
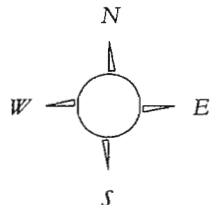
- Trails**
-  New Trail (Option 1 Only)
-  Existing Trail
- Fence**
-  New Fence
-  New Fence for Option 1
-  New Fence for Option 2
-  City of Boulder Open Space
-  South Boulder Creek Management Area Extents
- Roads**
-  Arterial
-  Highway
- Hydrology**
-  Creek / Ditch
-  Lake

Scale

0 30 60 Meters



0 100 200 Feet

Map produced by the City of Boulder Open Space GIS Lab, May 1998.
Cartography by Sean Metrick
Copyright 1998, City of Boulder

area. The newly designated trail should avoid the riparian area along South Boulder Creek and connect directly to South Boulder Creek Trail via a new pedestrian bridge. The bridge should be designed to accommodate pedestrians (no bikes or horses) and minimize environmental impacts. Although public access will be allowed across the proposed bridge and the Greenbelt Meadows access, the bridge and signs should be developed to discourage general public use of this access. The Greenbelt Meadows access will not be shown on public trail maps in order to discourage parking and access through Greenbelt Meadows subdivision. Adequate public access currently exists at Bobolink Trailhead, East Boulder Community Center, and Cherryvale Trailhead. Fences will be constructed along the north and south of the new designated trail to discourage use of existing undesignated trails and surrounding sensitive natural areas. If necessary permits for the proposed bridge cannot be obtained due to environmental impacts, the existing undesignated trails along the west side of the creek should still be closed with educational signs and fences. Residents of Greenbelt Meadows would then be directed to other existing accesses or along the westerly edge of existing Open Space lands to minimize further environmental impacts.

- Residents of Wildflower Ranch will be allowed to continue access to surrounding Open Space lands by using the perimeter gate at the north end of their subdivision. Recreational use of this area is very low, and creation of a designated trail is not needed at this point. Development of undesignated trails in this area should be monitored on an annual basis, and further management may be required if trails develop.
- Strongly encourage use of designated access points and trails (see Objective 10.4.5).
- Monitor new residential development through the City and County review processes and designate access points and trails if appropriate.
- Evaluate future trail and access needs and cooperate with other public agencies on City, County, and Boulder Valley regional trail plans. The City of Boulder Open Space Program will participate in the review and development of the trails element of the *Boulder Valley Comprehensive Plan* and the *Boulder County Comprehensive Plan* and pursue completion of appropriate trail corridors.
- Assist Boulder County Parks and Open Space on evaluating and providing a connection from Cottonwood Trail to Twin Lakes area. Boulder County currently owns and manages the majority of land needed for this potential trail connection, and the County will take the lead in evaluating trails in this area.
- Monitor existing access points for problems (development of undesignated trails, parking capacity at trailheads, roadside parking, vandalism, need for additional dog stations and services) and take appropriate actions to resolve these problems.
- Reduce the impacts of providing large parking areas and impacts caused by overflow parking on adjacent lands by encouraging use of alternative modes of transportation to Open Space access points and trails. Work with the Regional Transportation District to develop bus stops to designated trails and trailheads and encourage use of existing bus stops (Bobolink and Dry Creek Trailheads). Open Space will work with the Tributary Greenways Program, the City of Boulder, and Boulder County Transportation to ensure appropriate alternative transportation routes are available to access designated Open Space trails and trailheads.

Priority areas for providing alternative transportation routes are the Pearl Parkway corridor and connecting lower Fourmile Canyon Creek to Cottonwood Trail. Other areas include the Boulder-Longmont Diagonal Highway right-of-way and a route along U.S. 36 right-of-way from Louisville. Alternative transportation routes are generally not provided on Open Space lands. Open Space trails are for appropriate recreational use and will be carefully evaluated on a case-by-case basis to ensure there are no significant impacts to surrounding environmental values.

- Develop criteria for creation and placement of passive recreational facilities within the Visitor Use Plan. Criteria will be based on passive recreational goals, current use levels, and preservation of natural, cultural, and agricultural resources.

10.4.4 Objective #4: Provide safe passive recreational experiences.

Visitor safety is an important consideration in providing appropriate passive recreational opportunities. New trails will be designed and constructed to minimize hazards and conflicts between uses. Old trails will be reconstructed as needed. Designated passive recreational facilities and trails will be inspected and maintained on a regular basis. Educating visitors on trail etiquette in order to minimize potential conflicts between visitors will be a management emphasis.

Recommended Management Actions

- Design and construct new trails to accommodate appropriate uses and minimize safety hazards. The new section of trail which connects South Boulder Creek Trail to Marshall is approximately 8 to 10 feet wide to safely accommodate multiple uses and emergency vehicles.
- Improve and maintain existing trails to accommodate appropriate uses. The underpass at South Boulder Road will be improved to alleviate muddy conditions.
- Designate appropriate passive recreational activities on trails to minimize interactions between various trail users (see Objective 10.4.1).
- Establish regular inventory, monitoring, and maintenance of trails, access points, passive recreational facilities, and high-use areas to ensure safety hazards and maintenance needs are identified and corrected in a timely manner. Priority for monitoring will be given to areas with heavy visitor use and areas with potential safety hazards.
- Promote responsible use and trail etiquette through educational programs, signs, brochures, coordination, and outreach with user groups, field contacts with staff, and volunteer programs to minimize conflicts (see Education and Outreach chapter).
- Post warning notices or close trails temporarily for safety purposes as needed (bubonic plague outbreaks, periods of intense agricultural operations, application of herbicides, flooding, wildlife conflicts, etc.). Trails will only be closed for the duration required to ensure visitor safety. The public should be separated from areas of intense agricultural activity when new trails are constructed.
- To improve visitor safety, request striping and pedestrian signs at the grade crossing where

the Tributary Greenway Program trail connects with 55th Street near the East Boulder Community Center and any future trail connections which may cross roadways.

10.4.5 Objective #5: Minimize passive recreational impacts to natural, cultural, and agricultural resources.

Provision of passive recreational opportunities will be balanced with preservation of natural ecosystems and responsible agricultural use. Responsible visitor use and stewardship of Open Space lands will be promoted to ensure protection of agricultural, natural, and cultural resources. Trails and passive recreational facilities will be designed, constructed, and maintained to protect environmentally fragile and sensitive areas. Visitors will be encouraged to use designated trails and access points in order to minimize environmental impacts and staff resources. Appropriate passive recreational experiences will be designated on trails to minimize environmental impacts and prevent user conflicts. Dogs will be prohibited or required to be on a hand-held leash on all trails within prairie dog Habitat Conservation Areas and prohibited off trail in these areas. Seasonal closures may be used in certain areas to prevent impacts to sensitive wildlife species (ground-nesting birds and raptors). Trails and facilities will be located on appropriate soils to minimize soil erosion. Studies will be developed to determine potential impacts of passive recreation on natural resources, and appropriate management actions will be implemented. Natural, cultural, and agricultural resources will be interpreted to increase the public's understanding of the significant resources in the area, to minimize visitor conflicts, and to discourage visitor use in sensitive areas.

Recommended Management Actions

- Minimize passive recreational impacts by focusing public education and outreach on awareness and understanding of the natural, cultural, and agricultural resources located within South Boulder Creek. Staff will work with volunteers and user groups to create an understanding and appreciation for the natural, agricultural, and cultural resources of the area (see Education and Outreach chapter). A variety of education and outreach techniques will be used and evaluated. Various studies have evaluated the effectiveness of various management techniques upon influencing recreational behavior. These studies, public involvement in the planning process, and staff experience will be used to determine what techniques are most effective.
- Continue to encourage and fund research on recreational influences on Open Space lands.
- Monitor visitor use and evaluate recreational impacts on wildlife, vegetation, wetlands, and agricultural activities. Conduct trail inventories to identify development of undesigned trails and access points in sensitive areas. Implement appropriate management actions (e.g., educational signs, use of fences, and seasonal closures) based on inventory or monitoring results.
- Strongly encourage use of designated trails and access points. Large trailhead signs, public trail maps, and educational signs will encourage visitors to use designated access points and trails.

- Direct visitor use away from sensitive resource areas by closing and reclaiming undesignated trails and access points (some undesignated trails and access points will be improved and designated, see Objective 10.4.3). Undesignated trails and access points will be closed with physical barriers (slash with woody vegetation, fences, plantings of native vegetation), unnecessary gates removed, and educational signs placed to encourage use of designated trails and access points. Removal of undesignated gates in sensitive areas discourages development of established use patterns and formation of undesignated trails which may impact environmental, agricultural, or cultural resources, while still allowing low volumes of dispersed passive recreational activities (wildlife viewing and other informal activities). Closed undesignated trails should be monitored for 3 to 5 years to identify potential weed infestations. Sensitive resource areas within South Boulder Creek include Habitat Conservation Areas, wetlands, tallgrass communities, rare plant species, raptor habitat, and ground-nesting bird habitat. Priority areas for discouraging visitor use and removing pedestrian gates include the Gallucci property (a Habitat Conservation Area) and off-designated trail areas on the Burke I, Burke II, and Gebhard properties (these properties contain extensive wetlands, tallgrass communities, rare plant species, and ground-nesting bird habitat, and several designated trails already exist in these areas). Direct visitor use away from the Open Space lands south and east of Baseline Reservoir (the Suitts and St. Walburga properties) to prevent potential impacts to wintering golden eagles, bald eagles, other raptors using the area throughout the year (nesting Swainson's hawks, osprey, great horned owls, red-tailed hawks), Preble's meadow jumping mouse, wetlands, tallgrass communities, and Ute ladies'-tresses habitat.
- Post warning notices, restrict inappropriate recreational activities, or close trails temporarily for protection of wildlife during vulnerable times of life cycles (e.g., nesting). Appropriate restrictions will only be in effect for the duration required to protect wildlife.
- Route potential new trails away from sensitive areas to prevent fragmenting plant and animal habitat.
- Provide well-defined and drained trail surfaces to prevent trail braiding. Trail braiding results in vegetation trampling, erosion, and disturbed areas which increase the potential for introduction of weeds. Potential new trails will be located in suitable soils whenever possible or construction techniques will be used to provide suitable trails in poor soil conditions (use of crusher fines, etc.).

11. PUBLIC SAFETY AND RESOURCE PROTECTION

11.1 BACKGROUND

There are many public safety and resource protection issues to consider in the South Boulder Creek Management Area. Managing these issues requires provisions for public safety, visitor assistance, and protection of natural and cultural resources. Public safety issues are addressed in this chapter of the Plan. Resource protection issues are integrated in this and other chapters.

A patrol presence is required to ensure public safety and resource protection and includes education, law enforcement, and emergency response. Patrol activities include monitoring resource impacts, monitoring wildlife populations, enforcing state hunting and fishing regulations, providing information to the public, and monitoring stream and ditch levels. Area specific issues include mine subsidence, flooding, and wildlife-visitor interactions.

Education is a fundamental part of patrol. Educational activities include providing information about changing regulations, upcoming events, leading educational programs, and answering general information questions on the trail.

Response to emergencies is provided in conjunction with other law enforcement and emergency services agencies. Law enforcement and fire training, first aid skills, and knowledge of properties and access points are crucial to public safety as well as resource protection. Emergency response is provided 365 days a year.

11.2 GOAL STATEMENT

The following broad statement was developed to direct the Public Safety and Resource Protection actions in the South Boulder Creek Management Area.

Protect and maintain natural and cultural resources and provide for public safety while educating visitors and enforcing laws.

11.3 OBJECTIVES

Issues specific to the area, such as mine subsidence, flooding, and wildlife-visitor interactions require provisions for public safety, visitor assistance, and protection of natural and cultural resources. Law enforcement services emphasize education and protect visitors from conflicts and natural resources from unnecessary impacts. South Boulder Creek is patrolled regularly, and emergency response is provided 365 days a year.

- Improve levels of service and coverage to enhance emergency response for medical, fire, flood, and law enforcement incidents.
- Continue to enforce laws, including state hunting and fishing regulations and local laws.
- Enhance patrol activities to educate the public, monitor natural and cultural resource impacts, and respond to visitor conflicts with the ultimate objective of proactively reducing the need for future enforcement.
- Improve levels of patrol to increase awareness and compliance with the agreements in the Dog Management Plan.
- Evaluate public safety hazards such as mine subsidence areas, flood hazards, tree hazards, and wildlife interactions.

11.4 MANAGEMENT RECOMMENDATIONS

11.4.1 Objective #1: Improve levels of service and coverage to enhance emergency response for medical, fire, flood, and law enforcement incidents.

As the amount of Open Space lands and the general population in the area increases, there is an increased need for emergency response to incidents occurring on Open Space.

Recommended Management Actions:

- Continue to provide 24 hour emergency response.
- Use bike and horse patrol, where appropriate, to enhance response time and coverage.
- Develop and implement a program for seasonal rangers to augment peak season coverage.
- Attend appropriate medical, fire, and law enforcement trainings to maintain and improve skills.
- Coordinate with other law enforcement agencies on a regular basis to discuss specific problems and conduct joint operations.
- Encourage and provide emergency training for all Open Space staff (wildland fire training and first aid) to ensure adequate personnel are available for emergency response.

11.4.2 Objective #2: Continue to enforce laws, including state hunting and fishing regulations and local laws.

Ensure compliance with local laws as well as state regulations to provide public safety and resource protection. Ensure in-field compliance with area management plans and resource plans.

Recommended Management Actions

- Maintain law enforcement certifications.
- Maintain ability to enforce applicable Division of Wildlife fish and game statutes.
- Focus patrol in problem areas and areas with changing seasonal regulations.

11.4.3 Objective #3: Enhance patrol activities to educate the public, monitor natural and cultural resource impacts, and respond to visitor conflicts with the ultimate objective of proactively reducing the need for future enforcement.

Ensure in-field compliance with area management plans and resource plans to reflect increased visitation and off-trail use and increased impacts to sensitive resources.

Recommended Management Actions

- Improve levels of back-country coverage.
- Develop consistent monitoring procedures to detect changes to sensitive resources.
- Coordinate with Education and Outreach to help disseminate educational information that reflects new management concerns.
- Monitor effectiveness of voluntary wildlife closures (e.g., grassland bird nesting closures, raptors).
- Increase awareness and compliance of regulations designated to protect wildlife and livestock from harassment.

11.4.4 Objective #4: Improve levels of patrol to increase awareness and compliance with agreements in the Dog Management Plan.

Carry out terms of compliance in current Dog Management Plan.

Recommended Management Actions

- Provide opportunities to educate public through contacts while on patrol as well as through the educational programs.
- Use seasonal rangers to help with education and enforcement of dog regulations in areas with high dog use.
- Focus patrol in problem areas when needed.

11.4.5 Objective #5: Evaluate public safety hazards such as mine subsidence areas, flood hazards, tree hazards, and wildlife interactions.

Safety hazards must be identified before appropriate management actions can be taken. Rangers and field staff must routinely inspect all Open Space to identify these concerns. Periodic inspections and immediately addressing identified concerns protects the public from harm and protects the agency from legal liability.

Recommended Management Actions

- Identify high risk mine subsidence areas on Richardson I property, work with the Colorado State Mine Reclamation Division to seal high risk areas, review remaining hazards with the City's risk attorney, and post warning signs at appropriate locations.
- Work with appropriate agencies to evaluate safety hazards (tree hazards and wildlife interactions) and take appropriate precautions.
- Patrol areas regularly to identify public safety concerns and inform appropriate Open Space Program personnel. Regularly inspect undermined areas on Richardson I, Hogan Brothers, Damyanovich, and Church properties. Non-routine inspections should be conducted during unusually moist times of the year. Work with Colorado State Mine Reclamation Division and the City's risk attorney to take appropriate actions.
- Continue to coordinate with other agencies to implement local Emergency Services protocols (e.g., floods).
- Post warning notices or close trails temporarily for safety purposes as needed (bubonic plague outbreaks, mountain lions, bears, periods of intense agricultural operations, application of herbicides, mine subsidence areas, and others).

12. EDUCATION AND OUTREACH

12.1 BACKGROUND

Open Space staff works closely with the public and other agencies to provide information and education to the public. Education and outreach activities are often the most effective means of stimulating understanding and appreciation of Open Space, providing information and orientation, helping to ensure resource protection, and promoting visitor safety. Open Space is an integral part of the Boulder Valley. Therefore, education and outreach activities are important in developing a better understanding of the need to maintain and preserve natural systems.

The Program's outreach activities provide opportunities for the community to provide comment, direction, and information to the Program. Effective public participation processes are essential to ensure the Program's awareness of community issues and perspectives and to maintain understanding and support for the Open Space Program.

An average of 11 educational activities are mostly offered in the South Boulder Creek area annually through the Nature Trails program series. This series of programs reaches approximately 250 people. Volunteer projects include research, trail maintenance, general maintenance, community service work, vegetation work, and public information in this area. Due to the heavy use of the area, educational programming, volunteer opportunities, and outreach should be expanded and focused.

12.2 GOAL STATEMENT

Following are goals of the education and outreach program and management and planning programs:

- **Establish education and management measures in a reasonable, responsible, timely way to ensure that the Open Space system remains ecologically, agriculturally, and recreationally viable**
- **Priority education and outreach topics will be: (1) visitor use issues (new dog regulations, minimizing impacts to resources and other visitors), (2) developing a better understanding of the natural, cultural, and agricultural resources in South Boulder Creek (educational programs, inventory and monitoring of resources), and (3) weed control**

The following are the ways to accomplish these goals:

- Conduct high-quality education and outreach activities for the general public. Ensure that decision makers are aware of these activities and understand both the benefits and limitations of these efforts

- Proactively provide education and public participation opportunities on management decisions. Actively seek public input and responsibly incorporate citizen ideas into management recommendations

To achieve these goals education and outreach efforts are focused on three audiences:

- General public: citizens as a whole and people who pay sales taxes that support the Program
- Frequent Open Space visitors: people who visit Open Space at least once a week comprising 85% of Open Space visits
- Opinion leaders: members of the community that have an active interest in influencing Open Space decision making, including elected and appointed officials

The Program's education and outreach goals are met through the following general activities:

- Conducting projects and programs that provide opportunities for people to establish a relationship with the Open Space Program and land system
- Engaging in public processes which provide opportunities for public input, discussion, and involvement in Open Space planning and decision making
- Using media opportunities to communicate Open Space activities, achievements, issues, management challenges, and messages

12.3 OBJECTIVES

The Open Space Program has developed the following objectives to meet its education and outreach goals:

- Disseminate information concerning the ecology, natural history, and cultural history of the area.
- Disseminate information concerning the goals, projects, and operations of the Open Space Program.
- Disseminate information about the situations that arise when humans interact with natural systems and about ways of lessening or eliminating the impact of these interactions.
- Conduct projects and activities that provide opportunities for people to establish a relationship with the Open Space Program and land system.
- Engage in public participation processes which provide opportunities for public input and involvement in Open Space planning and decision making.
- Identify goals and priorities for volunteer programs in the South Boulder Creek and implement these programs with neighbors, visitors, and interest groups.

12.4 MANAGEMENT RECOMMENDATIONS

12.4.1 Objective #1: Disseminate information concerning the ecology, natural history, and cultural history of the area.

Recommended Management Actions

- Continue educational programming on natural and cultural history.
- Disseminate additional information on focus topics, including stay-on-designated trail, dog management, agriculture, prairie dogs, rare plants and animals, wetlands, weed infestation and control, and grassland ecosystem and foothills ecotone.
- Increase the number of on-site education and outreach activities held in the area.
- Coordinate with natural resource staff to produce wildlife brochures.
- Develop and install interpretive signs in several locations along the South Boulder Creek and Dry Creek Trails to inform visitors about the native grass, rare plant and animal, agriculture, and wetland communities.
- Develop a raptor brochure interpreting the importance of raptors and the need for special restrictions and management actions. Coordinate with the Resource Conservation Division to develop “species list” brochures on amphibians and reptiles, birds, and mammals. Distribute these through trailhead brochure boxes and programs.
- Work with the Tributary Greenways Program to develop and install interpretive signs along the Bobolink section of the Tributary Greenways Program trail. The Tributary Greenways Program has agreed to finance the production and installation of these signs. Signs should be similar to existing interpretive signs.
- Work cooperatively with the Colorado Division of Wildlife to develop and install interpretive signs about prairie dogs on the Gallucci property at the U.S. 36 scenic overlook and at the Dry Creek Trail.
- Evaluate appropriate sites for a “watchable wildlife” station, including the Ute Industrial property.

12.4.2 Objective #2: Disseminate information concerning the goals, projects, and operations of the Open Space Program.

Recommended Management Actions

- Disseminate information and inform citizens on revised regulations and management direction for South Boulder Creek through on-site programming, in-field contacts with staff, and a fact sheet to summarize the South Boulder Creek Area Management Plan.
- Distribute information on noxious weeds, impacts, spread, and control.
- Educate agencies and public on the value of weed-free products.
- Use staff and volunteers in the field to educate and inform the public on regulations.
- Develop and install signs for new dog regulations.
- Coordinate with staff to design studies and collect data on resource inventories.
- Continue to utilize information boards and brochure boxes.

- Develop and distribute a brochure on the South Boulder Creek area which will interpret the natural, cultural, and agricultural resources; identify trails and access points, and inform visitors of regulations.
- Provide information on restoration efforts for native plant and animal communities.
- Continue to install welcome signs at major access points.
- Develop educational signs to help visitors understand visitor/wildlife interactions. Priority topics include the importance of swallow nesting sites at underpasses and ways to minimize conflicts.
- Develop educational materials on prescribed burn program.

12.4.3 Objective #3: Disseminate information about the situations that arise when humans interact with natural systems and about ways of lessening or eliminating the impact of these interactions.

Recommended Management Actions

- Continue to distribute the “Keeping Boulder's Open Space a Special Place” brochure.
- Use field staff and volunteers to contact visitors about trail etiquette to reduce conflicts.
- Conduct “Do the Wild Thing...Leave No Trace on Open Space” pilot educational project in the Management Area to educate visitors on ways to reduce their impacts to natural resources and reduce conflicts between visitors, including riparian habitats, prairie dogs, raptors, and amphibians.
- Disseminate information (field staff and signs) on the provisions of the Dog Management Plan. This includes information on risks to dogs and people from bubonic plague.
- Develop and install signs to encourage on trail use, particularly in sensitive areas.
- Work with user groups to disseminate information to their members.

12.4.4 Objective #4: Conduct projects and activities that provide opportunities for people to establish a relationship with the Open Space Program and land system.

Recommended Management Actions

- Continue to have field staff and volunteers conduct outreach activities which target specific management goals.
- Train staff about specific topics to communicate to visitors.
- Work with staff to develop outreach topics on resource management.
- Communicate annually with other agencies to coordinate education and outreach opportunities of mutual interest.
- Identify neighbors, adjacent landowners, and community groups to establish and continue working relationships.

12.4.5 Objective #5: Engage in public participation processes which provide opportunities for public input and involvement in Open Space planning and decision making.

Recommended Management Action

- Develop and implement public participation mechanisms to facilitate community involvement. Mechanisms include Web, group outreach, media, personal conversations, and meetings such as open houses, forums, work groups, and hearings.

12.4.6 Objective #6: Identify goals and priorities for volunteer programs in the South Boulder Creek area and implement these programs with neighbors, visitors, and interest groups.

Recommended Management Actions

- Continue to utilize volunteers to supplement staff in attaining the management goals of this Plan, such as avian, amphibian, and bat monitoring.
- Utilize volunteers to assist with research on Open Space lands. Priority areas include dog management monitoring and recreational impacts to resources.

13. PLAN IMPLEMENTATION

Implementing the South Boulder Creek Area Management Plan will require identification and prioritization of management actions to accomplish resource management objectives and plan goals. These prioritized management actions will be reviewed on an annual basis to determine annual work programs within Open Space budget and staff constraints. Implementation of the South Boulder Creek Area Management Plan will be balanced with other resource needs throughout the Open Space system via system-wide work programs. These annual work programs will incorporate the management needs of South Boulder Creek with those of the whole Open Space system.

Annual capital improvement projects and work programs are reviewed and approved by the Open Space Board of Trustees and City Council through the City's budget process. This Management Plan will be evaluated on a periodic basis and revised in approximately 5 years. Due to the size, complexity, and variability of the Open Space system, an implementation time schedule has not been developed for the South Boulder Creek Area Management Plan.

Many of the management actions will be implemented within the first few years of Plan approval, while others will take many years to accomplish. Some management tasks are ongoing--a continuation of current management actions. Some new management tasks are short-term in duration; other new management tasks are long-term, representing considerable investments of time and energy.

Table Description and Prioritization

The table below is a prioritized summary of management actions. The summary is derived from all the individual resource goals, objectives, and recommended management actions in the body of this Plan. Each section of the table has been reviewed by the interdisciplinary team in order to integrate the various resource goals, objectives, and recommended management actions. In many cases, individual resource objectives and management actions are so closely related that some repetition occurs.

In order to avoid repetition during Plan implementation, the resource objectives and management actions in this chapter have been integrated and regrouped into discrete management actions. The resulting discrete management actions have then been placed in the appropriate resource section in the table. For organizational purposes, the table has been arranged by individual resource chapter. The table thus prioritizes management actions, provides a summary for Plan implementation, and will guide the development of annual work programs. For a complete listing of all resource objectives and management actions, please refer to the individual resource chapters in the body of this Plan.

The table summarizes the prioritized management actions, according to tiers, and describes the duration and timing of each management action. The first column summarizes the goals, objectives, and management actions.

Duration and Timing of Each Management Action

The second column provides the duration and timing of each management action. The first letter describes if the action is current or new. New actions (N) have not been started and need to be incorporated into annual work programs according to their respective prioritization. Current actions (C) are already incorporated into annual work programs.

The next letter describes how long it will take to accomplish an action. Short-term actions (S) should take less than 2 years to accomplish once they have been started. Long-term actions (L) should take more than 2 years to accomplish once they have been started. Ongoing actions (O) will continue over time and represent considerable investments of time and energy.

Criteria for Prioritization

Management actions have been evaluated and prioritized into tiers. Criteria for tier designation include the importance and relationship of each action to other resource goals, objectives, and actions. Other considerations include community need, legal requirements, budget, personnel, timing and duration of management actions, permit requirements, and system-wide management needs.

Tier 1 management actions are the highest priority and are expected to be accomplished first. Tier 1 management actions are generally those actions that are considered extremely important to the preservation and protection of the resource and are directly related to the accomplishment of other resource goals and objectives.

Tier 2 management actions are next in priority. Tier 2 management actions are very important and meet a combination of other resource goals and objectives.

Tier 3 management actions are important but not critical to resource protection needs. Tier 3 management actions do not have to be completed in the immediate future and primarily fulfill a specific resource goal or objective.

The management tiers are meant to provide a rough framework for implementing the South Boulder Creek Area Management Plan. It is important to be flexible and adaptive when developing annual work programs. New properties with different resource conditions and management needs will be acquired and incorporated into the work program. Management actions will be adapted as new information and monitoring results are available. Ongoing management actions will continue to be evaluated and may be modified as new actions are implemented. The best available information from research data, inventories, and monitoring results will continue to provide the basis for management decisions and actions.

Table 13.1: Prioritized Management Actions

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
GEOLOGIC AND PALEONTOLOGIC RESOURCES GOAL: Preserve and interpret significant geologic and paleontologic resources of the area		
<i>Objective #1: Identify, document, and evaluate significant geologic and paleontologic resource sites within the Management Area.</i>		
Inventory and map significant geologic and paleontologic resources, including known sites of rare or unique rock, mineral, or fossil occurrences and potential locations of illegal “casual collecting” of rock, mineral, and fossil specimens.	N,S	2
<i>Objective #2: Protect and preserve significant geologic and paleontologic resources within the Management Area.</i>		
Routinely patrol geologic and paleontologic resource sites and potential locations of illegal “casual collecting.”	N,O	3
Discourage public access in areas susceptible to damage and vandalism.	N,L	3
Train Open Space staff to identify potential geologic and paleontologic resources in the field.	C,O	3
<i>Objective #3: Interpret appropriate sites to promote understanding and appreciation of geologic and paleontologic resources.</i>		
Interpret suitable sites. Themes should focus on geologic processes such as the formation of the Rocky Mountains and their relationships to the history of the area.	N,O	3
Interpret the foothill riparian and floodplain transition zones as the geographic boundary between the High Plains and the Rocky Mountains.	N,O	3
Discourage access in areas susceptible to damage and vandalism (e.g., erodible soil types, rare vertebrate fossils).	N,L	3
<i>Objective #4: Identify properties containing geologic, paleontologic, or other sensitive resources that could be threatened by surface mineral extraction.</i>		
Evaluate and determine priorities to acquire mineral rights for properties in the Management Area.	N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
VEGETATION GOAL: Preserve and maintain native plant communities, protect rare species and communities, and restore native vegetation in suitable areas.		
<i>Objective #1: Integrate vegetation management with other resource goals and policies.</i>		
Integrate vegetation management in South Boulder Creek with the <i>Long Range Management Policies, City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i> , Open Space area management plans, and other resource management plans.	C,O	1
Implement vegetation management through the Open Space coordinated resource management framework.	C,O	1
Participate in City-wide and interagency fire planning and integrate South Boulder Creek fire management objectives and recommendations with interagency planning	C,O	1
Participate in interagency Integrated Pest Management planning and management.	C,O	1
Develop a system-wide Open Space Integrated Pest Management plan to guide and integrate Integrated Pest Management activities.	C,O	1
Work with University of Colorado to coordinate resource management planning and to ensure that adjacent Open Space properties are not adversely affected by development of its Gateway property.	N,O	1
Consult with Colorado State University experts to develop Integrated Pest Management and restoration plans.	N,O	1
Coordinate resource management planning with neighboring public land management entities and other stakeholders. Major groups include City of Boulder Mountain Parks, City of Boulder Water Quality/Environmental Services group, City of Boulder Fire Department Wildland Fire Division, Boulder County Weed Management, Boulder County Parks and Open Space, Colorado Department of Transportation, agricultural lessees, and homeowner associations.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
<i>Objective #2: Protect native plant community health using or simulating natural processes where possible.</i>		
Fire		
Work with local fire agencies to prevent unnecessary damage to natural resources, fence, irrigation structures, etc. when responding to a wildfire. Follow Best Management Practices outlined in Appendix 3.2.	C,O	1
Integrate prescribed burn planning for the Management Area with system-wide Open Space fire management planning, including interagency burn planning within Boulder County.	C,O	1
Restore and manage fire as a natural or simulated natural process in grassland, wetland, shrubland, and woodland communities.	C,O	1
Stimulate native plant species growth and competitive ability by removing accumulated dead plant material.	C,O	1
Enhance wildlife habitat by improving or restoring sensitive species habitat and by creating patch mosaics of different composition and structure.	N/C,O	1
Exclude riparian areas from prescriptive burning on properties, unless monitoring and research recommend it be done.	C,O	3
Control exotic plant species of concern, such as Canada thistle and cheatgrass, by using carefully-timed fire and follow-up treatments.	C,O	1
Reduce the risk of accidental, unplanned fire by reducing dry fuels. Fire risk mitigation is particularly important at the urban/open land interface.	C,O	1
Burn to maintain irrigation ditch function and efficiency.	C,O	1
Develop educational programming and materials that promote the use of fire as a natural process to restore and maintain native plant communities, and to reduce wildfire risk.	C/N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Develop a fire information database and Geographic Information Services component that manages documentation on fire history, fire weather and behavior, and fire effects monitoring.	N,S	1
Formulate annual fire plans by convening planning meetings during winter months and clearly defining staff roles for developing and implementing burn plans. Develop a 2 to 5 year time line for burn planning to accommodate monitoring and coordination with Integrated Pest Management and agricultural operations.	C,O	1
Conduct research on the fire ecology of <i>Spiranthes diluvialis</i> , diffuse knapweed, and tallgrass communities.	N,L	2
Burn in orchid habitat that has been held out of haying for a season.	C,O	2
<i>Fourmile Canyon Creek subarea</i>		
Use fire, whipping, wicking, and a modified grazing regime to control the teasel and Canada thistle on McKenzie. (Integrated Pest Management duplicate).	N,O	2
Burn upland patches of grassland dominated by native species in Gallagher, Lousberg, and on Andrus Mesa with a frequency of 3 to 8 years. Burns should be conducted between March 1 and May 15 and September 1 and October 31. Frequency should be based on monitoring results and coordination is needed with the cattle grazing regime in each area.	N,O	2
<i>Boulder Creek subarea</i>		
Burn the mosaic of upland grassland and wetland patches on Short and Milne and adjacent Colorado Open Lands with a 3 to 8 year frequency. Burns should be conducted between March 1 and May 15 and September 1 and October 31.	N,O	3
Evaluate using fire and various other control techniques to manage weedy vegetation in the understory of the Cottonwood Grove.	N,S	3

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Use prescribed burning to control Canada thistle, teasel, and smooth brome throughout the subarea. Each species requires specific timing to impact vulnerable phenological stages. (Need to list target areas for each species.)	C,O	1
<i>South Boulder Creek/Dry Creek subarea</i>		
Burn wet meadow/tallgrass communities with a 3 to 8 year frequency. Base burn schedule and timing on grassland community monitoring results, Integrated Pest Management regime, grassland bird life cycle stage, orchid phenological stage, and the emergence of Preble's meadow jumping mouse from hibernation. Coordinate cattle grazing regime with burn plans.	C,O	1
Maintain a habitat mosaic that manages for biological and landscape diversity. Create a patch mosaic of 1-year, 3-year, 6-year, and older prescribed burns. (Identify specific locations and design for long-term burn planning.)	N,O	1
Shift native plant communities from cool season species dominance toward warm season species dominance by using spring and fall burns, dormant (late winter to May 15) season grazing, and grazing rest rotation regimes. Minimize damage to soft spring soils in wet meadow/wetland areas through grazing planning (exclusion). (Identify properties and areas of properties.)	N,O	1
<i>Prescribed Natural Fire</i>		
Promote and implement prescribed natural fires as another means to meet resource management objectives.	N,O	2
Include prescribed natural fires in the prescribed fire and annual Wildfire Operational Plans.	N,O	2
Investigate the feasibility of small-scale, prescribed natural fire in the Management Area.	N,S	2
Identify potential areas where prescribed natural fires may be used.	N,S	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Create a clear and concise map displaying these areas for use by wildfire managers.	N,S	3
Identify areas and seasons where fires should be controlled to prevent damage to sensitive species or other native species important to management goals.	N,S	2
Grazing		
Time livestock grazing on native grasslands to minimize negative impacts to native grasses and forbs and to provide the opportunity for native plant reproduction to occur.	C,O	1
Establish range monitoring in as many grazed native community types as possible. (Identify and recommend sites for monitoring.)	N,O	1
Build in rest for all upland communities. Rest/rotation should allow one ungrazed season every 3 years at a minimum. Longer rest periods are desirable, and monitoring results should be used to determine optimum regime. (Identify rest rotation areas and design schedule.)	N/C,O	1
Monitor plant species richness and cover and streambank condition in riparian corridors and bottomland grassland patches that are enclosed from cattle grazing. Monitor Canada thistle densities. Survey annually for <i>Spiranthes diluvialis</i> . Monitoring priorities are in the second Van Vleet field south of U.S. 36 and riparian reaches that will be fenced upon implementation of this plan.	N,L	1
Evaluate Colorado Tallgrass Prairie Natural Area exclosures to determine whether occasional (e.g., use a 2 to 3 year interval based on observations throughout each growing season) winter/early spring grazing may be beneficial to control weeds and stimulate growth of perennial grasses (high intensity, short duration).	N/C,O	1
Use prescriptive grazing as an Integrated Pest Management technique to control target weed species. Support ongoing research investigating grazing effects on diffuse knapweed.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Protect riparian and shrub communities and assist in the restoration of woody vegetation by adjusting grazing regimes, removing areas from grazing, fencing areas for one or more grazing periods, and/or manipulating the distribution of use through water source and salt block placement.	C,O	1
Coordinate prescribed burn planning and Integrated Pest Management planning with grazing plans.	C,O	1
<i>Objective # 3: Prevent new infestations and manage existing infestations of priority non-native species of concern using the Integrated Pest Management planning process.</i>		
Prevention		
<i>Neighboring Lands</i>		
Develop a memorandum of understanding with the Colorado Department of Transportation, Boulder County (Parks and Open Space, Transportation, Weed District), and other City of Boulder departments (Parks and Recreation and Public Works) concerning control of diffuse knapweed and Canada thistle in state and County road right-of-ways and City-owned lands. Include guidelines for rare and uncommon plant species conservation along highway right-of-ways and on City owned lands.	N,O	1
Develop a process for coordinated weed management planning. Work with County Weed District Officer to educate landowners on integrated weed management for their lands.	N,O	1
Develop cooperative weed management strategies. Examples of cooperative weed control tasks are: (1) organize community weed pulls and hand-digging of weeds in rare plant habitat and other appropriate areas and encourage groups or individuals to adopt a rare species and/or conduct stewardship projects in sensitive areas; (2) install fence line barriers to control knapweed spread; (3) mow problem areas, using the proper seasonal timing to prevent spread of target species (Appendix 3.5); and (4) develop educational materials for new landowners.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Communicate regularly with neighboring landowners to coordinate Integrated Pest Management planning and activity.	N,O	1
Work with Accent Gardens nursery to ensure steps are being taken to prevent cultivated/ornamental species from contaminating neighboring Open Space native grassland orchid habitat. Monitor adjacent Open Space lands for escaped ornamentals.	N,O	2
Use Integrated Pest Management treatment selection criteria (Appendix 3.5) in planning cooperative weed control efforts. Emphasize the goals of protecting good water quality, human safety, and rare plant and animal species and communities.	C,O	2
Include weed management strategies in conservation easement agreements.	N,L	2
<i>Open Space Lands</i>		
Design livestock grazing regimes (timing, duration, stocking rate) to prevent overgrazing, erosion, and trailing. Place salt blocks, water sources, and supplemental forage to minimize erosion. When possible, use supplemental feed (hay) that is produced on the same property containing the livestock. Use weed-free hay, whenever possible, if hay is brought in from outside the leased area. If weed infested hay is used to feed contained livestock, manure should be composted for 1 year before depositing onto hay fields.	C,O	2
Visit those lands where cattle pasture during seasons when cattle are absent from Open Space. Determine weed species present and assess if cattle are capable of transporting these weed species to Open Space via manure, fur and/or hoof. Consider containment period for cattle before entering Open Space or revise lease conditions to address weed control.	N,O	3
Irrigate uniformly and efficiently to discourage the spread of Canada thistle, teasel, and knapweed.	C,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Prevent over-fertilization of cropland and transport of excess fertilizer by runoff (high soil nitrogen levels can increase the competitive ability of some weed species over most native species).	C,O	2
Use cultivation practices, plant materials, and crop rotation that will maximize the competitive ability of annual crops and hayfield species. Clean cultivating equipment before moving from one field to another.	C/N,O	1
Include weed management strategies in lease agreements. Involve lessees in the development and review of annual operating plans.	N,O	1
Manage weed infestations in agricultural field buffer areas and along fence lines to prevent infestations in crop/hayfields.	N,O	1
Prevent weeds from becoming established along ditches and laterals. Incorporate more burning into ditch management.	N,O	1
Place fences to avoid the creation of weedy areas that are difficult to manage. Place fences or reinforce existing fences to prevent the spread of knapweed.	N/C,O	2
Use weed-free materials in trail construction. Survey new trails for weed infestations annually.	C/N,O	1
Encourage use of pelletized feed or weed-free forage for horses before and during visits to Open Space.	C,O	3
Use appropriate weed free materials when closing trails. Do not use these materials in an amount or fashion that could lead to weed invasions (placing too many branches in an area can lead to Canada thistle problems). Trail managers should monitor all closures for 3 to 5 years to ensure they are not creating weed problems.	N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Plan trails to minimize the risk of weed introduction and spread. Do not place trails in areas with severe existing weed infestations. Keep trails out of wet areas. Minimize ongoing erosion in steep areas. Avoid creating a trail corridor that stretches from a weed infested area into an area with relatively few or no noxious weed infestations.	C,O	1
Ensure wildfire suppression and prescribed burn monitoring activities: (1) select and use staging areas to minimize ground disturbance and avoid the spread of weeds to other areas, (2) avoid or minimize the construction of ground-disturbing fire breaks, and (3) avoid or minimize off-road use of vehicles and completely avoid wet or friable soils.	N,O	1
Plan the timing and frequency of prescribed burns to optimize native plant growth and reproduction.	C,O	1
Implement timely reclamation in areas where ground disturbance has occurred. Native plant species should be used in post-burn reclamation seedings or plantings.	N?,L	1
No slash piles will be left on site after a fire since these establish weeds infestations.	N,O	1
Use native plant species in reclamation projects following the guidance set by the <i>Long Range Management Policies</i> .	C,O	1
Before reseeding a disturbed area, monitor the area for weed species well in advance of the project and take steps to ensure the reclamation area (and surrounding area) is free of noxious weeds. Do not reclaim an area when weed species are present.	C,O	1
Review, evaluate, and manage reclamation projects annually for a minimum of 3 years to ensure early detection of weed infestations. Monitor reclaimed areas annually for 3 to 5 years after closure.	C/N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Use weed prevention and control techniques in prairie dog Habitat Conservation Areas in concordance with the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i> . Reseed areas where plague has occurred as soon as possible to discourage weed establishment.	C/N,O	2
Train staff, volunteers, and the public to recognize weeds and the conditions that lead to their establishment.	C,O	1
Educate agencies and the public about weed-free products (e.g., hay, road base) and other opportunities to prevent weed introduction and spread.	N,O	2
Educate the public about aggressive ornamentals and native alternatives.	C,O	1
Detect, map, and eradicate isolated infestations or single plants of high-priority weed species before spreading occurs.	C,O	1
Develop and implement strategies to minimize the potential for introducing weeds and for creating conditions conducive to weed invasion (e.g., use of pre-cleaned construction equipment, weed-free hay, weed-free road and trail construction materials, native seed mixes in reclamation projects, and timely reclamation in disturbed areas, etc.)	C,O	1
Control		
General		
Use Integrated Pest Management decision-making process and treatment selection criteria to select control treatments.	C,O	1
Develop monitoring plan for priority weed species to monitor control treatment effects.	N,O	1
Develop and apply criteria to prioritize weed management projects.	C/N,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Monitor Van Vleet area south of U.S. 36 if excluded from grazing for increase in noxious weed species. Treat appropriately.	N,O	1
Develop a weed management plan for the Cottonwood Grove area. Work with staff to determine resource management goals for this area.	N,L	2
Work with staff to evaluate weed control responsibilities of different lessees according to lease agreements. Educate lessees on their responsibilities and work with them on what control options they have available to them.	C,O	1
Conduct research or monitoring projects that potentially contribute to the knowledge of weed species biology, control methods, and effects on native species.	C,O	1
Investigate the potential for acquisition of land, conservation agreements, or coordinated Integrated Pest Management control where Open Space land receives an ongoing weed seed source from neighboring lands; dispersed by the prevailing west-to-east wind direction. Emphasize prevention.	N,O	2
Develop a small parcel management plan that would include weed species management.	N,S	2
<i>Specific</i>		
Focus and increase control strategies for species listed on the Boulder County Noxious Weed List while keeping with the resource management goals of the individual properties. Not all listed species are currently in the Management Area.	C,O	1
Canada thistle		
Require cultural practices, including mowing, fire, and tillage in cultivated agricultural lands to prevent seed formation of Canada thistle. Management should include all ditches and buffer areas.	C,O	1
Mow Canada thistle in pastures before July 4th using the appropriate equipment. Coordinate these activities with timing of irrigation and sensitive plant and animal species.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier Designation:
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	1 = higher 2 = medium 3 = lower
Encourage research on different control techniques for Canada thistle, especially grazing and fire used in the South Boulder Creek floodplain and related tallgrass areas. Impacts to native plant and animal species should also be examined.	C,O	2
Examine grazing schedule annually in the South Boulder Creek floodplain and ensure that priority areas of Canada thistle are being addressed.	N,O	1
Integrate prescribed fire into the South Boulder Creek floodplain area. Priority areas are the cordgrass areas in orchid habitat that are ungrazed by cattle, tallgrass parcels, and sensitive wetland areas.	C/N,O	1
Coordinate with staff on appropriate timing of different control techniques in areas with sensitive species (Preble’s meadow jumping mouse, bobolink, orchids). Work control techniques around closures dates, breeding periods, irrigation, etc.	C,O	1
Continue intensive hand whipping and wicking efforts along the Burke I riparian area. Incorporate periodic fire in riparian area where beneficial to natives species.	C/N,O	1
Musk thistle		
Continue to monitor properties for infestations that may be approaching unacceptable levels. Control these populations using mechanical treatments.	C,O	2
Continue to control musk thistle on Gallucci next to U.S. 36.	C,O	1
Knapweed		
Increase the use of reinforced fencing to prevent major adjacent infestations from spreading into Management Area. Coordinate control strategies with major adjacent infesters including Wildflower Ranch, Baseline Reservoir, and East Boulder Community Center.	C/N,O	1
Continue to assist in the control of knapweed at East Boulder Community Center. Continue yearly contact with Park Superintendent to discuss control efforts.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Coordinate with other City departments to control knapweed in areas around the bike path adjacent to the Cottonwoods and Colorado Open Lands.	N,O	1
Hand pull small infestations of mapped knapweed. Utilize volunteers, jail crews, and volunteer stewards when possible.	C,O	1
Control small mapped infestations of moderate to heavy densities with wick applicators. Tractor spray areas not conducive to wick applications.	C,O	1
Encourage research on control strategies and the effects of control treatments on native species.	C,O	1
Purple loosestrife		
Intensify control efforts at Flatiron Industrial Park.	C,O	1
Continue to assist in the control of purple loosestrife at East Boulder Community Center to eliminate purple loosestrife from the property.	C,O	1
Monitor known properties (Mary Clyncke, Burke II, adjacent private) where individual loosestrife plants have been reported in the past for reoccurrences.	C,O	1
Dalmatian/yellow toadflax		
Hand pull all mapped dalmatian toadflax (except one large infestation on Van Vleet) in the Management Area. Monitor these areas yearly for reoccurrences.	C,O	1
Continue chemical control efforts on the largest infestation of dalmatian toadflax in the Management Area located on Van Vleet east of Cherryvale next to the Oakley Conservation Easement until the infestation is eliminated or reduced to where mechanical control efforts are feasible. Educate owners of the Oakley conservation easement about the dalmatian toadflax infestation on their property and potential control methods.	C,O	1
Continue control efforts for yellow toadflax on Klein until eliminated.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Other species		
Control or eliminate where feasible those weed species not on the County Noxious Weed List but have the potential to become widespread and/or threaten rare plant/animal habitat.	N,O	1
Research controls available on those weed species.	C,O	1
Prioritize areas and focus control efforts for Russian olive according to available labor sources, season, and surrounding sensitive species (plant and animal). Current priority areas are the tallgrass community in the area of Short, Yunker, and East Van Vleet, and West Church south of Sam's Lane.	C,O	1
Eliminate oxeye daisy from Burke I and Burke II hayfield using mechanical techniques if possible. Monitor results of control efforts yearly and adjust treatment if necessary.	N,L	1
Develop integrated weed management strategies for teasel.	N,S	2
Monitor treatment effects for teasel in two or more pilot areas.	N,O	2
Hand pull all known infestations of myrtle spurge annually and monitor for reoccurrences.	C,O	2
Develop and implement a management plan for sulfur cinquefoil in the South Boulder Creek floodplain. Involve appropriate staff.	N,L	1
Monitor areas prone to invasion by sulfur cinquefoil.	N,O	1
Develop and implement a management plan for bouncing bet in the South Boulder Creek floodplain. Involve appropriate staff.	N,O	2
Research possible controls available for queen of the meadow. Develop a plan of action for this species in the Burke II property.	N,O	1
Avoid the use of smooth brome in agricultural and reclamation seedings.	C,O	1
Remove crack willow from riparian and floodplain areas when feasible. Consider wildlife use of crack willow trees before removing.	N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
<i>Objective # 4: Protect and maintain rare species and communities of special concern.</i>		
General		
Plan recreational development to avoid or minimize direct, indirect, and cumulative negative effects on rare species, communities, and potential habitat.	C,O	1
Develop and use a project checklist to identify and evaluate potential impacts to sensitive resources.	N,S	1
Integrate rare plant management and weed management. Use control techniques that avoid negative impacts to species of special concern.	C,O	1
Integrate rare plant management and fire management. Plan prescribed burning to avoid negative impacts to species of special concern. Use prescribed fire to enhance habitat for species and communities of special concern.	C,O	1
Integrate rare plant management and livestock grazing management. Prevent negative impacts to species and communities of special concern by excluding livestock or by employing prescriptive grazing only.	C,O	1
Solicit and support research on topics related to rare plant conservation and management in order to fill important information gaps.	C,O	1
Specific		
Develop a monitoring plan for Ute ladies'-tresses to document ongoing monitoring.	N,S	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Participate in <i>Spiranthes diluvialis</i> recovery efforts through involvement (membership) in the recovery team, development of a habitat management plan (South Boulder Creek Area Management Plan), monitoring of management effects and potential threats, supporting research to fill priority information gaps, coordination with other landowners who own or influence orchid habitat (e.g., the University of Colorado and Denver Water Board), and development of a conservation agreement between the U.S. Fish and Wildlife Service, Open Space, and other key stakeholders (e.g., ditch companies) to establish and implement recovery guidelines.	C/N,O	1
Follow recovery plan guidelines when establishing management goals for maintaining population numbers, key processes, and areal extent of dynamic habitat.	N,O	1
Establish orchid habitat restoration guidelines, including the identification of reference community/habitat sites, recommended fluvial geomorphological conditions, and recommendations for the use of fire and other management treatments.	N,S	1
Monitor orchid phenology in hayfields annually and coordinate with Open Space agricultural managers, wildlife biologist, and lessees to minimize negative effects from haying.	C,O	1
Continue agricultural leasing and irrigation water management in orchid habitat and apply adaptive management to traditional practices to ensure orchid recovery.	C,O	1
In addition to current annual surveys, conduct surveys for Ute ladies'-tresses on East Church (before haying), along Viele Channel, in the Dry Creek riparian area between Baseline Lake dam (east side) and 75th Street, the Lousberg spring-fed pond, and any new properties with potential habitat. Map all occurrences and submit documentation to the Colorado Natural Heritage Program annually.	C/N,L	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Survey for <i>Spiranthes romanzoffiana</i> throughout <i>Spiranthes diluvialis</i> habitat, particularly in the South Boulder Creek floodplain. Verify and document any occurrences.	N,O	2
Survey fencelines and other potential habitat for American groundnut (<i>Apios americana</i>) throughout the Management Area and all Open Space. Map all occurrences and submit documentation to the Colorado Natural Heritage Program.	C,O	2
Conduct rare plant clearances for all ground-disturbing or fence replacement projects within the Management Area and all Open Space in potential or known American groundnut habitat.	C/N,O	1
Survey potential habitat in the Management Area and all Open Space and map all occurrences and submit documentation to the Colorado Natural Heritage Program for the following species: toothcup (<i>Rotala ramosior</i>), dwarf indigo (<i>Amorpha nana</i>), Colorado butterfly plant (<i>Gaura neomexicana</i> ssp. <i>coloradensis</i>), and showy prairie gentian (<i>Eustoma grandiflorum</i>).	N,O	2
Objective # 5: Establish and manage Special Land Designations (e.g., State Natural Areas) to highlight areas and communities with exceptional natural value.		
Continue management of the Colorado Tallgrass Prairie Natural Area according to 1986 <i>Management Plan</i> until reviewed and revised.	C,O	1
Review and update the 1986 <i>Management Plan</i> .	N,S	1
Designate South Boulder Creek State Natural Area in cooperation with the Colorado Natural Areas Program.	N,S	1
Ensure that provisions of the State Natural Area Articles of Designation are met through the management actions in this Plan.	N,O	1
Manage black-tailed prairie dog Habitat Conservation Areas as grassland preserves according to the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i> .	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
<i>Objective #6: Restore, reclaim, and enhance native vegetation in areas with restoration potential and/or reclamation needs. Use native plant species in the reclamation of areas impacted by development, land use, exotic plant control, and other ground disturbances.</i>		
Identify and document native communities that can serve as templates or references for the restoration of other areas with similar site conditions.	N,O	1
Evaluate native grass seed production as a crop alternative and a way of providing native seed for restoration and reclamation projects.	N,S	2
Reclaim areas affected by disturbances such as new trail and trailhead construction, weed control treatment, and undesignated trail closures.	C,O	1
Seed irrigation ditch banks as needed when routine cleanings leave bare soil. Coordinate with ditch operating companies to ensure that soils disturbed during ditch cleaning be spread and smoothed evenly to match the ditch bank contour.	C,O	2
Level and seed abandoned prairie dog burrow entrances outside of Habitat Conservation Areas to improve irrigation water application and to prevent and control weed invasion.	C,O	2
Develop and implement a reclamation plan for sites where structures are demolished.	C,O	1
Follow Best Management Practices during reclamation to prevent the introduction and spread of non-native plant species and to minimize soil erosion.	C,O	1
Seed Burke I east of concrete trail, north of East Boulder Ditch. A spring seeding is best.	N,S	2
Seed Damyanovich snakeweed area after burning.	N,S	2
Evaluate the reclamation needs and feasibility in the Van Vleet gravel mine and rock stockpile area.	N,S	3
Evaluate the reclamation needs associated with weed control areas in the Boulder Creek corridor (emphasize coordination between multiple landowners).	N,L	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Evaluate restoration potential on the west end of Andrus Mesa. Active prairie dog colonies will pose reclamation challenges.	N,L	3
Control weeds, replace or amend top soil, and seed on the Reynolds property.	N,L	3
Evaluate reclamation needs and potential on Celestial Seasonings property.	N,L	3
Control weeds and seed upland areas of Short and Milne property.	N,L	2
Develop a restoration plan for Dry Creek riparian area north and south of Baseline Road that includes controlling Russian olives, planting native woody species, creating the potential for orchid habitat to develop, and coordinating with adjacent landowners.	N,L	1
Convert Clough wheat fields into native perennial grasses. Coordinate with adjacent landowners (Klein) to assist them in converting to perennial grasses (landowner has suggested this).	N,L	2
Convert the northeast cropped field of St. Walburga property to native perennial grasses. Evaluate potential for using an eastern strip of that field for a small tree/shrub nursery.	N,L	2
Reclaim any designated or undesignated trail sections that are closed at Dry Creek Trailhead area.	N,S	1
Reclaim the Ute Industrial Park property remnants of the past subdivision development: the pond, stockpiled dirt, and other ground disturbance. Coordinate reclamation plans with Habitat Conservation Area management objectives.	N,L	1
Reclaim/restore abandoned agricultural fields around the Ute Industrial Park butte on the west side of the property. Coordinate plans with Habitat Conservation Area management objectives.	N,L	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Work with the Public Utilities Department (Water) to reclaim the disturbed utility corridor on the Straty-Cline property. Adjust the cattle grazing regime to assist grassland restoration. Develop Integrated Pest Management priorities to control diffuse knapweed and several non-native thistle species.	N,O	1
Work with City Tributary Greenways Program to plan/ensure trailside maintenance (weed control) and post-construction reclamation on Flatiron Industrial Park, small properties along Boulder Creek, Belgrove, McKenzie, and Bobolink transportation trail.	C,O	1
Continue reclamation of the Jirkovsky property. Seed remaining disturbed areas on the eastern edge of the property. Continue mowing for weed control and develop a long-term Integrated Pest Management plan for the area. (Refer to the Agriculture chapter for action items regarding cattle grazing and proposed fencing changes.)	C,O	2
Monitor reclamation and restoration projects and maintain documentation (records) of seedings and plantings.	C,O	1
Collect seed from graminoid and woody species for propagation. Common species are: switchgrass, yellow Indian, big and little bluestem, hawthorne, chokecherry, currant, rose.	C,O	1
Collect cuttings for propagation or plantings. Common species are peach leaf willow, coyote willow, snowberry, sumac.	C,O	1
Salvage native plant propagules, when feasible, prior to machined ditch cleaning, trail building, and other ground-disturbing activities. Salvage or collect propagules for use in reclamation and restoration.	C/N, O	2
Continue to consult/coordinate with the University of Colorado on the reclamation plans for its Gateway property.	C,O	1
Convert annual crops to perennial grasses where appropriate.	C,O	2
Avoid the use of smooth brome in agricultural seedings.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Enhance wildlife habitat and use native plantings for black-tailed prairie dog management.	C,O	2
Plant shrubs as visual barriers to control the distribution of prairie dogs.	C,O	2
Plant trees to replace raptor perch sites where appropriate.	C,O	2
Plant shrub and tree species in appropriate sites along riparian corridors.	C,O	2
Convert agricultural fields from annual crops to perennial native grass species where feasible at the edges of native grasslands. (See the Agricultural chapter for recommendations related to the use of native hay as an alternative crop).	C,O	1
Document baseline site conditions and reclamation/restoration project plans.	C,O	1
Develop and apply reclamation and restoration project evaluation protocols.	C,S	1
Monitor and evaluate the ongoing success of reclamation and restoration projects annually for 3 to 5 years and adjust the monitoring schedule for subsequent years using evaluation results. The need for additional seedings or plantings will be determined from annual monitoring and evaluation results. Monitoring for the presence and status of invasive weed species is critical.	C,O	1
Support research in reclamation and restoration methods.	C,O	2
<i>Objective # 7: Inventory and monitor native vegetation to evaluate the potential effects of land use and to measure the effectiveness of vegetation management techniques.</i>		
Collect the appropriate baseline data to use as a reference for short-term and long-term monitoring (see above research needs list for rare plants).	C,O	1
Inventory plant species in prairie dog Habitat Conservation Areas.	C,O	1
Conduct periodic inventories of rare species occurrences and potential habitat.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Monitor population trends and/or flowering plant numbers in rare plant occurrences (see rare plant objective).	C,L	1
Monitor plant community structure, composition, and trends in and near prairie dog-inhabited sites within Habitat Conservation Areas.	C,L	1
Monitor fire effects on diffuse knapweed density and spread.	N,L	1
Monitor grazing effects on native plant community types: xeric and mesic tallgrass, and upland mixed grass; monitor all grazed areas to ensure that management objectives are met; monitoring may be low-intensity and qualitative or of higher intensity.	N,L	1
Monitor the effects of weed control treatments on target weed species and native plant communities.	C/N,O	1
Continue tallgrass community monitoring in tallgrass site 7, and in other tallgrass areas with established monitoring (e.g., Bock plots).	C,O	1
Develop integrated resource inventory and monitoring when feasible to optimize efficiency in data collection.	N,O	2
Develop a natural community classification that is based on site potential so that management actions can be guided uniformly across the Open Space system.	C,S	1
Map native upland grassland patches on Gallagher and Lousberg.	N,S	2
WETLANDS GOAL: Preserve significant wetlands and riparian areas, minimize impacts to important ecological functions, and restore or enhance suitable wetlands and riparian areas.		
<i>Objective #1: Preserve and protect important wetland and riparian areas.</i>		
Avoid trail development and undesignated trail use through significant wetlands and riparian corridors.	C,O	1
Use elevated boardwalks or other appropriate means to minimize impacts to hydrology, vegetation, and wildlife habitat when wetland crossings through identified wetlands are unavoidable.	N,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Construct a fence around Suitts Pond and adjacent wetlands to exclude livestock.	N,S	1
Establish fencing priorities to protect other wetlands and riparian areas susceptible to livestock disturbance.	N,O	2
Protect Sombrero Marsh by acquiring property owned by Boulder Valley School District and private landowners.	C,O	1
Work cooperatively with adjacent property owners to prevent land use activities (such as inefficient use of fertilizer or pesticides) adjacent to and within Sombrero Marsh which could adversely affect wetland ecosystem function.	C,O	1
Investigate the impacts from point and non-point water sources on water quality and plant communities of Sombrero Marsh.	N,L	2
Work with Public Service Company to coordinate with Open Space prior to conducting maintenance on the headgate for the East Boulder Ditch. Historically, clearing and dredging of this structure have impacted the riparian and stream habitat.	C,O	2
Reclaim social trails south of the end of the South Boulder Creek Trail and discourage public and livestock access to this reach of South Boulder Creek.	N,L	2
Fence South Boulder Creek to restrict cattle from the riparian area. Grazing should only be permitted for specific management actions such as weed control. Grazing will be used only when other Integrated Pest Management methods are not practicable.	N,L	1
Work with ditch companies to implement wetland Best Management Practices to minimize adverse natural resource impacts.	C,O	2
Conduct surveys in the Viele Channel for Ute ladies'-tresses orchid, Preble's meadow jumping mouse, plains topminnow, and other rare species and their habitats. Work closely with Public Works Department and Urban Drainage and Flood Control to ensure resource impacts are avoided if channel maintenance is carried out.	N,S	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Fence wetlands and riparian areas on the Klein, Cohagen, Lewis, and Methvin properties to exclude livestock.	N,S	1
Draft an agreement with Flatiron Industrial Park for South Boulder Creek channel maintenance north of the Burlington Northern railroad bridge.	N,S	2
Track floodplain management issues as they affect Open Space interests regarding riparian and wetland resource values.	N,O	3
Ensure wetlands and riparian areas on the Short and Milne property are protected in the event Pearl Parkway is extended.	N,S	1
Investigate the vegetation and ecological characteristics of the complex of alkali wetlands on Gallagher, Lousberg, Hart-Jones, and other Open Space properties.	N,S	2
Survey aquatic vegetation in the spring-fed pond on the Lousberg property.	N,S	3
<i>Objective #2: Restore or enhance suitable wetlands and riparian areas.</i>		
Use prescribed burns and grazing management to maintain or enhance wetland and riparian plant community diversity.	C,O	1
Protect riparian and shrub communities and assist in the restoration of woody vegetation by adjusting grazing regimes, removing areas from grazing, fencing areas for one or more grazing periods, and/or manipulating the distribution of use through water source and salt block placement.	C,L	1
Utilize Integrated Pest Management practices to control weeds and non-native vegetation in wetlands and riparian areas.	C,O	1
Design and implement an instream flow and riparian management program for South Boulder Creek.	C,O	1
Develop a formal planting and maintenance program through the Tributary Greenways Program to establish native riparian trees and facilitate efficient removal of hazard trees from the channel. Trees that are not deemed to be a hazard should be allowed to remain to provide aquatic and wildlife habitat.	N,S	3

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Remove the underdrain on the southern portion of the Andrus property (wetland #423) to improve wetland conditions.	N,S	2
Consult with a fluvial hydrologist/engineer to evaluate the feasibility of reestablishing natural processes that lead to stream meandering on South Boulder Creek and, where feasible, implement projects to rejuvenate and sustain healthy riparian communities.	N,L	2
Inventory streams and wetlands to identify degraded areas that have restoration potential.	N,L	2
Evaluate, design, and implement riparian restoration and management programs for Fourmile Canyon, Boulder, and Dry Creeks that flow through the Management Area. Activities may include, but are not limited to, fencing riparian corridors, locating livestock water sources outside of riparian and wetland areas to minimize disturbance, removing Russian olive and other non-native species, and planting of native species such as coyote willows and cottonwood trees.	N,L	1
Utilize Colorado Natural Heritage Program natural communities descriptions to provide guidelines for the desired result of riparian and wetland restoration projects.	C,O	2
Investigate the feasibility of relocating or removing existing trails out of wetlands and riparian areas and implement where practicable to protect sensitive areas.	N,L	1
Objective #3: Monitor wetland and riparian related issues.		
Update wetland inventory in the Management Area.	C,O	1
Monitor wetlands known to support breeding amphibian populations.	N,O	1
Monitor the occurrence and spread of weeds in wetlands and riparian areas.	C,O	1
Support research to gain a more thorough understanding of the ecological functions of wetlands and activities which impact them.	N,S	3

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Establish protocols for long-term monitoring of wetland and riparian functions, values, vegetation, and wildlife.	N,L	1
Monitor regulatory compliance that affects wetland and riparian values and function in the Management Area.	C,O	1
Study the relationship between the local ground water system and native riparian trees and shrubs.	N,S	2
Conduct an inventory of fish and aquatic macroinvertebrate populations in Fourmile Canyon Creek and Dry Creek as well as various ponds and lakes in the Management Area to determine the ecological condition of these waters. If needed, develop action plans to improve the ecological condition of these creeks.	N,S	2
Investigate water quality in ponds and lakes within the Management Area to determine if any specific management is needed to maintain or improve water quality.	N,S	2
Monitor Schearer Ditch headgate wetland mitigation project and prepare mitigation report.	N,S	1
Monitor wetland vegetation on the Burke II meadow to determine the long-term effects of the underdrain installed beneath Country Meadows Subdivision on wetland plant communities.	N,S	3
Monitor non-native species in the exclosure area on the east side of the Burke II property. These species include the large headed yellow loosestrife (<i>Naumbergia=Lysimachia thrysiflora</i>), Queen of the meadow (<i>Filipendula ulmaria</i>), and tansy aster (<i>Tanacetum vulgare</i>). The persistence of these plants suggests that they may have the ability to spread farther in the floodplain.	N,S	3
Monitor the spread of <i>Scirpus linearis</i> (a non-native bulrush) on the Burke II property south to U.S. 36 to determine whether it poses a threat to the biological diversity of floodplain wet meadows.	N,L	2
Ensure wetland mitigation projects on the Lewis property and on South Boulder Creek north of Valmont Road are monitored in accordance with the City protection ordinance.	N,S	3

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Coordinate with Boulder County Transportation and City of Boulder Development Review on the Pearl Parkway bridge project to avoid impacts to wetlands on Open Space.	C,S	1
Complete wetland fieldwork and data entry as detailed in Table 8.9 of the <i>Inventory Report</i> .	N,S	1
Encourage research on the impact of fire and various grazing prescriptions on wetland productivity and diversity.	N,S	2
Conduct a more thorough investigation of wildlife use of wetlands in order to improve the understanding of the species of concern and the value of wetlands as wildlife habitat.	N,S	2
Prioritize environmental education and outreach to increase public awareness of wetland functions and values.	N,L	1
Test ground water and soils on the Hart-Jones salt marsh and other salt marshes for selenium and follow up as appropriate.	N,S	2
WILDLIFE GOAL: Preserve wildlife and wildlife habitat through proper land stewardship that incorporates strategies of habitat enhancement and minimizes the impacts of land use harmful to wildlife.		
<i>Objective #1: Inventory wildlife species to establish accurate and replicable monitoring and evaluate effectiveness of land management techniques</i>		
Conduct surveys for mammals, fish, birds, reptiles, amphibians, and invertebrates as part of system-wide surveys.	C,O	1
Conduct and coordinate surveys for the Preble's meadow jumping mouse in the following locations: South Boulder Creek, Dry Creek, Straty-Cline, Short and Milne, Viele Channel, Lousberg, and any other properties which might contain suitable habitat.	C,O	1
Conduct and coordinate surveys for amphibians in Suitts Pond, Sombrero Marsh, and other appropriate wetland sites.	C,O	2
Conduct and coordinate surveys for rare fish (orange-spotted sunfish and plains topminnow) in appropriate stream reaches.	N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Focus research on inventories of wildlife species and impacts of land uses (i.e., trails, grazing, haying) on wildlife populations and habitats.	C,O	1
Coordinate efforts to share wildlife information among agencies for annual deer, goose, heron, and bat counts	C,O	3
Maintain a wildlife database as a usable repository for information and for analyses and make results available to the public and land managers.	C,O	1
<i>Objective #2: Maintain and/or restore wildlife habitat and/or populations at risk, based upon results of ecological research and site-specific monitoring.</i>		
Evaluate the ecological conditions that support rare fish with the Division of Wildlife and other interested agencies and coordinate aquatic resource restoration activities.	N,L	2
Create and/or enhance habitat for Preble's meadow jumping mouse.	N,L	2
Evaluate water quality conditions with appropriate staff to determine where wetland restoration activities may most benefit amphibian populations (e.g., Sam's Lane, West Church).	N,L	3
Identify and provide natural and/or artificial habitat for wildlife species to assist with Integrated Pest Management control of insects (e.g., bat roosts to assist in controlling mosquitoes).	C,O	3
Enhance native plant communities (see Vegetation chapter) to increase wildlife species diversity (e.g., invertebrates).	C,O	2
Enhance or create habitat for species of special concern (e.g., barn owls, bank swallows, cavity-nesting birds).	N,L	3
<i>Objective #3: Coordinate wildlife management in the Management Area with other resource management plans and agencies such as the City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan.</i>		
Enforce the dog management recommendations as outlined in the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i> in conjunction with Education and Outreach and Public Safety	N,S	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Follow recommendations of <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i> for designation of prairie dog colonies on existing properties, and for new properties that are outside Habitat Conservation Areas.	C,O	1
Promote trail-free Habitat Conservation Areas where practicable; if not practicable, place/move trails to the perimeters of the colonies.	N,L	1
Designate Klein and Suitts North as the Dry Creek Habitat Conservation Area due to their isolation.	N,S	1
Designate the newly acquired Marshall colonies as a Habitat Conservation Area.	N,S	1
Designate the Suitts South colony as a Habitat Conservation Area due to the isolation of the colony.	N,S	1
Designate the Gallagher colony as a Habitat Conservation Area due to its large size.	N,S	1
Designate the Belgrove colony as a Habitat Conservation Area due proximity to the Independence Road Habitat Conservation Area.	N,S	1
Designate McKenzie North colony as a Transitional Area.	N,S	1
Extend Transitional Area designation of Rolling Rock Ranch.	N,S	3
Extend the Transitional Area designation of the Van Vleet Northeast colony until natural barriers are in place.	N,L	3
Designate the Van Vleet Southwest colony as a Transitional Area due to burrowing owl activity and proximity to Colorado Tallgrass Prairie Natural Area.	N,L	3
Designate the Van Vleet Northwest colony as a Transitional Area until further evaluation.	N,L	3
Designate the Aweida II colony as a Transitional Area due to possible conflicts with reclamation efforts on the property.	N,L	3
Extend the north boundary of the Gallucci/Yunker Habitat Conservation Area to the Davidson Ditch.	N,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier Designation:
	N = new C = current ----- S = short-term L = long-term O = ongoing	1 = higher 2 = medium 3 = lower
Extend the northeast corner of the Andrus Habitat Conservation Area to the ditch.	N,O	1
Change the boundaries of the Rolling Rock Transitional Area to the northwest, north and east fences, the ditch to the west, and the South Boulder Creek trail to the south.	N,O	3
Change the boundaries of the Van Vleet Northeast Transitional Area to the fence to the east/northeast, the fence/U.S. 36 to the south, and the fence/Marshallville Ditch to the west/northwest.	N,O	3
<i>Objective #4: Integrate wildlife population and habitat protection/enhancement into other resource management actions.</i>		
Protect wildlife from impacts of short-term construction activities (i.e., utility construction).	N,O	1
Encourage protection of large tracts of land unfragmented from trails.	C,O	1
Protect critical breeding and winter habitat of raptors through protection of large tracts of relatively unfragmented land.	C,O	1
Encourage agricultural activities (hay) to occur after July 15 to protect grassland bird species and coordinate site-specific haying schedules in order to help with Ute ladies'-tresses orchid management.	C,O	1
Use seasonal closures to protect sensitive wildlife species where appropriate.	C,O	1
Identify weed management areas to benefit wildlife populations.	C,O	2
Design grazing management to minimize impacts on wildlife populations and wildlife habitat.	C,O	2
Assist in designing burn plans that minimize negative impacts and enhance habitat for wildlife.	C,O	2
Develop and implement an instream flow program during low-flow winter months to enhance fish and wildlife habitat.	N?,O	1
Identify parcels of land for potential acquisition to decrease habitat fragmentation.	N, O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Participate in long-term fire management plan with specific resource management objectives.	N,L	3
CULTURAL RESOURCES GOAL: Preserve and interpret historic sites, landscapes, and themes of the area.		
<i>Objective #1: Identify, document, and evaluate significant national, state, and local cultural resource sites, landscapes, and themes within South Boulder Creek.</i>		
Evaluate local significance and how various outbuildings and sites contribute to historic themes and landscapes within the Management Area. Structures to be evaluated include the Lewis residence and associated outbuildings, Suitts silo, the ruins at the Hogan residence, the ruins at Richardson I (two locations), and the Abernathy farmstead.	N,S	2
Conduct inventories on new properties, including Lousberg, Gallagher, Marshall, and Lentsch to ensure cultural resources are identified, documented, and evaluated for national, state, and local significance.	C,O	2
<i>Objective #2: Protect and preserve significant national, state, and local cultural resources within the Management Area.</i>		
Discourage public access in areas susceptible to damage and vandalism (e.g., use signs, field contacts).	C,O	2
Notify Open Space staff of existing cultural resource sites and patrol them on a routine basis.	C,O	2
Train Open Space staff to identify potential cultural resources.	N,O	3
Remove vegetation around the foundation of the Fox Mine Office to prevent foundation damage. Make repairs necessary to secure the building and prevent deterioration of the structure.	N,O	1
Repair roof at the Fox/Hogan Stone Barn and enhance drainage around the structure.	N,S	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Stabilize and maintain the exterior of the Viele house and buildings. The remaining outbuildings will be maintained (repairs should maintain historical integrity) and used for agricultural purposes.	C,O	1
Evaluate potential uses for the Viele house and pursue grant funding to restore and use the building for appropriate Open Space purposes.	C,L	2
Stabilize the sod-roofed building on the Suitts property. Research its history interpret if a trail is built in this proximity.	N,S	1
Continue to maintain the Doran barn, the Hogan residence, and the Harf barns (repairs should maintain historical integrity) and use for agricultural purposes.	C,O	3
Stabilize structures determined to be locally significant and incorporate into the Open Space caretaker or agricultural program.	N,O	3
Review future caretaker and agricultural leases to ensure significant cultural resources are identified and managed appropriately.	C,O	2
<i>Objective #3: Interpret sites and educate visitors to understand and appreciate cultural resources.</i>		
Interpret suitable sites as needed.	C,O	2
Research and document the history of the sod-roofed building on the Suitts property and incorporate into the general history of the area.	N,S	2
Develop and install an interpretive sign for the Viele farmstead. It should be placed near the adjacent trail and explain the role of this complex in the agricultural development of the area.	N,S	2
Work with volunteers to assist in the interpretation of suitable sites.	N,O	3

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Focus cultural resource interpretive themes on mining, agriculture, and water resources (as identified in the <i>Inventory Report</i>).	N,O	3
Discourage access in areas susceptible to vandalism.	C,O	1
PROPERTY GOAL: Pursue acquisition of lands consistent with the Open Space Charter and the area management plan goals and ensure proper management of easements and Open Space properties.		
<i>Objective #1: Acquire lands surrounding and within the Management Area that meet Open Space Charter and area management goals;</i>		
Incorporate resource management needs and significant environmental values (including mineral rights, water rights, or other real property interests) into future acquisitions.	C,O	1
Pursue individual acquisitions based on meeting Open Space Charter and area management goals, availability, price, and purchase terms.	C,O	1
Consolidate Open Space lands by acquiring private inholdings such as Warremburg, Straty/Cline, Fancher, Walker, and Sombrero Marsh.	C,O	1
Reduce impacts from development of adjacent areas by reviewing City and County development applications for environmental protection, recreational access, and real estate management needs (applications are referred through the City's Development Review process and through the County's referral process). Determine if resource management goals can be met through this process without actual purchase of a property interest.	C,O	2
Assess and prioritize trail access and development issues related to existing Open Space properties and future acquisitions.	N,S	3

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
<i>Objective #2: Research and document all easements and mineral and water rights in the Management Area.</i>		
Describe, locate, and document existing easements and right-of-ways.	C,L	3
Establish procedures for managing existing utility easements.	N,L	3
Review existing easement request policy.	N,S	3
Eliminate or revise burdening easements that have been abandoned or have expired. Pursue abandonment of utility easements which are no longer in use or that have been revised.	N,L	3
Renegotiate easements which do not meet Open Space management needs.	N,L	3
Resolve ownership and maintenance issues on roadways within the Management Area.	N,L	3
Inventory mineral interests on existing properties and determine mineral interests of new acquisitions.	C,O	1
Inventory water rights on existing properties and determine water rights of new acquisitions.	C,O	1
<i>Objective #3: Monitor existing Open Space conservation and other easements for compliance.</i>		
Determine responsible staff and establish procedures for easement compliance.	N,S	1
Disseminate information on easements to staff and monitor for compliance.	N,S	1
<i>Objective #4: Work with adjacent landowners and agencies on cooperative management issues.</i>		
Continue to work with adjacent agencies and landowners to improve water quality for Open Space and surrounding areas.	C,L	3

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Work with Boulder County and other departments within the City to provide trail linkages that meet regional recreational needs and are consistent with natural resource protection. Assist negotiations with other agencies for trail connections.	C,O	2
Work closely with City of Boulder Planning and Boulder County Land Use to ensure proper access and natural resource protection concerns are addressed as surrounding lands develop.	C,O	1
Work with the City of Boulder Planning and Boulder County Land Use to ensure that surrounding land uses are compatible with Open Space management.	C,O	3
Monitor Western Mobile's long-term use of the asphalt plant near the Valmont townsite.	N,L	3
Contact adjacent landowners and agencies on coordinated weed control efforts and other resource management needs.	C,O	2
Continue to coordinate with City Public Works about contamination management at the Marshall Landfill site.	C,O	2
Evaluate potential land trade opportunities with other public agencies such as Sawhill Ponds.	C,O	3
<i>Objective #5: Establish appropriate leases to meet management goals.</i>		
Revise agricultural leases to reflect current management direction.	C,O	1
Revise and monitor leases for caretaker and lessee facilities.	C,O	3
<i>Objective #6: Coordinate and integrate reviews of new acquisitions.</i>		
Establish management needs prior to Open Space Board of Trustees approval, incorporate resource management requirements into purchase agreement, and incorporate major capitol improvement costs into the acquisition whenever possible.	C,O	1
Update the property <i>Inventory Report</i> with new properties as acquired and evaluate management needs.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
FACILITY GOAL : Ensure safe, responsible, and efficient use and maintenance of all structures or buildings owned by the City of Boulder Open Space Program.		
Objective #1: Ensure proper management of existing buildings and structures.		
Maintain Open Space Operations Center as office space and provide maintenance as needed. Designate appropriate contact person for grounds and building maintenance.	C,O	1
Maintain the Operations Annex as office space and storage for equipment and supplies. Designate appropriate contact person for grounds and building maintenance.	C,O	1
Maintain Rocky Mountain Riding for the Disabled as a leased facility and provide maintenance as needed. Designate appropriate contact person for grounds and building maintenance.	C,O	1
Maintain Hawkins residence as an occupied caretaker facility and provide maintenance as needed.	C,O	2
Evaluate potential uses of Viele house.	N,S	3
Evaluate costs and need for improving structural integrity of the Viele house and associated outbuildings (see Cultural Resources chapter).	N,S	3
Repair and maintain Fox/Hogan Stone Barn for historical significance (see Cultural Resources chapter).	N,S	1
Repair foundation and maintain Fox Mine Office for historical significance (see Cultural Resources chapter).	N,S	1
Maintain existing structures in the Harf complex for agricultural purposes.	C,O	2
Repair Harf pump house for agricultural needs.	N,S	3
Maintain barn and outbuildings at the Doran complex for historical significance and maintain for agricultural purposes.	N,S	3
Evaluate historical significance and habitability of the Lewis house and maintain barn and hay shed for agricultural purposes.	N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Evaluate historical significance for all buildings on the Suitts property.	N,S	3
Maintain Hogan house as an occupied facility and provide maintenance as needed.	C,O	2
Maintain barns and sheds at the Hogan complex for agricultural purposes.	C,O	2
Remove pump house on Klein.	N,S	3
Evaluate potential uses for wells and pump house on Klein and either secure or remove.	N,S	2
Remove abandoned box cars from Merle-Smith.	N,S	3
Remove Lousberg garage as recommended by the Open Space Board of Trustees.	N,S	2
<i>Objective #2: Ensure all facilities are safe and maintained to an acceptable standard.</i>		
Inspect each facility annually or as needed for safety concerns.	C,O	1
Test well water for contaminants annually at all occupied facilities.	C,O	1
Inspect heating systems annually in all occupied facilities.	C,O	2
<i>Objective #3: Develop policies for the use of facilities.</i>		
Implement caretaker and facilities policy as soon as approved by the Open Space Board of Trustees.	N,S	2
Define acceptable standards for all occupied facilities.	N,S	3
AGRICULTURE GOAL: Refine, focus, and implement sustainable agricultural practices that enhance multiple resource management objectives.		
<i>Objective #1: Enhance the balance between natural resources and agricultural practices.</i>		
<i>Coordinate Resource Management Planning with Lessee Agricultural Planning</i>		

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Evaluate existing leases as they expire and, if necessary, modify language to stipulate specific compliance with resource goals and objectives (weed management, natural grass communities, etc.) on specific properties.	C,O	1
Hold an annual meeting with resource staff, between November 1 and November 30 before the lessee meetings to establish coordinated natural resource management objectives for agricultural management.	N,O	1
Hold an annual meeting with each agricultural lessee, between December 1 and February 15 before field season to coordinate resource management activities and agricultural activities on Open Space.	N,O	1
Hold an annual meeting with lessees who have operations on the properties along the South Boulder Creek floodplain. The meetings should be held during the first 2 weeks of June to coordinate their specific haying times and locations with the efforts to protect the Ute ladies'-tresses orchid, bobolink, and other sensitive species.	N,O	1
<i>Lease Reviews</i>		
Evaluate the potential options for operating Lousberg and Gallagher as a single operating unit. Leases for these properties are effective until 1999.	N,S	1
<i>Specific Grazing Prescriptions</i>		
Adjust management scheme for the West Van Vleet property (the Dorn barn field/posie patch). Include spring grazing prescriptions and prescribed fire and investigate the feasibility of repairing the well adjacent to the Dorn barn so that it can be used as an alternate water source for livestock. Spring grazing should be complete by mid-May. Prescribed burns should be conducted in late winter/early spring (after grazing is complete) and should result in the creation of a mosaic of small patches of burned and unburned vegetation throughout the property.	N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Prepare grazing prescriptions for Jirkovsky and City on the Hill that will benefit reclamation and native vegetation management.	N,S	3
Manage livestock grazing patterns through the strategic placement of fencing, salt blocks, and watering areas.	C,O	2
Develop annual and long-term grazing prescriptions for native grasslands.	C,O	2
Review and evaluate grazing practices used by Rocky Mountain Riding for the Disabled. Work with them to establish more sensitive grazing prescriptions.	N,S	1
Develop management strategy for hay field south of U.S. 36 and west of South Boulder Creek. Management should include prescribed fire, grazing for Canada thistle control, aftermath grazing, and haying to improve vegetation condition.	N,L	2
Prepare Rolling Rock Ranch (rocky area) grazing prescription that includes prescribed fire or mowing and grazing schedule.	N,O	2
Prepare grazing prescriptions consistent with the Van Vleet model for the Suitts and St. Walburga properties.	N,L	2
Exclude grazing (except for weed management) from the northern portion of the Klein property (along Dry Creek and the prairie dog Habitat Conservation Area).	N,O	2
Develop alternative routes of moving cattle around and over Davidson Mesa (in the spring) between winter pastures (Van Vleet properties) and the summer pastures (Stengel and other southern properties). Alternate routes are necessary to provide rest for short- and mixed grass vegetation that is influenced by annual grazing the same way.	N,L	2
<i>Fencing</i>		
Install or realign fences to protect resources and better manage grazing in or near riparian areas along the South Boulder Creek, Dry Creek, and Fourmile Canyon Creek floodplains.	N,L	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Fence the riparian area (corridor) of South Boulder Creek from South Boulder Road to U.S. 36. Locate the fence between the trail and creek.	N,L	1
Fence the riparian area (corridor) south of U.S. 36 to Fancher on the east side of the creek	N,S	2
Fence Suitts pond to help manage cattle grazing in the area.	N,S	1
Install fence on Fancher to exclude grazing which will facilitate vegetation recovery and protect Preble's meadow jumping mouse habitat.	N,S	2
Evaluate the existing fence alignments on Gallagher and Lousberg. Identify ways to re-fence the properties to maximize cropland production and wetland protection.	N,L	2
Evaluate the Gallagher and Nu-West properties for new fencing alignments that will enhance rotational grazing and haying opportunities (1/3 hayed and 2/3 grazed).	N,L	2
Evaluate other properties such as Colorado Open Lands, Short and Milne, and others for needed fencing to facilitate improved natural resource management.	N,L	2
Fence the boundary of the Clough property and the Aweida II property.	N,S	2
Evaluate the Lewis, Cohagen, and Methvin properties for new fencing alignments that will enhance grazing and haying opportunities. In conjunction with fencing alignments, re-ditch field laterals to make the irrigated fields consistent with the fenced fields.	N,S	2
Construct fence on the McKenzie property after seeking to accommodate agriculture, wildlife (prairie dogs), and passive recreational needs with new alignments.	N,S	2
Realign fences on Suitts and St. Walburga properties.	N,S	1
Remove north-south boundary fence between Suitts and St. Walburga property.	N,S	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
<i>Vegetation Management</i>		
Continue prescribed grazing to assist with control of non-native weed management and to reduce the buildup of thatch, to improve potential Ute ladies'-tresses orchid habitat, and to maintain current orchid habitat. Carefully monitor the use of grazing to control the infestations of non-native weeds, and reduce grazing pressure whenever such reduction seems wise and appropriate in the interests of better habitat management.	C,L	1
Maintain irrigated grasslands to support the populations of the Ute ladies'-tresses orchid.	C,L	1
Maintain irrigated grasslands to support tallgrass communities and irrigated hay pastures.	C,L	1
Continue to coordinate and evaluate the effectiveness of the timing of haying to protect ground-nesting birds and the reproduction of Ute ladies'-tresses.	C,L	1
Seed the Clough and East St. Walburga properties to native grass.	N,L	2
Work with lessees to evaluate the feasibility of excluding grazing from the second field south of U.S. 36 on the Van Vleet property for 3 years.	N,O	2
<i>Exotic Plant Species and Insect Pests</i>		
Adjust grazing schedules to assist with Integrated Pest Management.	C,L	1
Collaborate efforts with Open Space staff to schedule short-term, intensive grazing on Burke II in the northeast corner to reduce Canada thistle infestations.	C,O	1
Encourage alternative, non-chemical control of weeds and insect pests on irrigated crop lands, particularly on the McKenzie and Baseline 75 properties which produce annually harvested crops.	C,O	2
Continue to maintain spray-free buffers around schools and other sensitive areas.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Coordinate with Integrated Pest Management to develop and implement a rotational system of haying and grazing for the Nu-West and Andrus properties that will reduce teasel and Canada thistle infestations.	C,O	2
Research Needs		
Continue to research and evaluate the feasibility of developing organic/natural farming opportunities in the Management Area, including the Baseline 75 property.	N,L	3
Review the report <i>Feasibility of Converting City of Boulder Open Space Agriculture Properties to Organic and Natural Production Operations</i> for its strengths and weaknesses. Prepare recommendations for additional research based on data gaps.	N,S	3
Work with Boulder County on efforts to develop a range inventory and monitoring program that will help track regional vegetation health.	C,L	2
Complete an inventory of existing and potential livestock watering locations. The results of this analysis should be analyzed in conjunction with the completed fence inventory and recommendations.	N,S	3
Objective #2: Use agricultural facilities as appropriate and make improvements to the facilities so that benefits are maximized.		
Improve hay storage facilities, corrals, irrigation infrastructure, fences, and gates as needed.	C,O	2
Evaluate potential alternative livestock water sources:	C,O	1
• Merle-Smith	N,S	2
• Suitts property	N,S	1
• west Church	N,S	2
• Van Vleet property near the Harf barn	N,S	1
• Church of Christ property	N,S	2
• Lousberg and Gallagher properties for wetland protection	N,S	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Evaluate the feasibility of reactivating domestic wells on Jirkovsky and/or City on the Hill to assist with prescriptive grazing objectives.	N,S	3
Evaluate the potential of establishing a pipeline and stock tank from the Merle-Smith property to the Aweida II property to create a new water source.	N,S	2
Provide livestock water development on the Lewis, McKenzie, Aweida II, and Merle-Smith properties.	N,S	3
Build new structures where necessary to maintain agricultural operations.	N,O	2
<i>Objective #3: Use the City's adjudicated water rights effectively and efficiently to sustain the natural values of the area.</i>		
Utilize water rights or ditch company shares to ensure sustainable agricultural operations or to maintain or enhance instream flows and high-quality wetlands and sensitive species.	C,O	1
Acquire additional water rights or ditch company shares where needed to ensure sustainable agricultural operations or to maintain or enhance instream flows, high-quality wetlands, and sensitive species and plant communities.	C,O	1
Work with ditch companies to implement Best Management Practices to ensure that ditch maintenance activities do not adversely affect natural resource values.	C,O	1
Work with ditch companies to ensure that when new headgates and diversion structures are installed or old headgates and diversion structures are refurbished that the design accommodates fish passage if appropriate.	C,O	2
Coordinate and communicate with the Water Quality Division of the City Utilities Department to identify and implement agricultural Best Management Practices to prevent water quality degradation.	C,O	2
Identify and monitor sources of water quality impairment.	C,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Track Gross Reservoir relicensing to help ensure that reservoir operations avoid adverse impacts to the City's Open Space water resources and natural resource interests.	C,O	1
Track the development of the University of Colorado Gateway property to ensure that development does not adversely affect water flows and natural resources on adjacent Open Space properties.	C,O	2
Coordinate irrigation schedules with weed management, native plant, and wildlife management schedules.	C,O	1
<i>Maintain and Replace Water Supply Facilities to Allow Efficient Water Delivery Consistent with Natural Resource Protection Goals</i>		
Use the water resources inventory to prioritize water infrastructure improvements to increase long-term irrigation efficiency consistent with natural resource management goals.	O,L	1
Design and build headgates and field laterals to reestablish irrigation on the Andrus Property and Colorado Open Lands.	N,S	1
Design and build new headgate on the McGinn Ditch along with appurtenant facilities to provide for more efficient irrigation on the east side of the St. Walburga property.	N,S	1
Evaluate the water quality of the Church Mine No. 1 and No. 2 to determine if its use is suitable for long-term agricultural uses.	N,S	2
Evaluate and build the irrigation system improvements at the Suitts/Klein/St. Walburga properties to integrate and improve water efficiency and management.	N,S	1
Construct a headgate at the Ute Industrial Park property to facilitate the reclamation of the area.	N,S	1
Evaluate Suitts pond for the installation of a pond level regulator.	N,S	3
Evaluate the use of East Boulder Ditch for irrigating the Burke I property.	N,S	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
The headgates that serve the Lousberg, Gallagher, and Nu-West properties from Farmers Ditch are in an advanced state of disrepair and should be replaced.	N,S	1
Construct a headgate at the Burke I property on Enterprise Ditch to reestablish irrigation at that location.	N,S	2
Design/construct the appropriate facilities to irrigate Lousberg and Gallagher as a single operating unit. Replace appropriate irrigation structures on these properties.	N,S	1
Evaluate the use of the Orcine Ditch on the Gallagher property for wetland enhancement and livestock watering.	N,S	2
Line lateral on the Belgrove property with concrete or construct several drop structures to control soil erosion at the site.	N,S	1
Install gated pipe for use in irrigating the Baseline 75 property and for filling in the eroded field laterals.	N,S	1
Design and build a water division structure in the Enterprise Ditch on the Aweida II property to better supply water to the Lewis property.	N,S	2
Work with the Dry Creek No. 2 Ditch company to ensure that work on the University of Colorado Gateway property does not adversely affect water distribution through and from the ditch.	C,O	1
Evaluate needs to improve irrigation via the Dry Creek No. 2 Ditch, particularly on the Mary Clyncke property.	N,S	1
Perform routine maintenance, such as periodic re-ditching, on field laterals to ensure efficient water delivery.	C,O	1
Complete inventory of wells, stock ponds, seeps, and springs for properties in the Management Area.	C,L	2
Collect hydrologic data for Dry Creek to support resource management planning.	N,L	3

Management Goals, Objectives, and Actions	Timing Code:	Tier Designation: 1 = higher 2 = medium 3 = lower
	N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing	
<i>Protect the City's Adjudicated Water Rights and Investment in Ditch Companies</i>		
Monitor the effectiveness of the irrigation improvements and modify water management.	C,L	1
Diligently protect irrigation facilities by performing routine maintenance and care (e.g., ditch burning, emergency repairs, headgate repair).	C,O	1
Maintain, upgrade, and replace the water structures (wells, springs, stock tanks) or add new structures.	C,L	1
Utilize irrigation facilities inventory for the Management Area to prioritize capital improvement projects.	C,L	1
Track ditch companies and ditch maintenance activities to ensure that Open Space receives its allocation of water and that natural resource values are not adversely affected.	C,O	1
Design and implement a program of water measuring for agricultural properties to improve irrigation efficiency consistent with natural resource management goals.	N,L	1
Continually evaluate the effects of irrigation improvements on quality wetlands in the Management Area (i.e., use adaptive management).	C,L	1
Monitor water rights issues to determine the effects of planned infrastructure improvements.	C,O	1
Determine best location for use for water from Enterprise Ditch and construct headgates and appurtenant facilities for its use.	C,L	1
Evaluate, design, and build irrigation facilities to assure a viable, long-term agricultural operation and improve water distribution.	C,O	1
Evaluate, design, and build irrigation facilities serving the Lousberg and Gallagher properties. (These properties were operated separately prior to Open Space purchase.)	N,S	1
Utilize irrigation infrastructure inventory to schedule maintenance and replacement of irrigation facilities.	N,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Conduct an inventory of all wells, ponds, springs, and other water sources in the Management Area.	N,L	2
Represent Open Space interests at ditch company annual shareholder meetings and other related meetings.	C,O	1
PASSIVE RECREATION GOAL: Manage and preserve land for passive recreation use, its aesthetic or passive recreational value, and its contribution to the quality of life of the community.		
<i>Objective #1: Provide a variety of appropriate quality passive recreational activities, outdoor education opportunities, and visitor services where consistent with overarching environmental values.</i>		
Provide opportunities for a variety of passive recreational activities in appropriate areas and continue to encourage on-trail use.	C,O	2
Evaluate and designate appropriate activities on any new trails constructed within South Boulder Creek.	N,S	2
Provide a trail system for appropriate passive recreational activities within South Boulder Creek.	C,O	1
Evaluate and designate appropriate fishing areas within South Boulder Creek. Designated fishing areas within South Boulder Creek include KOA Lake, Pit D on Colorado Open Lands, Boulder Creek, and South Boulder Creek.	C,O	2
Work with the Colorado Division of Wildlife to determine appropriate fishing regulations for designated fishing areas.	N,S	2
Work with model glider pilots to minimize impacts until formal policies are developed in the Visitor Use Plan.	C,S	2
Integrate appropriate management actions from a system-wide visitor use plan when completed.	N,S	2

<p align="center">Management Goals, Objectives, and Actions</p>	<p>Timing Code:</p>	<p>Tier</p>
	<p>N = new C = current <hr style="border-top: 1px dashed black;"/> S = short-term L = long-term O = ongoing</p>	<p>Designation: 1 = higher 2 = medium 3 = lower</p>
<p>Implement provisions of the City’s Dog Management Plan applicable to South Boulder Creek. New recommendations to the City’s dog management for South Boulder Creek include:</p> <ul style="list-style-type: none"> • continuing the prohibition of dogs on the section of South Boulder Creek Trail south of South Boulder Road • allowing dogs in voice and sight command on Cherryvale Trail and the access trail along the south side of South Boulder Road (currently inside the City limits and technically a leashed area) • revise existing dog regulations in prairie dog Habitat Conservation Areas within South Boulder Creek to reflect management direction from the City’s Dog Management Plan and the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i>. These revisions include prohibiting dogs in the Habitat Conservation Areas and some immediate surrounding areas on Ute Industrial Park, Gallagher, part of Klein (Dry Creek), Belgrove, Suitts South, Marshall, and Gallucci since there are no designated trails in these areas. Sections of the designated trails at Dry Creek and Cottonwood will be rerouted to the perimeter of the Habitat Conservation Areas and fenced to separate use from the prairie dog areas. Dogs will be required to be on a hand-held leash in the Habitat Conservation Area and immediate surrounding areas on Andrus and James properties. Dogs will continue to be allowed in voice and sight control on the trail corridors near the Habitat Conservation Areas at Dry Creek (the first part of Dry Creek Trail) and McKenzie (the first part of the Cottonwood Trail just north and south of Independence Road) but will not be allowed outside designated trail corridors in these areas. Dogs will continue to be allowed in voice and sight control on the northern portion of the Cottonwood Trail (near Jay Road), but will be separated from the prairie dog Transitional Area with fencing. 	<p>C,O</p>	<p>1</p>

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Work with volunteers and user groups to ensure compliance and monitor the effectiveness of the proposed dog management policies.	C,O	1
Develop surveys or public involvement processes to determine the types and quality of passive recreational experiences desired.	C,O	3
Establish and provide appropriate levels of service for facilities such as trailheads and dog excrement pick-up stations. Monitor service levels provided and visitor use patterns to meet changing needs.	C,O	2
Incorporate American Disabilities Act standards into existing and new passive recreational facilities (trails, trailheads, benches, signs, etc.) whenever possible and reasonable.	C,O	1
<i>Objective #2: Preserve scenic vistas and undeveloped views.</i>		
Design and locate new trails to provide scenic vistas and minimize their visual impacts to surrounding lands	N,S	1
Use natural trail surfacing whenever possible to minimize the visual impacts of trails.	N,S	3
Continue to acquire lands that provide scenic vistas and urban buffers. Priority areas for acquisition within South Boulder Creek include, but are not limited to, private lands along the Boulder-Longmont Diagonal Highway, private lands along U.S. 36 near Louisville and Davidson Mesa, and private lands along South Boulder Road.	C,O	1
<i>Objective # 3: Provide trails, access points, and passive recreational facilities to accommodate appropriate uses and to connect with adjacent trail systems.</i>		
Encourage visitors using South Boulder Creek Trail to park at Cherryvale Trailhead. Parking will be discouraged along the east and west sides of Marshall Road (at the southern terminus of the newly completed section of South Boulder Creek Trail) to prevent vehicles from blocking emergency access gates and minimize conflicts with adjacent landowners.	N,S	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Further evaluate potential options for trails which would provide a connection from South Boulder Creek Trail to Dry Creek Trail and northeast to East Boulder Trail.	N,S	1
Reroute the existing Dry Creek Trail to the northern perimeter of the Habitat Conservation Area (in the front or eastern field) and formally designate and improve a portion of the undesignated loop trail to provide trails and appropriate dog activities (in the second or western field).	N,S	1
Use the designated trail to the eastern perimeter of the Habitat Conservation Area and close and reclaim the southwest section of the Cottonwood Trail (just north of Independence Road and the Cottonwood Trailhead) to separate passive recreational use from the prairie dog areas. This trail reroute will minimize conflicts with dogs and wildlife within the Habitat Conservation Area and allow dogs to remain in voice and sight control. Monitor the northern portion of Cottonwood Trail (near Jay road) for wildlife harassment from dogs and if needed, place fence to separate the trail from the prairie dog Transitional Area.	N,S	1
Further evaluate potential options for trail connections from South Boulder Creek Trail to Dry Creek Trail. Open Space will evaluate the feasibility of acquiring easements or fee ownership of lands north of Baseline Reservoir to provide a trail from Dry Creek to South Boulder Creek Trail connecting somewhere in the vicinity of Baseline and Cherryvale Roads. If these lands are unavailable or the alignment has to be placed adjacent to the road, additional analysis of trail options south of Dry Creek Trailhead will be conducted. If impacts from various alignments on Open Space are determined to be unacceptable, this connection may not be completed, or an already existing on-street route on Baseline may be used.	C,L	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Further evaluate potential options for a trail which would provide a connection from Dry Creek Trail northeast to East Boulder Trail. This trail proposal, if determined to be suitable, should be constructed in its entirety from Dry Creek Trailhead to South Teller Trailhead to avoid the need for a new trailhead along 75th Street. A suitable conceptual alignment is currently available on the Open Space lands west of 75th Street to Dry Creek Trailhead. The Open Space lands east of 75th Street are not a part of this Management Area and have not been evaluated.	C,L	2
Do not pursue further evaluation of other trail alternatives identified in the South Boulder Creek planning process at this time.	C,L	2
Determine appropriate accesses for private subdivisions. Work with residents of Greenbelt Meadows Subdivision to designate a trail which would provide access from the east side of their subdivision to the surrounding Open Space lands and to designated trails in the area. Residents of Wildflower Ranch will be allowed to continue access to surrounding Open Space lands by using the perimeter gate at the north end of their subdivision.	N,S	1
Strongly encourage use of designated access points.	N,S	1
Monitor new residential development through the City and County review processes and designate access points and trails if appropriate.	C,O	2
Evaluate future trail and access needs and cooperate with other public agencies on City, County, and Boulder Valley regional trail plans.	C,O	2
Assist Boulder County Parks and Open Space on evaluating and providing a connection from Cottonwood Trail to Twin Lakes area.	N,S	3

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Monitor existing access points for problems (development of undesignated trails, parking capacity at trailheads, roadside parking, vandalism, need for additional dog stations and services) and take appropriate actions to resolve these problems.	C,O	1
Reduce the impacts of providing large parking areas and impacts caused by overflow parking on adjacent lands by encouraging use of alternative modes of transportation to Open Space access points and trails. Work with the Regional Transportation Division to develop bus stops to designated trails and trailheads and encourage use of existing bus stops (Bobolink and Dry Creek Trailheads). Open Space will work with the Tributary Greenways Program and the City of Boulder and Boulder County Transportation to ensure appropriate alternative transportation routes are available to access designated Open Space trails and trailheads. Priority areas for providing alternative transportation routes are the Pearl Parkway corridor and connecting lower Fourmile Canyon Creek to Cottonwood Trail. Other areas include the Boulder-Longmont Diagonal Highway right-of-way and a route along U.S. 36 right-of-way from Louisville.	N,S	2
Develop criteria for creation and placement of passive recreational facilities within the Visitor Use Plan.	N,S	1
Objective #4: Provide safe passive recreational experiences.		
Design and construct new trails to accommodate appropriate uses and minimize safety hazards.	N,S	1
Improve and maintain existing trails to accommodate appropriate uses. The underpass at South Boulder Road will be improved to alleviate muddy conditions.	C,O	1
Designate appropriate passive recreational activities on trails to minimize interactions between various trail users (see Objective 10.4.1).	C,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Establish regular inventory, monitoring, and maintenance of trails, access points, passive recreational facilities, and high-use areas to ensure safety hazards and maintenance needs are identified and corrected in a timely manner.	C,O	1
Promote responsible use and trail etiquette through educational programs, signs, brochures, coordination, and outreach with user groups, field contacts with staff, and volunteer programs to minimize conflicts (see Education and Outreach chapter).	C,O	1
Post warning notices or close trails temporarily for safety purposes as needed (bubonic plague outbreaks, periods of intense agricultural operations, application of herbicides, flooding, wildlife conflicts, etc.).	N,S	1
To improve visitor safety, request striping and pedestrian signs at the grade crossing where the Tributary Greenways Program trail connects with 55th Street near the East Boulder Community Center and any future trail connections which may cross roadways.	C,O	1
<i>Objective #5: Minimize passive recreational impacts to natural, cultural, and agricultural resources.</i>		
Minimize passive recreational impacts by focusing public education and outreach on awareness and understanding of the natural, cultural, and agricultural resources located within South Boulder Creek.	C,O	2
Continue to encourage and fund research on recreational influences on Open Space lands.	C,O	1
Monitor visitor use and evaluate recreational impacts on wildlife, vegetation, and agricultural activities.	C,O	1
Strongly encourage use of designated trails and access points.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Direct visitor use away from sensitive areas by closing and reclaiming undesignated trails and access points. Priority areas for discouraging visitor use and removing pedestrian gates include the Gallucci property (a Habitat Conservation Area) and off-designated trail areas on the Burke I, Burke II, and Gebhard properties (these properties contain extensive wetlands, tallgrass communities, rare plant species, and ground-nesting bird habitat). Direct recreational use away from the Open Space lands south and east of Baseline Reservoir (the Suitts and St. Walburga properties) to prevent potential impacts to wintering bald eagles, raptors, Preble’s meadow jumping mouse, wetlands, tallgrass communities, and Ute ladies’-tresses habitat.	C,O	1
Post warning notices, restrict inappropriate recreational activities, or close trails temporarily for protection of wildlife during vulnerable times of life cycles (e.g., nesting).	C,O	1
Route potential new trails away from sensitive areas to prevent fragmenting plant and animal habitat.	C,S	1
Provide well-defined and drained trail surfaces to prevent trail braiding.	C,O	1
PUBLIC SAFETY AND RESOURCE PROTECTION GOAL: Protect and maintain natural and cultural resources and provide for public safety while educating visitors and enforcing laws.		
<i>Objective #1: Improve levels of service and coverage to enhance emergency response for medical, fire, flood, and law enforcement incidents.</i>		
Continue to provide 24 hour emergency response.	C,O	1
Use bike and horse patrol, where appropriate, to enhance response time and coverage.	C,O	2
Develop and implement a program for seasonal rangers to augment peak season coverage.	N,O	1
Attend appropriate medical, fire, and law enforcement trainings to maintain and improve skills.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Coordinate with other law enforcement agencies on a regular basis to discuss specific problems and conduct joint operations.	C,O	2
Encourage and provide emergency training for all Open Space staff (wildland fire training and first aid) to ensure adequate personnel are available for emergency response.	C,O	2
<i>Objective #2: Continue to enforce laws, including state hunting and fishing regulations and local laws.</i>		
Maintain law enforcement certifications.	C,O	1
Maintain ability to enforce applicable Division of Wildlife fish and game statutes.	C,O	2
Focus patrol in problem areas and areas with changing seasonal regulations.	C,O	1
<i>Objective #3: Enhance patrol activities to educate the public, monitor natural and cultural resource impacts, and respond to visitor conflicts with the ultimate objective of proactively reducing the need for future enforcement.</i>		
Improve levels of back-country coverage.	N,O	2
Develop consistent monitoring procedures to detect changes to sensitive resources.	N,O	2
Coordinate with the Education and Outreach Division to help disseminate educational information that reflects new management concerns.	C,O	2
Increase awareness and compliance of regulations designated to protect wildlife and livestock from harassment.	C,O	1
Monitor voluntary wildlife exclosures including grassland bird nesting closures.	C,O	2
<i>Objective #4: Improve levels of patrol to increase awareness and compliance with agreements in the Dog Management Plan.</i>		
Provide opportunities to educate public through contacts while on patrol as well as through the educational programs.	C,O	2
Use seasonal rangers to help with education and enforcement of dog regulations in areas with high dog use.	N,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier Designation: 1 = higher 2 = medium 3 = lower
	N = new C = current ----- S = short-term L = long-term O = ongoing	
Focus patrol in problem areas when needed.	C,O	1
<i>Objective #5: Evaluate public safety hazards such as mine subsidence areas, flood hazards, tree hazards, and wildlife interactions.</i>		
Identify high risk areas on Richardson I property, work with the Colorado State Mine Reclamation Division to seal high risk areas, review remaining hazards with the City’s risk attorney, and post warning signs at appropriate locations on all property.	C,S	1
Work with appropriate agencies to evaluate safety hazards (tree hazards, and wildlife interactions) and take appropriate precautions.	C,O	1
Patrol areas regularly to identify public safety concerns and inform appropriate Open Space Program personnel. Regularly inspect undermined areas on Richardson I, Hogan Brothers, Damyanovich, and Church properties. Non-routine inspections should be conducted during unusually moist times of the year. Work with Colorado State Mine Reclamation Division and the City’s risk attorney to take appropriate actions.	C,O	1
Continue to coordinate with other agencies to implement local Emergency Services protocols (e.g., floods).	C,O	2
Post warning notices or close trail temporarily for safety purposes as needed (bubonic plague outbreaks, mountain lions, bears, periods of intense agricultural operations, application of herbicides, mine subsidence areas, and others).	C,O	1
EDUCATION AND OUTREACH GOAL: Establish education and management measures in a reasonable, responsible, timely way to ensure that the Open Space system remains ecologically, agriculturally, and recreationally viable.		
<i>Objective #1: Disseminate information concerning the ecology, natural history, and cultural history of the area.</i>		
Continue educational programming on natural and cultural history.	C,O	2

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Disseminate additional information on focus topics including stay-on-designated trail, dog management, agriculture, prairie dogs, rare plants and animals, wetlands, and weed infestation and control.	N,L	2
Increase the number of on-site education and outreach activities held in the area.	N,O	2
Coordinate with natural resource staff to produce wildlife brochures.	N,O	2
Develop and install interpretive signs in several locations along the South Boulder Creek and Dry Creek Trails to inform visitors about the native grass, rare plant and animal, agriculture, and wetland communities.	N,S	2
Develop a raptor brochure which educates visitors on the importance of raptors and the reason for closure restrictions.	N,S	3
Work with Tributary Greenways Program to develop and install interpretive signs along the Bobolink section of the Tributary Greenways Program trail. The Tributary Greenways Program has agreed to finance the production and installation of these signs.	N,S	1
Work cooperatively with the Colorado Division of Wildlife to develop and install interpretive signs about prairie dogs on the Gallucci property at the U.S. 36 scenic overlook and at the Dry Creek Trail.	N,S	1
Evaluate appropriate sites for a "watchable wildlife" station, including the Ute Industrial property.	N,S	2
<i>Objective #2: Disseminate information concerning the goals, projects, and operations of the Open Space Program.</i>		
Disseminate information and educate the public on revised regulations and management direction for South Boulder Creek through on-site programming, in-field contacts with staff, and a document to summarize the South Boulder Creek Area Management Plan.	N,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier
	N = new C = current ----- S = short-term L = long-term O = ongoing	Designation: 1 = higher 2 = medium 3 = lower
Distribute information on noxious weeds, impacts, spread, and control.	N,O	1
Educate agencies and public on the value of weed-free products.	C,O	2
Use staff and volunteers in the field to educate and inform the public on regulations.	C,O	1
Develop and install signs for new dog regulations.	N,S	1
Coordinate with staff to design studies and collect data on resource inventories.	C,O	2
Continue to utilize information boards and brochure boxes.	C,O	2
Develop and distribute a brochure on the South Boulder Creek area which will interpret the natural, cultural, and agricultural resources, identify trails and access points, and inform visitors of regulations.	N,O	2
Provide information on the restoration of native plant and animal communities.	N,O	3
Continue to install welcome signs at major access points.	C,S	2
Develop educational signs to help visitors understand visitor/wildlife interactions. Priority topics include the importance of swallow nesting sites at underpasses and ways to minimize conflicts.	N,S	2
Develop educational materials on prescribed burn program.	N,S	2
<i>Objective #3: Disseminate information about the situations that arise when humans interact with natural systems and about ways of lessening or eliminating the impact of these interactions.</i>		
Conduct "Do the Wild Thing...Leave No Trace on Open Space" pilot educational project in the Management Area to educate visitors on ways to reduce their impacts to natural resources and reduce conflicts between visitors, including riparian habitats, prairie dogs, raptors, and amphibians.	C,O	1
Continue to distribute the "Keeping Boulder's Open Space a Special Place" brochure.	C,O	1

Management Goals, Objectives, and Actions	Timing Code:	Tier Designation:
	N = new C = current ----- S = short-term L = long-term O = ongoing	1 = higher 2 = medium 3 = lower
Use field staff and volunteers to contact visitors about trail etiquette to reduce conflicts.	C,O	1
Disseminate information (field staff and signs) on the provisions of the Dog Management Plan. This includes information on risks to dogs and people from bubonic plague.	O,S	1
Develop and install signs to encourage on-trail use, particularly in sensitive areas.	O,S	1
Work with user groups to disseminate information to their members.	C,O	3
<i>Objective #4: Conduct projects and activities that provide opportunities for people to establish a relationship with the Open Space Program and land system.</i>		
Continue to have field staff and volunteers conduct outreach activities which target specific management goals.	C,O	1
Train staff about specific topics to communicate to visitors.	C,O	2
Work with staff to develop outreach topics on resource management.	C,O	2
Communicate annually with other agencies to coordinate education and outreach opportunities of mutual interest.	C,O	3
Identify neighbors, adjacent landowners, and community groups to establish and continue working relationships.	N,O	3
<i>Objective #5: Engage in public participation processes which provide opportunities for public input and involvement in Open Space planning and decision making.</i>		
Develop and implement public participation mechanisms and facilitate community involvement.	C,O	1
<i>Objective #6: Identify goals and priorities for volunteer programs in South Boulder Creek and implement these programs with neighbors, visitors, and interest groups.</i>		
Continue to utilize volunteers to supplement staff in attaining the management goals of this Plan.	C,O	2
Utilize volunteers to assist with research on recreational impacts to resources.	C,O	2

PLAN CONTRIBUTORS

SOUTH BOULDER CREEK MANAGEMENT AREA INTERDISCIPLINARY TEAM MEMBERS

Bob Crifasi (Water Resources Specialist) - water resource analysis and management

Don D'Amico (Environmental Planner) - wetlands/riparian analysis and management; coordination of wetland/riparian issues (permits, Best Management Practices)

Laurie Deiter (Natural Resource Specialist) - coordination of integrated pest management

Cindy Hansen (Education/ Outreach Specialist) - community outreach and education opportunities and overall coordination with the Education Outreach Division

Matt Jones (Open Space Planner) - project manager; public outreach and contact; cultural resources manager

Jean Koszalka (Ranger II) - coordination of emergency activities, patrol activities, and public contact

Dave Kuntz (Planning Supervisor) - planning context; coordination with administrative staff and Open Space Board of Trustees; and integrating project into Open Space Program's work program

John Leither (Trails Coordinator) - trail and facility management; overall coordination with Land Management staff

Sean Metrick (Technical Research Assistant) - cartography and Geographic Information System analysis

Doug Newcomb (Property Agent) - real estate/property/easement information and related issues

Anne Oyer (Wildlife Biologist) - wildlife management

Andy Pelster (Resource Specialist) - agricultural resource management; lease manager

Lynn Riedel (Plant Ecologist) - vegetation analysis and management; coordination of integrated pest management and fire management

Kerri Vierling (Wildlife Biologist) - wildlife management; coordination of research needs

Brent Wheeler (Environmental Planner) - passive recreation and cultural resource management

Other Plan Contributors

Many other staff members, surrounding agencies, consultants and volunteers were involved in collecting information and completing inventory reports. Other significant contributors include:

Roy Bell (Natural Resource Specialist) - soil information and agricultural resources

Brett Davis (Integrated Pest Management Technician) - Geographic Information System support

Ann FitzSimmons (Administrative Assistant) - document editing

Geographic Information System Lab: Robert Grover, Jeff Holland, Sean Metrick, and Jon Osborne - fieldwork, maps, and data development

Pete Gleichman (consultant, Native Cultural Services) - cultural resource recommendations

Mark Grundy (Natural Resource Specialist) - agricultural resources

Todd Kipfer (Technical Research Assistant) - cartography and Geographic Information System analysis

Mary Lovrien (Administrative staff) - document editing

Bryan Pritchett (Natural Resources Manager) - coordination with natural resources and administrative staff and integrating project into work programs

Cary Richardson (Wildlife Biologist) - wildlife management

Colleen Scanlon-Lyons (Resource Planner) - public outreach and contact

Delani Wheeler (Deputy Director) - historical perspectives on Open Space acquisition and management

Open Space Board of Trustees: plan guidance and approval

Current members are: Linda Andes-Georges, Suzanne Bohan, Crystal Gray, Jon Howard, Christopher Mueller

Past members involved with the South Boulder Creek Area Management Plan include Dave Bones and Allen Crockett

REFERENCES

- Baker, W.L. and S.M. Galatowitsch. 1985. The Boulder tallgrass prairies. In: M. Figgs and N. Lederer, editors. Publication No. 3, Boulder County Nature Association.
- Bestgen, K. 1997. Long term monitoring of fish populations and habitat of South Boulder Creek, Colorado, within the City of Boulder open space property. Unpublished report. City of Boulder Open Space Department.
- Boulder County Land Use Staff. 1986. Revised 1995. Boulder County comprehensive plan. Environmental resources element.
- Bunin, J.E. 1985. Vegetation of the City of Boulder, Colorado open space lands. Natural Science Associates, Inc. Unpublished report. City of Boulder Open Space Department.
- City of Boulder. 1995. Open Space long range management policies. City of Boulder Open Space Department.
- City of Boulder. 1996a. Boulder fire department master plan. City of Boulder Fire Department.
- City of Boulder. 1996b. Boulder Valley comprehensive plan. City of Boulder Department of Community Design, Planning, and Development.
- City of Boulder. 1996c. City of Boulder grassland management: black-tailed prairie dog habitat conservation plan. City of Boulder Open Space Department.
- City of Boulder. 1996d. North Boulder Valley inventory report. City of Boulder Open Space Department.
- City of Boulder. 1996e. Wildland fire management operations plan: personnel and equipment mobilization guide. City of Boulder Fire Department.
- City of Boulder. 1997a. North Boulder Valley area management plan. City of Boulder Open Space Department.
- City of Boulder. 1997b. South Boulder Creek management area inventory report. City of Boulder Open Space Department.
- City of Boulder. Undated. City of Boulder integrated pest management policy.
- Colorado Natural Areas Program. 1986. Colorado tallgrass prairie management plan, City of Boulder open space. Unpublished report. Colorado Natural Areas Program.

Colorado Natural Areas Program. 1998. Bonnie Prairie state natural area management plan. Colorado Natural Areas Program.

Colorado Natural Heritage Program. 1997. Colorado's natural heritage: rare and imperiled animals, plants, and natural communities. Volume 3 Number 1. Colorado State University, Fort Collins.

ERO Resources, Inc. 1996. Environmental review of South Boulder Creek management area. Prepared in association with Stoecker Ecological Consultants. City of Boulder Open Space Department.

Gleichman, P.J. and S.C. Phillips. 1997. Cultural resources of City of Boulder open space, South Boulder Creek, Boulder County, Colorado. Unpublished report. City of Boulder Open Space Department.

Hammit, W.E. and D.N. Cole. 1987. Wildland recreation: ecology and management.

Hydrosphere, Inc. 1994. Review draft South Boulder Creek instream flow enhancement study. Unpublished report. City of Boulder Open Space Department.

Lelewi, M.H. 1994. Feasibility of converting City of Boulder open space agricultural properties to organic and natural production operations. Unpublished Report. City of Boulder Open Space Department.

McLendon, T. and E.F. Redente. 1992. Effects of nitrogen limitation on semiarid sagebrush site. *Oecologia* 91:312-317.

McGregor, R.L., coordinator; T.M. Barkley, R.E. Brooks and E.K. Schofield, editors. 1986. *Flora of the Great Plains*. The Great Plains Flora Association, University Press of Kansas.

Miller, S.G., R.L. Knight, and C.K. Miller. 1998. Influence of recreational trails on breeding bird communities. *Ecological Applications* 8(1):162-169.

Moir, W.H. 1972. Tallgrass prairie in Colorado and its aesthetic value. In: J.H. Zimmerman, editor. *The Second Midwest Prairie Conference*. University of Wisconsin Arboretum, Madison.

Richardson, C.T. and C.K. Miller. 1997. Recommendations for protecting raptors from human disturbance: a review. *Wildlife Society Bulletin* 25(3):634-638.

Rutledge, C.R. and T. McLendon. 1996. An assessment of exotic plant species of Rocky Mountain National Park. Colorado State University, Fort Collins.

Sinton, P.J. 1997. Soil carbon isotope measurements as an index of change in C₃ and C₄ species in Boulder open space grasslands. Honors thesis. Department of Environmental, Population, Organismic Biology, University of Colorado, Boulder.

Soil Conservation Service. 1982. Colorado important farmland inventory. U.S. Department of Agriculture.

Stubbendieck, J. et. al. 1994. Weeds of Nebraska and the Great Plains. Nebraska Department of Agriculture.

U.S. Fish and Wildlife Service. 1995. Ute ladies'-tresses (*spiranthes diluvialis*) agency review draft recovery plan. U.S. Fish and Wildlife Service, Denver, Colorado.

Veblen, T. 1996. Fire ecology in the wildland/urban interface of Boulder County. Unpublished report. City of Boulder Open Space Department.

Whitson, T.D. et. al. 1992. Weeds of the West. Western Society of Weed Science.

APPENDICES

APPENDIX 1.1 CHARTER OF THE CITY OF BOULDER, COLORADO ARTICLE XII. OPEN SPACE SEC. 176. OPEN SPACE PURPOSES: OPEN SPACE LAND

The management of Open Space lands is guided by the City of Boulder Charter, as approved by the City of Boulder voters in 1986. Open Space land shall be acquired, maintained, preserved, retained, and used only for the following purposes:

- Preservation or restoration of natural areas characterized by or including terrain, geologic formations, flora, or fauna that is unusual, spectacular, historically important, scientifically valuable or unique, or that represent outstanding or rare examples of native species
- Preservation of water resources in their natural or traditional state, scenic areas or vistas, wildlife habitats, or fragile ecosystems
- Preservation of land for passive recreation use, such as hiking, photography or nature study, and, if specifically designated, bicycling, horseback riding, or fishing
- Preservation of agricultural uses and land suitable for agricultural production
- Utilization of land for shaping the development of the City, limiting urban sprawl and disciplining growth
- Utilization of non-urban land for spatial definition of urban areas
- Utilization of land to prevent encroachment on floodplains
- Preservation of land for its aesthetic or passive recreational value and its contribution to the quality of life of the community

APPENDIX 1.2 PUBLIC COMMENT RESPONSE SUMMARY--SOUTH BOULDER CREEK AREA MANAGEMENT PLAN

Responses to public comments and suggestions are provided below. They include comments from both the Revised Draft Management Plan and General Management Direction established in February, 1998. The first column paraphrases and summarizes the comment or issue. Sometimes two comments are listed representing different view points; these differing comments are separated by a short dashed line. The second column describes the Open Space staff response and how the Management Plan addresses the comment. The third column explains the rationale behind the response. The comments are grouped and ordered in categories that correspond to the chapters in the Management Plan. Please see the Management Plan and the *South Boulder Creek Management Area Inventory Report* (City of Boulder 1997b) for more information.

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>GENERAL</p> <p>The <i>Draft South Boulder Creek Area Management Plan</i> once again attempts to throw all its weight behind environmental preservation, at the expense of passive recreation.</p> <p>-----</p> <p>I strongly urge you to place environmental protection and especially preservation of habitat for declining species as your top concern. Although there are many interests that must be balanced in managing Open Space, none is nearly as important as environmental protection.</p>	<p>Open Space strives to balance the sometimes competing purposes of Open Space including protecting natural ecosystems and providing passive recreational experiences. The <i>Long Range Management Policies</i> state: "Weighing of the potential benefits and impacts of proposed management actions will include consideration of long term viability and health of natural ecosystems."</p>	<p>Passive recreation, wildlife and other purposes of Open Space are balanced within the context of the entire system. To minimize impacts to wildlife and provide recreation, it is critical to locate trails carefully and in suitable locations. In some instances, recreational activities and trails are inappropriate for an area because of their potential impacts to environmental, agricultural, and cultural resources.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Allowing potentially harmful activities in sensitive areas may preclude ever managing for sensitive species and habitats again, while the inverse is not the case. Protected areas can be opened up to additional use as it becomes clear that such use is compatible with protecting natural resources, but repairing environmental damage is far more difficult and expensive than preventing it, and removing use that has become established is extremely difficult politically. The absence of a full understanding about the impacts of various open space activities is not a reason to allow potentially damaging activities; rather, it is a compelling reason to manage the lands in a prudent, conservative manner, and to consistently err on the side of caution.</p>	<p>Agree. The Management Plan directs visitor use and other harmful activities away from areas with fragile natural resources.</p>	<p>Because of extremely complex interactions in ecosystems, restoration is expensive and often impossible. A more prudent and cost effective management approach is to prevent impacts by preserving wildlife habitat and natural processes.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>A great concern with the Management Plan has to do with the ability of the Open Space Department to inventory, monitor, and actually practice adaptive management. Virtually all of the management actions call for monitoring, yet my impression is that Open Space staff is already overworked. How can the department realistically expect to carry out the level of field work called for in the Draft Management Plan? This comment is not meant as a criticism, so much as a “reality check”. Unless Open Space can secure more positions, staff will continue to be burdened with planning, report writing, and putting out the day-to-day brush fires that are part and parcel of resource management. I’m afraid the on-the-ground work of inventory and monitoring will slip through the cracks despite the best intentions.</p>	<p>Agree. Accomplishing all the management actions will be difficult with current staff and resource levels.</p>	<p>Balancing all the needs of Open Space lands involves difficult tradeoffs. Area management plans are used to systematically identify, integrate, and prioritize management actions. Priorities for the management actions area established in Table 13.1 using three tiers: extremely important, very important, and important. These priorities are used in annual budgeting and annual goal setting. Inventorying and monitoring are set within this framework. All monitoring listed in the Management Plan may not be accomplished, listing ensures that the need will be considered on an annual basis and competing demands are known when making the tradeoffs.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Clearly articulate your decision process. The plan needs to include an outline of the process the board will apply to make these tough decisions and a description of the analysis tools they will use to evaluate alternatives.</p>	<p>The decision process is outlined in the next column. The Open Space Board reviews staff analysis, listens to input from the public, and weighs and makes decisions based on its best judgement using the City Charter Open Space purposes.</p>	<p>The first step in the decision making process is to identify issues. The best scientific knowledge available is obtained from both inventories and research on Open Space and other natural lands. The ability to inventory and do area specific research is limited by resources. This information is then integrated across subject matter areas. Management decisions are made based on the available information and professional judgement. Recommendations are based on criteria specific to an issue. For example, trails recommendations are based on both human based issues (including, safety, aesthetics, residential proximity, demand, cost, agriculture objectives) and natural resource based issues (habitat fragmentation, sensitive species, wetlands, riparian areas). Input from the public that includes new information or better ways to accomplish objectives is then incorporated into the recommendation. Decisions are prioritized through annual budgets and goal setting and then individual work plans.</p>
<p>The planning area boundary designations appear surprisingly arbitrary and irrational. The southern boundary of the management area apparently misses the portion of South Boulder Creek riparian area upstream of State Highway 93. The portion of the South Boulder Creek floodplain upstream of State Highway 93 needs to be managed as a unit with the remainder of the floodplain area within the management area.</p>	<p>Partially agree. Dividing an interconnected system is going to be problematic, no matter how it is divided. Given the differences in the surrounding land use and type found in the Shanahan Area, and the more urbanized area in South Boulder Creek, the areas were divided as they are.</p>	<p>The South Boulder Creek Area Management Plan is one of seven distinct Open Space areas for which management plans are being developed. Size, watershed, location, and land uses were used in delineating areas. Making the area small enough to prescribe specific management actions for budgeting was another consideration. Deciding by watershed level may conflict with land use. The Open Space area to the southwest of the management area is connected by South Boulder Creek. It is, however, not dominated by the elevational variance and ponderosa pine forest and savanna and grasslands complexes found in the Shanahan area. In addition, urban land uses in the South Boulder Creek area are generally more complex.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Monitor the developments proposed and constructed by other City of Boulder Departments (e.g., Utilities, Transportation, etc.), as these infrastructure projects may be in conflict with the South Boulder Creek Area Management Plan. This concern stems from previous development proposals that were reviewed by County Staff in County review processes.</p>	<p>Agree.</p>	<p>The City of Boulder Open Space staff works closely with other departments and agencies to insure that impacts on Open Space lands from other projects are minimized.</p>
<p>One month is a very short period of time to respond to such a large and complex document, for those of us who have full time jobs, particularly since it was difficult to obtain a copy to read.</p>	<p>Partially agree. A 30 day comment period is common and adequate time period. An open house was also held to make staff available to answer questions and to increase public understanding of the document. To make it easier to comment in the future, drafts will be available for cost.</p>	<p>A 30 day comment period is a common and adequate time period for public documents. In addition to copies being available at the libraries and City of Boulder Open Space offices, to increase accessibility the Draft Management Plan was placed on the Open Space home page. When requested, staff provided copies of the Management Plan. To increase accessibility, in the future extra copies of the draft will be printed and made available for cost.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>I attended the open house on 8/26/98 and I was left with the impression that the request for public input, dog lovers in particular, was just for show and that Open Space will go ahead with their proposals regardless of mine or anyone else's comments.</p>	<p>Disagree. Public comments have been and will continue to be used to improve the Draft Management Plan. Open houses are to provide discussion forum, a place for Staff to explain proposals and to listen for ways to improve the proposals. Comments that are particularly helpful are those that provide information on what was not thought of or ways to better accomplish objectives. In some instances, it would be irresponsible for staff to use suggestions that ran contrary to the mission and objectives of Open Space. In other instances, when there are a variety of public opinions, regardless of the decision, some members of the public are not happy with a proposal. In both of these instances, it does not mean staff is not listening, it just means they may disagree on what should be done.</p>	<p>The Inventory Report, General Management Direction, and Draft Management Plan were all modified as a result of citizen suggestions.</p> <p>The proposal in the Draft Management Plan for the Dry Creek area took dog walkers interests into account as expressed through letters and in person prior to the release of the Draft Management Plan: continued voice and sight control, a large field where dogs are easy to see, a year-round water source, convenient location, and a "friendly" place for dogs. These interests were balanced with wildlife protection responsibilities.</p>
<p>The maps are hard to read and important details such as trail locations and fences were not easy to locate.</p>	<p>Agree.</p>	<p>Improvements are being made to the grey tones in the maps so the photocopiers will better reproduce the shades. Black and white maps are used to keep production costs down.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>VEGETATION</p> <p>Grazing intensity and pressure has increased in the last 15 years. This is causing an increase in graze-resistant plants-- an increase in undesirable weeds such as thistle, and in woody shrubs such as willow. One young staff member refuted this at the recent open house, saying that studies of the last five years indicated a decline in thistle. I do not know where his study plots are, but we are quite certain that obnoxious weed such as thistle are increasing at the Baseline-Cherryvale areas. We have been observing this area for over 15 years and have noted the decline in grassland and the increase in cattle numbers and duration. I specifically request that the Recommended Management Actions under Agricultural change the present wording: "Continue the use of prescribed grazing to control the infestation of non-native weeds, ..." to Carefully monitor the use of grazing to control the infestations of non-native weeds, and reduce grazing pressure whenever such reduction seems wise and appropriate in the interests of better habitat management.</p>	<p>Partially agree. Neither grazing nor weeds have increased in the area. The mapping shows a decline in the amount of Canada thistle. However, Objective 9.4.1 now states: incorporates the recommended language-- Carefully monitor the use of grazing to control the infestations of non-native weeds, and reduce grazing pressure whenever such reduction seems wise and appropriate in the interests of better habitat management--as part of a management action to further clarify that overgrazing should not occur.</p>	<p>The stocking rates for the area have not changed substantially over the last 5 years. Weed mapping in 1992 and 1997 shows a significant decline in Canada thistle, likely from intensive integrated pest management that includes prescriptive grazing. Another indication that overgrazing has not occurred is the increase in willow, a preferred food of cattle.</p> <p>Prescriptive grazing is used during the dormant season to remove thatch, mimic historic grazing patterns, and meet the citizen mandated goal of preserving agriculture. The area's complex ecological condition requires species and resource management actions that sometimes conflict: grazing, integrated pest management (weeds), and managing for Ute ladies'-tresses orchid, Preble's meadow jumping mouse, bobolink, tallgrass, and the riparian area. The perceived increase in Canada thistle may be due to the disturbance from trail construction and staging adjacent to the trail near the trailhead. Preserving historical agricultural practices in the Boulder Valley is one of the citizen-mandated objectives of Open Space.</p>
<p>The suggested setbacks for livestock fences in riparian zones of a minimum of 100 feet, seems unnecessarily restrictive. The 100-foot setback may be a useful starting point for case-by-case determination but should not be a hard rule applied in all cases.</p>	<p>Agree. Objective 4.4.1 states: Fence South Boulder Creek to restrict cattle from the riparian area. Setbacks should vary depending on local conditions but in most cases should be a minimum of 100 feet from the channel bank. Grazing should only be permitted for specific management actions such as weed control. Grazing will be used only when other Integrated Pest Management methods are not practicable.</p>	<p>Grazing is a management tool which can be used to achieve a variety of natural resource management goals, including weed control. For example, livestock grazing has been used to replicate more natural grazing patterns and to reduce the build-up of non-native grasses and weeds.</p> <p>Open Space staff will consider using prescriptive grazing to meet other resource management goals if practical.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Why not fence South Boulder Creek on the west side south of U.S. 36? What kind of fence will be used?</p>	<p>Cattle grazing on the west side of South Boulder Creek will be removed from this area except for intermittent grazing for specific management purposes such as weed control. This eliminates the need for the fence. The fence on the east side of the Creek will be high tensile fence (HTF).</p>	
<p>I recommend that you replace the last line with: Because of the unique wildlife and vegetation in this area, the south Boulder Creek region has been registered as a Colorado Natural Area by the Colorado Natural Areas Council. I would strongly suggest that we append the South Boulder Creek Article's of Designation be added as an appendix to this plan.</p>	<p>Agree. The Natural Area Articles of Designation has been added to the Management Plan as Appendix 3.8.</p>	<p>Because of the unique wildlife and vegetation in this area, the south Boulder Creek region has been registered as a Colorado Natural Area by the Colorado Natural Areas Council. The next step is designation as a Colorado Natural Area.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>WETLANDS</p> <p>Management Recommendations. With regard to the recommendation of '[t]rack floodplain management issues as they affect Open Space interests regarding riparian and wetland resource values, be aware that there is currently a multi-jurisdictional South Boulder Creek floodplain management study underway involving City of Boulder, Boulder County, Urban Drainage and Flood Control District, and University of Colorado. This week the group is sponsoring public informational sessions about flooding issues related to South Boulder Creek.</p>	<p>Open Space is involved.</p>	<p>Staff is involved in the floodplain study as it relates to Open Space lands and resource values. Staff will continue to provide input, including evaluating alternatives for flood control.</p>
<p>The language "avoid trail development and undesignated trail use through significant wetlands and riparian corridors" is more restrictive than necessary. Such language could be read as a mandate to prohibit such use under all conditions. I suggest the following language: "minimize trail development and undesignated trail use through significant wetlands and riparian corridors."</p> <p>----- Add "only be permitted if it" so text reads: "Future trails should avoid significant wetlands, and passive recreational use should be 'only be permitted if it' can be compatible with wetland and riparian corridor preservation."</p>	<p>Disagree.</p>	<p>Avoid does not imply, "prohibit such (recreational) use under all conditions." The language already provides guidance that trails will be placed in riparian areas only when they are compatible with wetlands and riparian corridor preservation.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>As you consider instream flow matters for the management area, do not overlook management opportunities for the other end of the hydrologic spectrum, flood events. Historical flooding has obviously played a significant role in the natural evolution of the landforms and the plant and animal species inhabiting the area.</p>	<p>Flood events are considered in Open Space management.</p>	<p>While it is true that the historic hydrologic regime, particularly large flood events, have shaped the geology and biotic communities of South Boulder Creek, opportunities to reestablish natural floods are limited. While much of the land in the floodplain is Open Space, roads, bridges and downstream development would prohibit the type of flooding that occurred in the past. In addition, all of the water in South Boulder Creek is appropriated and most is unavailable during the spring and early summer when natural high water events typically occur.</p> <p>Other opportunities may exist for maintaining native riparian communities that rely on flooding. Examples include providing minimum instream flows which help maintain a high ground water table and restoring natural meanders where the stream has been channelized. Opportunities such as these will be investigated and implemented if feasible.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>WILDLIFE</p> <p>Prairie Dogs Habitat Conservation Areas. Rocky Mountain Animal Defense fully supports the redesignation of lands to increase Habitat Conservation Areas in the management plan domain (Objective 5.4.3). Though some wildlife species can learn to adapt to human encroachment, many of the species now inhabiting the South Boulder Creek management area are sensitive to human disturbances. For example, some raptors and other birds tend to migrate away from areas with even moderate levels of human activity.</p>	<p>Agree.</p>	<p>Staff recommends designation of Habitat Conservation Areas where appropriate. The <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i> gives guidelines for such a designation. Habitat Conservation Areas are designated in areas determined to be both ecologically and culturally suitable. Large blocks of contiguous habitat are preferred for designation, but the importance of small blocks as found in the South Boulder Creek Management Area is emphasized, especially in the event of plague epizootics that may not affect a small isolated colony. Habitat Conservation Areas are not compatible with irrigated crops and pasture, reclamation efforts, or tallgrass prairie. In areas where a Habitat Conservation Area is designated, preservation of the grassland ecosystem is given priority over potential recreational use of the area. Therefore, staff has recommended the removal of pedestrian gates, or exclusion of trails and/or dogs from some Habitat Conservation Areas.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>If Area Management Plans are to classify prairie dog transitional areas as either habitat conservation areas or removal areas, why are there still transitional areas designated in the Draft Management Plan? Why is southwest Van Vleet a transitional area with the recent burrowing owl activity?</p>	<p>There are three reasons Transitional Areas are recommended to remain in South Boulder Creek Management Area: (1) there has been no change or new information, (2) a new area was discovered and delineated, or (3) new information required the reclassification of a Removal Area to a Transitional Area. The Van Vleet Southwest colony was not previously delineated or designated in the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i>. Burrowing owls were observed at the site in 1998. The owls did not stay. Because of proximity to then Colorado Tallgrass Prairie Natural Area, the colony would not qualify as a Habitat Conservation Area. The area was delineated and designated a Transitional Area to allow for further observation for burrowing owls.</p>	<p>Staff attempts to make determinations on Transitional Areas within the context of Area Management Plans. The <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i> states, "As circumstances change or as more information becomes available, a transitional area will be reclassified to either a habitat conservation area or removal area."</p>
<p>Grazing. We support the Plan's proposed prescription that grazing be excluded along Dry Creek and the prairie dog Habitat Conservation Area. We recommend that cattle grazing not be allowed to expand in the management area and that grazing leases be limited to current holders only. Furthermore, land that is now designated for grazing should be open to prairie dogs and the species dependent on them.</p>	<p>Agree.</p>	<p>Staff is taking these actions to prevent vegetative impacts by cattle in stream corridors. In many cases, cattle grazing and prairie dogs co-exist on Open Space.</p>

COMMENT/ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>I am concerned that dogs chasing prairie dogs on open space land will pick up fleas from these areas and transport them to other prairie dog towns. If this occurred on a town experiencing an active plague epizootic event, the potential for these dogs to vector disease-carrying fleas to another site would be high. Since City Open Space allows dogs off-leash, the potential is great for these dogs to vector fleas to County Open Space towns.</p>	<p>Agree.</p>	<p>It is a known risk that dogs (and other domestic pets) may vector fleas from prairie dog towns to humans or other prairie dog towns. Staff encourages on-trail use in or near prairie dog towns and educates whenever possible on the risks of Plague transmission from such interaction.</p>
<p>I do not agree with the recommendation that dogs not be allowed off-trail at McKenzie, north of Independence. There do not appear to be any prairie dogs between the trail proposed for closure, which presumably borders the Habitat Conservation Area and the perimeter trail that visitors will be asked to use. Because of this separation, it does not appear that there would be any problem allowing dogs off of the trail. Is there a trail or trail corridor restriction proposed for dogs on the Jay Road end of the Cottonwood Trail, where prairie dogs have actually burrowed into the trail? (See also trails)</p>		

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>The black-tailed prairie dog, currently the subject of two Endangered Species Act listing petitions, is likely to become listed in the near future. The City of Boulder is in the unusual position of having the potential to play a critical role in the recovery of this imperiled and rapidly declining species. The Open Space Department should aggressively act to ensure that prairie dogs and prairie dog communities are as fully protected from human impacts as possible. Harassment of prairie dogs by humans and domestic dogs is not acceptable. Domestic dogs do not substitute ecologically for natural predators, and human activity in prairie dog communities may well impede the natural predation patterns of remaining predators, such as raptors and coyotes. For these reasons, we also encourage that Habitat Conservation Areas be established to the maximum extent possible in the plan.</p>	<p>Agree. Designations for prairie dogs are in Objectives 5.4.3 and 10.4.5 of the Management Plan.</p>	<p>Staff designates Habitat Conservation Areas on a case-by-case basis according to the guidelines established in the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i>.</p>
<p>I would like to see Open Space providing more areas for prairie dogs who are in need of relocation. Some studies I am familiar with show that prairie dog colonies are not incompatible with cattle grazing and, rather, aid in the regeneration of the plants upon which the cattle graze. At the same time, if a choice needs to be made between allocating space for cows or providing desperately needed room for prairie dogs, I vote to restore the prairie with its original inhabitants.</p>	<p>Staff attempts to designate Habitat Conservation Areas for the preservation of grassland ecosystems, including prairie dogs, as qualify under the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i>.</p>	<p>Habitat Conservation Areas are designated in areas determined to be both ecologically and culturally suitable. Large blocks of contiguous habitat are preferred for designation, but the importance of small blocks as found in the South Boulder Creek Management Area is emphasized, especially in the event of plague epizootic that may not effect a small isolated colony. Habitat Conservation Areas are not compatible with irrigated crops and pasture, reclamation efforts, or tallgrass prairie.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Osprey and bald eagle perch and fish around Baseline Reservoir and along South Boulder Creek. The Management Plan should specifically address osprey, bald eagle, and other raptors and protect nesting and perch sites, as well as enhancing nesting habitat for American bittern and northern harrier.</p>	<p>Agree.</p>	<p>Historic winter bald eagle habitat, including perch sites, exist around Baseline Reservoir. Christmas bird count data generally indicate a stable population of raptors in the Baseline Reservoir area. Besides bald eagles, golden eagles, ferruginous hawks, red-tailed, and rough-legged hawks are common around the reservoir in the winter months. The area is used by osprey and Swainson's hawks in the spring, summer, and early fall. Prairie dog colonies exist on Suits and Klein properties and are important winter food source for the bald eagles. Maintaining viable prairie dog populations and grassland habitats for other small mammals and avoiding disturbance of hunting raptors by humans will be important to protect this area.</p>
<p>The Plan does not reference larger wildlife species such as coyote, foxes, deer.</p>		<p>The Management Plan addresses all wildlife at the ecosystem and community level. Species of concern are also addressed (Objective 5.4.2) as they require special attention because of their rarity or decline. Because the larger wildlife are not species of concern, they are not singled out and are addressed at a more general level.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>CULTURAL RESOURCES</p> <p>Have a courtesy review conducted by the City Landmark Preservation Board and County Historic Preservation Advisory Board before any demolition of buildings over 50 years old.</p>	<p>Partially agree. Any proposed demolition of a significant historic structure will be reviewed by the board with jurisdiction, either the City of Boulder Landmark Preservation Board or the Boulder County Historic Preservation Advisory Board</p>	<p>The Draft Management Plan states: "Standing buildings and structures that are not considered to be significant and pose significant safety hazards will be evaluated for removal on a case-by-case basis. These structures will be evaluated by Open Space staff, a cultural resource specialist, and the appropriate government entity (the City Landmarks Preservation Advisory Board on structures within the City limits of Boulder and the Boulder County Historic Preservation Advisory Board on Open Space lands within the County) prior to any demolition. Appropriate documentation of structures and all necessary permits will be obtained prior to any removal of standing structures."</p>
<p>Individual structures of a site need to be evaluated in context with the overall complex of structures.</p>	<p>Agree.</p>	<p>Careful consideration will be given to the relationship of the individual structure to the overall cultural significance of the site. Structures that may not be individually significant (for example, outbuildings such as silos, barns, outhouses), but collectively contribute to the overall importance or understanding of the site should be preserved whenever possible and reasonable.</p>
<p>Recognize the importance of remnant plantings, vegetation and field patterns.</p>	<p>Agree.</p>	<p>Remnant plantings, vegetation, and field patterns will be used when assessing the importance of the site and will be preserved when possible.</p>
<p>Pursue listing/designation of eligible historic sites</p>	<p>Partially agree. Designation of sites eligible for national, state, and local registers will be pursued on a case-by-case basis.</p>	<p>The Draft Management Plan states: "Due to the significant amount of time and resources required to pursue designation of sites eligible to national, state, and local registers designation will be pursued on a case-by-case basis. These sites are protected under general Open Space policies. Priority for pursuing designation will be given to sites that require intensive management and where additional public recognition and funding are needed."</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>PASSIVE RECREATION</p> <p>General Do not assume that all dog owners are opposed to dog regulations or restrictions. Many of the people in our neighborhood own dogs, including us, and would be glad to see restrictions on open space properties in order to protect habitat. Additionally, off leash dogs can be a potential threat to all types of open space users.</p>	<p>Agree. The Management Plan uses a combination of education, routing trails and dog activity away from sensitive natural areas, and dog regulations to protect natural resources and minimize conflicts with other visitors.</p>	<p>The Management Plan incorporates a broad spectrum of public input regarding dog management on the Open Space lands within South Boulder Creek and attempts to balance reasonable public access with protection of sensitive natural areas. In most cases, sensitive natural resources are protected using educational methods and/or routing existing uses to less sensitive areas. In prairie dog Habitat Conservation Areas without trails, dogs are prohibited to protect prairie dogs and associated wildlife species.</p>
<p>It is unclear why 'entry points' into the Management Area should be the primary focus of acquisition efforts. There is no discussion about why this is a priority, and this would be helpful.</p>	<p>Agree. The Management Plan states "These entry points provide expansive views of Open Space and the Boulder Valley and should be preserved from development whenever possible."</p>	<p>The majority of lands on the interior of the Management Area have either already been purchased as Open Space or have already been developed.</p>
<p>We encourage the City Council and the Open Space Department to take the steps necessary to increase the resources available for effective monitoring of open space lands. Given the importance of monitoring in this Plan for determining when unacceptable impacts are occurring, the Open Space Department should only permit specific activities to occur on open space when the resources are available to fully meet monitoring needs for those activities. Otherwise, impacts may occur but go unnoticed until they are either extremely expensive and difficult to repair or until they become completely irreversible (See General section for related comments).</p>	<p>Partially agree. Monitoring all activities on Open Space is impossible. Monitoring and other management activities are prioritized based on need and available resources. As is stated, once impacts occur they are difficult and expensive or impossible to restore. This makes it important to act conservatively when potential impacts are unknown or likely. In natural resource management, prevention is critical.</p>	<p>Balancing all the needs of Open Space lands involves difficult tradeoffs. Area management plans are used to systematically identify, integrate, and prioritize management actions. Priorities for the management actions area established in Chapter 13 using three tiers: extremely important, very important, and important. These priorities are used in developing annual work plans and budgets. Inventory and monitoring projects are determined within this framework. While it is acknowledged that not all monitoring listed in the Management Plan may be accomplished in the near future, identifying these needs ensures their consideration when making decisions on annual work plans.</p> <p>Staff agrees that activities with a likelihood of adversely affecting resources should be controlled or managed to minimize impacts. Restoration is an expensive and difficult proposition.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>The specific reason for the Charter references to specific uses was to restrict recreational use to only the most innocuous uses.</p>	<p>Partially agree. In the City of Boulder Charter, passive recreation is listed as one of the purposes of Open Space, and certain activities are listed: hiking, photography or nature studies, and, if specifically designated, bicycling, horseback riding, or fishing.</p>	<p>The City of Boulder Charter provides guidance on what type of recreational activities are allowed and which activities must be specifically designated. Although the Charter may imply that only these activities are allowed, it does not specifically define passive recreation, state where these activities may occur, or which activities are not allowed. Any type of recreational activity may cause potential environmental impacts if not properly planned and managed. The Management Plan attempts to provide a reasonable balance of providing passive recreational use and preserving natural, cultural, and agricultural resources.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Access The plan generally displays a sensitivity to the need for use restrictions and mitigation in order to protect native species and communities. However, it is important that the plan also include explicit provisions for the imposition of additional use restrictions and mitigation as necessary to protect natural resource values. For instance, the plan should explicitly establish that off-trail use will be prohibited where necessary, even if the original management direction did not include such a restriction. The plan's provision for equestrian use should be handled in a similar manner: Such use can be permitted but the plan should contain an explicit provision allowing for prohibiting (or otherwise restricting) of such use if necessary due to environmental impact concerns. Seasonal closures are another example. Such provisions should be an explicit component of the management for the Dry Creek area as well as all other areas in the management Area.</p>	<p>Partially agree. Objective 10.4.1 in the Management Plan states "Provide a variety of appropriate quality passive recreational activities, outdoor education opportunities, and visitor services where consistent with overarching environmental values." The text goes on to state "Passive recreational activities and opportunities will be reevaluated periodically to meet public and environmental preservation needs. Careful consideration of potential recreational impacts will ensure natural resources are protected and preserved, enhancing the long-term quality of the user experience."</p>	<p>The Management Plan strongly encourages visitor use to appropriate areas and directs visitor use away from sensitive resource areas. This will be accomplished by educational efforts and closing undesignated trails and access points. The Management Plan does not explicitly recommend any legal closures or stay on trail regulations at this time.</p> <p>Several management actions in the Management Plan emphasize the need to monitor visitor use and evaluate recreational impacts on wildlife, vegetation, wetlands, and agricultural activities. Increased understanding of recreational impacts and results of monitoring will be incorporated into future management actions.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Allowing for use of areas where specific mitigation is required to reduce impacts to an acceptable level must be explicitly contingent on high levels of compliance with those mitigation measures. For instance, if dogs are permitted in a sensitive area with the provision that leashes are required, dog use must be subsequently prohibited if compliance levels are found to be inadequate.</p>	<p>Agree. As stated in the previous comment, monitoring visitor use and incorporating the results into future management actions are important components of the Management Plan.</p>	<p>One of the management actions under Objective 10.4.1 states “Work with volunteers and user groups to ensure compliance and monitor the effectiveness of the proposed dog management policies. Results of monitoring and future studies will be incorporated into the City’s Dog Management Plan and reviewed on a semi-annual basis. Adjustments will be made accordingly.”</p>
<p>I do not agree with the recommendation that dogs not be allowed off-trail at McKenzie, North of Independence. There do not appear to be prairie dogs between the trail proposed for closure, which presumably borders the Habitat Conservation Area, and the perimeter that visitors will be asked to use. Is there a trail restriction proposed for dogs on Jay Road end of the Cottonwood Trail, where prairie dogs have actually burrowed into the trail?</p>	<p>Disagree. Objective 10.4.3 of the Management Plan states “Use the designated trail to the eastern perimeter of the Habitat Conservation Area and close and reclaim the southwest section the Cottonwood Trail (just north of Independence Road and the Cottonwood Trailhead) to separate passive recreational use from the prairie dog areas. This trail reroute will minimize conflicts with dogs and wildlife within the Habitat Conservation Area and allow dogs to remain in voice and sight control. Fencing will be placed along the northern portion of the Cottonwood Trail (near Jay Road) to separate visitors and dogs from the prairie dog Transitional Area.”</p>	<p>Prairie dog colonies expand and contract periodically due to vegetation conditions and plague events. The Habitat Conservation Area north of Independence Road was largely occupied by prairie dogs until a recent plague event. Although the entire Habitat Conservation Area is not currently occupied, it is likely to expand in the near future. Contiguous habitat is of great importance to the preservation of prairie dogs and associated wildlife species. Directing visitors to use the eastern branch of the Cottonwood Trail on the McKenzie property and placing a fence to separate domestic dogs and the prairie dogs allows dogs to continue under voice and sight control along the trail corridor.</p> <p>The northern portion of the Cottonwood Trail will be fenced so that both prairie dog colonies on McKenzie are separated from recreational use. Dogs will be allowed to be in voice and sight command along the entire Cottonwood Trail corridor.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>The discussion about dogs on trails and off-trails near the Habitat Conservation Areas should be reviewed for consistency with the Dog Management Plan and the North Boulder Valley Area Management Plan, specifically to review "trail corridor" type of regulation.</p>	<p>Agree. Objective 10.4.3 of the Management Plan states "Revise existing dog regulations in prairie dog Habitat Conservation Areas within South Boulder Creek to reflect management direction from the City's Dog Management Plan and the <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i>. These revisions include prohibiting dogs in the Habitat Conservation Areas and some immediate surrounding areas on, Ute Industrial Park, Gallagher, Dry Creek, Belgrove, Suits South, Marshall, and Gallucci properties since there are no designated trails in these areas. Sections of the designated trails at Dry Creek and Cottonwood will be rerouted to the perimeter of the Habitat Conservation Areas and fenced to separate passive recreational use from the prairie dog areas. Dogs will be required to be on a hand-held leash in the Habitat Conservation Area and immediate surrounding areas on Andrus and James properties. When necessary, these dog restrictions will be applied to small surrounding areas outside Habitat Conservation Areas in order to effectively post restrictions on existing barriers and fences, eliminating the need for additional fencing and expense." Dogs will continue to be allowed in voice and sight control on the northern portion of the Cottonwood Trail (near Jay Road), but will be separated from the prairie dog Transitional Area with fencing. Comprehensive dog regulations (current and proposed) for the South Boulder Creek Management Area are shown in Figure 10.1.</p>	<p>The <i>City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan</i> states "To minimize the impacts of pets upon prairie dogs and other grassland animals in Grassland preserves and prairie dog Habitat Conservation Areas, pets must be restricted to designated trails, required to be on hand held leash or restricted from designated areas."</p> <p>In prairie dog areas where there are no designated trails (Ute Industrial Park, Gallagher, Belgrove, Dry Creek, Belgrove, Suits South, Marshall, and Gallucci properties), dogs will be prohibited. In some cases, small immediate surrounding areas will also be closed to dogs in order to effectively post restrictions on existing barriers and fences, eliminating the need for additional fencing and expense. These are very small areas with no existing use patterns or access points.</p> <p>In other areas where designated trails are located near the perimeter of prairie dog areas, dog activity will be separated from prairie dog areas (by rerouting trails and fencing) allowing continued visitor use and dogs under voice and sight control. These management actions are consistent with other planning efforts and are similar to the "trail corridor" concept applied to portions of the <i>North Boulder Valley Area Management Plan</i>.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>What are the impacts to the prairie dogs in the Gallucci area? What is the decision rule? One equestrian per day, one per week, one per month, one per year? How much is too much? In the absence of any objective data showing negative impacts of trail use on the Gallucci property, please do not close it.</p>	<p>Disagree. One of the management actions under Objective 10.4.5 states "Direct visitor use away from sensitive resource areas by closing and reclaiming undesignated trails and access points." The Gallucci property is a designated Habitat Conservation Area set aside for the protection of prairie dogs and associated wildlife species.</p>	<p>Best available information does indicate that there are environmental impacts from recreational activity. Studies on Open Space and in related literature show that recreational use fragments natural areas resulting in both direct and indirect impacts to plant and animal habitats. Direct impacts include trampling of vegetation, soil compaction, soil erosion, introduction of non-native species, and disturbance and stress to sensitive wildlife species.</p> <p>The City of Boulder Grassland Management: <i>Black-tailed Prairie Dog Habitat Conservation Plan</i> sets aside Habitat Conservation Areas to protect prairie dogs and the 160 wildlife species that are associated with them. Recreational activity disrupts the natural processes and interactions among these species.</p> <p>Recreational activity on the Gallucci property is likely to dramatically increase in the near future because a recently constructed City of Louisville trail dead-ends nearby. Removal of the undesignated gates on this property discourages further development of established use patterns, while still allowing low volumes of dispersed passive recreational activities.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Disagree with the proposal to remove the pedestrian gates on Burke I, Burke II, Gallucci, and Gebhard. The use of voluntary closures combined with education would be a better solution for protecting sensitive species/ecosystems when they are most susceptible to damage. Disagree with the presumption that designated greenways and Open Space trails near these properties provide a visitor experience akin to walking onto one of these properties. If the plan remains unchanged in this respect, the plan needs to be more straightforward about what is being proposed here. By removing the access gates, Open Space is closing the areas. This should be stated, not merely inferred.</p>	<p>Disagree. The South Boulder Creek Inventory Report documented the environmental, agricultural, cultural, and recreational resources of the area. The general management direction was subsequently developed and approved after a careful analysis of existing information. One of the major goals of the general management direction for South Boulder Creek was to direct visitor use to appropriate areas and discourage visitor use of sensitive areas. The properties where gates are to be removed are considered sensitive natural areas.</p>	<p>Although the visitor experience is different (walking through an undeveloped natural area versus using an established designated trail), a variety of recreational experiences are provided in the Management Plan. In less sensitive areas, some gates will remain and visitors will have an opportunity to experience natural areas without the use of trails. In sensitive resource areas, visitor use will be strongly encouraged to appropriate areas and directed away from areas susceptible to damage. This will be accomplished by a combination of educational efforts and closing undesignated trails and access points. The Management Plan does not recommend any legal closures or stay on trail regulations at this time.</p> <p>Removal of undesignated gates in sensitive areas discourages development of established use patterns and formation of undesignated trails which may impact environmental, agricultural, or cultural resources, while still allowing low volumes of dispersed passive recreational activities (wildlife viewing and other informal activities).</p> <p>The Burke I, Burke II, Gebhard, and Gallucci properties contain a number of sensitive and rare species and plant communities: Ute ladies'-tresses orchids, Preble's meadow jumping mouse, bobolinks, wetlands, riparian area, prairie dog colonies, raptor areas, and tallgrass prairie. These species and communities require special management and protection.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Trails - General The management plan still proposes to reduce existing, legitimate public accesses to South Boulder Creek Open Spaces while proposing no real compensating enhancements. In the Dry Creek, Gallucci, and Cottonwood areas the plan removes existing trails. The staff uses a distinction between designated and undesignated trails to maintain that the closures are actually expansions. To the users of the trails this distinction is just so much double-talk. In fact, in the Dry Creek area the plan eliminates about 50% of the space presently available for public use. Identify and commit to providing alternate public access for that being removed in the Dry Creek and Cottonwood trails area. As these users are primarily people walking dogs, the designation of another, new Open Space facility in an area better suited for that activity would be most appropriate.</p>	<p>Disagree. The Management Plan incorporates a broad spectrum of public input regarding recreational uses and attempts to balance reasonable public access with protection of sensitive natural areas. In most cases, sensitive natural resources are protected using educational methods and/or routing existing uses to less sensitive areas. In some sensitive areas, public access will be discouraged by closing undesignated trails and removing gates.</p> <p>The Management Plan clarifies which undesignated trails are being formally designated and improved.</p> <p>One of the management actions under Objective 10.4.3 of the Management Plan is to further evaluate potential options for a trail which would provide a connection from Dry Creek Trail northeast to East Boulder Trail. The trail connection would greatly enhance recreational opportunities and provide additional trails within South Boulder Creek.</p>	<p>Passive recreation, wildlife and other purposes of Open Space are balanced within the context of the entire system, not necessarily within one property or management area. Passive recreation opportunities should be provided in appropriate areas and managed to minimize environmental impacts. The recently constructed Left Hand and completion of the South Boulder Creek Trails are good examples of providing increased recreational opportunities and minimizing potential environmental impacts.</p> <p>Extensive efforts have been made to accommodate and improve existing uses and recreational experiences. Recreation opportunities have been maintained in Habitat Conservation Areas by rerouting trails and fencing to separate potentially conflicting uses. Educational efforts will inform visitors of important natural and cultural resources enhancing the overall recreational experience and helping to preserve these important resources.</p> <p>Additional recreational access and trails within South Boulder Creek are to be further evaluated once existing problems on designated trails have been corrected, appropriate undesignated trails have formalized and improved, and undesignated trails in sensitive areas have been closed and reclaimed.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>The vast majority of us expect to have access to our public lands and, in particular, to our Open Space lands. We believe that wildlife and habitat can be protected (even enhanced) along with public access. However, we do not support blanket denial of public access to large areas of Open Space and we strongly believe that closures of areas presently experiencing significant use should be balanced by enhanced public access elsewhere within our Open Spaces.</p> <p>The majority of Boulderites want Open Space for wildlife habitat. That is not compatible with bikes, people, and dogs which constitute the trinity of trails. We already have two and a half times the national standard for trails according to The National Recreation and Parks Association.</p>	<p>Partially agree with both comments (See the response and explanation given in the previous comment).</p>	<p>Boulder residents do expect to have reasonable access to Open Space and entrust the Open Space Program to provide recreation in a way that minimizes impacts to the natural environment. Passive recreation, wildlife and other purposes of Open Space are balanced within the context of the entire system, not necessarily within one property or management area. Although recreation has potential impacts (see previous recreation responses and explanations), providing appropriate passive recreation opportunities can increase public awareness and support for Open Space and other environmental preservation efforts.</p> <p>Public access is currently being provided on over 78 miles of designated trails on City of Boulder Open Space lands alone. Boulder County estimates there are approximately 370 miles of existing trails in Boulder County. The National Recreation and Parks Association's Open Space Standards suggest a ratio of 1 trail mile per 2,000 people. Boulder currently has about 100,000 residents.</p>
<p>The comment regarding uncontrolled dogs being a safety concern for riders on South Boulder Creek trail begs the question of whether leashed dogs would be appropriate on this trail. The comment should be deleted.</p>	<p>Disagree. The full text for this management action in the Management Plan states "Continue the prohibition of dogs on the section of South Boulder Creek Trail south of South Boulder Road. Continuation of this dog regulation will protect the significant natural values of this riparian corridor and tallgrass area, minimize conflicts with other visitors and existing agricultural uses, and provide an area without dogs for visitors. Rocky Mountain Riding for the Disabled frequently uses this trail corridor, and uncontrolled dogs could create a safety concern for riders."</p>	<p>As stated in the Open Space response, there are a number of reasons for prohibiting dogs in this area. Although allowing leashed dogs in this area may alleviate some environmental and safety concerns, the significant natural values of the area and various skill levels of riders at Rocky Mountain Riding for the Disabled warrant a higher level of caution and management.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>If all future trails are located to minimize habitat fragmentation and all potential negative environmental impacts, all new trails could end up looking like the proposed Baseline Road trail, which, in my opinion, is unacceptable for a visitor enjoyment perspective.</p>	<p>Disagree. The text under Objective 10.41 of the Management Plan states "The quality of the visitor experience will be an important consideration when developing additional passive recreational opportunities but must be carefully balanced with other resource goals. Careful consideration of potential recreational impacts will ensure natural resources are protected and preserved, enhancing the long-term quality of the user experience."</p>	<p>Minimizing habitat fragmentation does not mean all new trails would be located along roadways. Open Space has the responsibility for the long term preservation of wildlife habitat and providing for appropriate recreational access. Minimizing habitat fragmentation is consistent with these objectives.</p> <p>Although a small portion of the proposed route along the north side of Baseline Reservoir would have to be in close proximity to Baseline Road, the remainder of the route could be constructed away from existing roads, could provide excellent views, and provide a safe, high quality visitor experience. A recent example of minimizing habitat fragmentation and still maintaining a high quality visitor experience is the Left Hand Trail. This trail travels around the perimeter of a Habitat Conservation Area and wetlands, while still providing a quality recreational experience.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Dry Creek Trail - current use General At the Dry Creek Trailhead, the need for environmental protection is especially important. We must protect the prairie dog colony there as well the conditions necessary for raptors. I believe that the staff proposal is good as a compromise between the legitimate recreational interests and the top priority of environmental protection. This proposal should not be weakened in any way, however, regardless of user pressure to do so.</p> <p>-----</p> <p>Applaud open space's efforts to save the environment, but I believe that the established nature of this area makes it too important as a recreational area for these changes to be made.</p>	<p>Agree with first comment. The Management Plan incorporates a broad spectrum of public input regarding recreational uses and attempts to balance reasonable public access with protection of sensitive natural areas. In this case, a prairie dog Habitat Conservation Area will be protected using educational methods, routing existing uses to less sensitive areas, and fences to separate conflicting uses.</p>	<p>The management actions for the Dry Creek area incorporate the broad spectrum of public input received and allow existing recreational uses to continue while minimizing further environmental conflicts.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Continue current rules for domestic dogs at Dry Creek Trailhead.</p>	<p>Agree. Voice and sight control will continue in the area. The trail near the trailhead will be rerouted to the perimeter of the prairie dog town and a fence placed between the trail and the prairie dog town to minimize the interaction between domestic dogs, people, and wildlife. Designating a loop trail in the "back field" (this is currently an undesignated trail) away from the raptor perch in the cottonwoods to the south provides additional "exercise" area. This solution allows the dog owners and domestic dogs to continue their activities and provides added protection for dogs, visitors, and prairie dogs. If the fence is not an effective barrier, additional actions/restrictions will be proposed.</p> <p>Currently there is a lack of compliance with existing voice and sight regulations resulting in conflicts between visitors, domestic dogs, and wildlife. Increased education and enforcement of current rules will be used to improve the situation.</p>	<p>Separating dog activity, visitor use, and wildlife benefits all. Prairie dogs sometimes carry plague, a health hazard to the dog and people they come into contact with. Domestic dogs chasing prairie dogs or even traveling off-trail through a prairie dog town, changes prairie dog behavior and adversely effects opportunities to forage and conduct other important activities. This is especially critical for wildlife during winter and when rearing young in the spring. Direct mortality of wildlife from domestic dogs has occurred. Because of these concerns it is illegal for domestic dogs to "charge, chase, or disturb wildlife."</p> <p>The area is recommend to be designated a Habitat Conservation Area from a Transitional Area for prairie dogs because of the isolated nature of the prairie dog town making it resistant to plague. Trails are normally restricted from Habitat Conservation Areas, and if not they are placed on the perimeter of the area for the reasons stated above. Separating the activities with a fence alleviates the need for a leash requirement. If the fence does not work as an effective barrier, additional actions will be recommended.</p>
<p>Delete language in the last action item about providing additional trails. This may be technically accurate but we are really talking about shortening an established trail loop. This plan needs to put people on notice of this action, if the action item is preserved in the final draft.</p>	<p>Partially agree. This management action under Objective 10.4.3 of the Management Plan has been revised to "Reroute the existing Dry Creek Trail to the northern perimeter of the Habitat Conservation Area (in the front or eastern field) and formally designate and improve a portion of the undesignated loop trail to provide trails and appropriate dog activities (in the second or western field). The loop trail in the western field will provide a 1/4 mile buffer (Richardson and Miller 1997) for the bald eagle perch sites to the south (see Figure 10.2 for a map depicting trail proposals)."</p>	<p>This management action would shorten the existing undesignated loop that has developed from informal use, but would provide greater protection to nesting raptors of the area. The proposal would formally establish a designated loop trail and include enhancing the existing trail with educational signs, proper trail design and construction, and ongoing trail maintenance responsibilities.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>The Dry Creek area has enormous native species and habitat value. In short, We believe that human use of this area should be severely restricted in order to protect fully the prairie dog community, raptors, and other animal and plant communities from adverse impacts. However, we are willing to accept a compromise solution in this situation, because, in this case, it is possible to offer a high level of protection for the species of concern while at the same time providing for most of the existing use with only minimal restrictions. For this reason, We support the proposal, which we take to be a sensible balancing of competing interests as a compromise position. We are dismayed that the off-leash dog use advocates and the trail construction advocates seem to be unwilling to compromise on this issue, despite claims that they, too, are seeking to balance recreational uses with environmental protection.</p>	<p>Agree. The Dry Creek area has great habitat and native species value (See previous related responses and explanations).</p>	<p>The proposal preserves natural values to a large degree, while providing passive recreational opportunities.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>It seems that moving the designated trail north of the prairie dogs is a reasonable plan. I think the new trail would work if there were enough places where the trail met the creek, more than just at the trailhead. There are several spots that are particularly popular: one where the bank is steep and the water deep enough so that dogs can 'dive' off the bank, and another where the water is shallow and it is often shady so that it is a spot where people stop and talk. I do not want to see a concrete trail in this area; in fact I prefer a minimal level of trail surface 'improvement.'</p>	<p>Agree. See previous related responses and explanations.</p>	<p>The relocated trail would provide access to the creek for dogs at convenient locations where impacts from erosion, sedimentation, and vegetation trampling can be minimized. The trail would be soft surface and placed to minimize environmental impacts and provide a good visitor experience.</p>
<p>It lacks rest-rooms as are present at both Coot Lake and North Valley Farm-- That is the only change needed--</p>	<p>Disagree. No restroom facilities are planned at this time and future passive recreational needs (facilities and trails) will be evaluated on a periodic basis.</p>	<p>One of the management actions under Objective 10.4.3 of the Management Plan states " Develop criteria for creation and placement of passive recreational facilities within the Visitor Use Plan. Criteria will be based on passive recreational goals, current use levels, and preservation of natural, cultural, and agricultural resources."</p>
<p>Put dog training information at the trailhead, e.g., the Humane Society of Boulder Valley.</p>	<p>Partially agree.</p>	<p>An interpretive educational program focusing on dog obedience and rules on Open Space has been and will continue to be offered.</p>
<p>If you find the elusive jumping mice, move them to another location.</p>	<p>Disagree.</p>	<p>An important part of the Open Space mission is to preserve rare species. Uses such as agriculture and recreation must be managed in this context. Preserving occupied, known, and potential habitat for the Preble's meadow jumping mouse is the law. The mice are quite capable of finding suitable habitat on their own. One preliminary estimate has only 1,000 to 2,000 Preble's meadow jumping mice in the world.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Best place for dog walking Dry Creek Open Space is the last haven for dog owners in Boulder County ... I can think of no other place in the County that can compare ... I would like to see if the permanent proposal that if the prairie dogs chose to migrate away from the area they are in now, then that will not affect the trail change, yet again.</p>	<p>Partially agree.</p>	<p>The Dry Creek Trail and area has several attributes enjoyed by dog walkers: voice and sight rules, large field where dogs are easy to see, year-round water source, convenient location, and a “friendly” place for dogs. Other Open Space areas are also available with similar attributes.</p>
<p>Cost Certainly, the expense of moving the trail and installing fencing is an example of unnecessary and ill-targeted use of funds which would be better used to purchase more land for humans and prairie dogs alike.</p>	<p>Disagree. The current situation at Dry Creek is unacceptable and creates conflicts with preserving the natural values of the area (primarily prairie dogs and raptors). The fence cost is a tradeoff with minimizing wildlife harassment, maintaining existing recreational uses, and continuing voice and sight control regulations for domestic dogs.</p>	<p>The fence will separate recreational uses and domestic dog activities from the prairie dog Habitat Conservation Area, minimizing wildlife harassment and allowing dogs to remain in voice and sight control. If the trail remained in its current location and no fencing occurred, more restrictive dog control (hand-held leash or dogs prohibited) would be required to protect the natural values of the area.</p>
<p>Grazing impact It appears that the large areas of erosion along the ditch has been getting worse due to the cattle that graze the area, not the dogs and people.</p>	<p>Partially agree. Cattle and dogs both cause erosion. A management action under Objective 9.4.1 in the Management Plan excludes grazing from the area except for prescriptive management purposes (using cattle grazing for weed control and to enhance native species composition).</p>	<p>Cattle can cause erosion around streams. Dogs also cause erosion and stream sedimentation. This is evidenced by the long narrow gullies created by dogs repeatedly leaving the stream in one place and the sediment adjacent to these areas.</p>
<p>Enforcement All dogs should be under voice control, so that these disturbances would be minimized. More strict enforcement of this requirement would allow the great majority of pet owners and pets to continue to enjoy this open space.</p>	<p>Agree. Increased education and enforcement are critical components of any management actions at Dry Creek.</p>	<p>Education and enforcement will be used in conjunction with relocating the trail and fencing.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Prairie Dogs I find the situation at that trailhead to be intolerable, with dog owners allowing their animals to roam freely throughout the prairie dog town, chasing animals, and digging at their burrow holes. It has been so upsetting to me to witness this irresponsible behavior that I now avoid walking my dogs in that area. I have tried speaking with people and explaining the effects their actions have but most people seem to be interested only in allowing their dogs free access to do whatever they please. If that trailhead is to remain open, it should be rerouted away from the prairie dogs and a fence built to keep dogs out. In the meantime, Open Space should enforce the already existing prohibition against the harassment of wildlife.</p>	<p>Agree. The current situation at Dry Creek is unacceptable and creates conflicts with preserving the natural values of the area (primarily prairie dogs and raptors). Rerouting the trail and fencing will separate recreational uses and domestic dog activities from the prairie dog Habitat Conservation Area, minimizing wildlife harassment and allowing dogs to remain in voice and sight control. Open Space has recently increased its educational and enforcement efforts to minimize conflicts with the current situation and will continue these efforts in conjunction with the proposed management actions.</p>	<p>The proposal strikes a balance between protecting wildlife and providing a positive recreational experience. Currently the trail runs directly through a prairie dog Habitat Conservation Area. This sets up conflicts between prairie dogs and domestic dogs that chase them. Open Space has the responsibility to preserve wildlife and natural processes and to provide for recreational activity when appropriate. By separating the two uses, conflicts will be minimized, and both activities can continue. There have been numerous reports from people who do not visit Dry Creek trail any longer because of similar experiences.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>The Dry Creek area is populated by bald eagles, the Preble's meadow jumping mouse, and Ute ladies'-tresses orchids all species protected under the Endangered Species Act. The black-tailed prairie-dog, also inhabiting the area, has been proposed for listing as a "threatened" species. This is a valuable, biodiverse community which is now threatened by recreational and other user impacts, particularly dogs allowed to disturb wildlife while off-leash. Preserving the biotic integrity of this area requires the highest level of protection from human and domestic animal disturbance. We recommend a strict leash requirement for domestic dogs utilizing the Dry Creek trail system. We do not recommend the addition of trails in the area (Objective 10.4.3).</p>	<p>Partially agree. The Dry Creek area has great habitat and native species value (see previous related responses and explanations). The management actions for the Dry Creek area incorporate the broad spectrum of public input received and allow existing recreational uses to continue while minimizing further environmental conflicts.</p>	<p>Instead of a leash requirement, the proposal will separate prairie dog and dog activity by relocating the trail to the perimeter of the Habitat Conservation Area and constructing a new fence. If this proposal is ineffective at minimizing wildlife harassment, more restrictive management actions may be required.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Plague It is also important to keep in mind that prairie dogs are frequently a vector for the spread of sylvatic plague. Dogs which run loose in infected colonies can bring fleas home and thus may infect their owners with plague.</p> <p>----- Concerned that dogs chasing prairie dogs on open space land will pick up fleas from these areas and transport them to other prairie dog towns. If this occurred on a town experiencing an active plague epizootic event, the potential for these dogs to vector disease-carrying fleas to another site would be high. Since City Open Space allows dogs off-leash, the potential is great for these dogs to vector fleas to County Open Space towns.</p>	<p>Agree. One of the management actions under Objective 10.4.4 of the Management Plan states "Post warning notices or close trails temporarily for safety purposes as needed (bubonic plague outbreaks, periods of intense agricultural operations, application of herbicides, flooding, wildlife conflicts, etc.). Trails will only be closed for the duration required to ensure visitor safety."</p>	<p>It is a known risk that dogs (and other domestic pets) may be a vector for fleas from prairie dog towns to humans or other prairie dog towns. Staff encourages on-trail use in or near prairie dog towns and educates whenever possible on the risks of plague transmission from such interaction.</p>
<p>Prairie dogs encroaching on new trail. If a raptor or Prebles' mouse decides to adapt and locate near the newly established trail, the trail should remain.</p>	<p>Partially agree.</p>	<p>Decisions are made on a case-by-case basis. The Open Space program must comply with U.S. Fish and Wildlife Service Endangered Species requirements.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Other predators There are coyotes and fox all around the South Boulder Creek area who eat mice and raptors are also predators of mice re: areas like Dry Creek.</p> <p>----- Domestic Dogs (Canines). Despite the protests of many dog owners, domestic dogs do negatively impact prairie communities when not properly controlled by their human companions--on leashes. Dogs chase, harass, and kill prairie dogs. However, they do not substitute for natural predators. The existence of domestic dogs on prairie dog colonies can disrupt the normal predation patterns of traditional predators including raptors and coyotes. As recognized in the Plan, the prairie dog and associated species are in severe decline. We recommend that leash rules be applied and strictly enforced in open space areas containing or in close proximity to prairie dog colonies.</p>	<p>Coyotes, fox, raptors, and other wildlife species are natural predators and are an important component of the natural ecosystem that Open Space is trying to preserve. Human disturbance and domestic dogs harassing and killing wildlife are not natural predators and is against the law. Management seeks to eliminate future conflicts.</p> <p>Agree with second comment. Existing recreational uses and uncontrolled domestic dogs have an impact on the prairie dog Habitat Conservation Area and associated wildlife.</p>	<p>Instead of a leash requirement, the proposal will separate prairie dog and domestic dog activity through use of a fence. If this proposal is ineffective at minimizing wildlife harassment, more restrictive management actions may be required.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>More study needed My primary concern is that the proposed changes appear to be based upon the assumption that there is a problem with the current situation. For example, the proposed fencing of the prairie dog colony assumes that the dog traffic via the trail through the colony is both stressful and detrimental to the colony. However, there is no data provided to support this assumption. Staff could provide no data demonstrating a link between stress and objective indicators of detriment such as prairie dog mortality, birth rate, or life expectancy. Indeed, the prairie dogs appear to be thriving.</p> <p>----- I realize that Open Space does not have the resources to scientifically study all of the situations for which it must formulate opinions. However, given the popularity of Dry Creek, this decision will impact a tremendous number of people. I submit that this is a situation in which a systematic assessment is needed prior to the Open Space Board's decision.</p>	<p>Disagree. Best available information does indicate that there are environmental impacts from recreational activity. Studies on Open Space and in related literature show that recreational use fragments natural areas resulting in both direct and indirect impacts to plant and animal habitats. Direct impacts include trampling of vegetation, soil compaction, soil erosion, introduction of non-native species, and disturbance and stress to sensitive wildlife species.</p>	<p>Open Space has the responsibility to manage Open Space lands within allocated resources. Despite an active research program, it is impossible and unrealistic to measure all interactions occurring on Open Space. Decisions must be made on best available information and on a conservative basis, precisely because it is impossible to know all the impacts of activities and once a problem is detected it is usually too late to save or restore the resource.</p> <p>As stated in another letter: "Dogs chase, harass, and kill prairie dogs. However, they do not substitute for natural predators. The existence of domestic dogs on prairie dog colonies can disrupt the normal predation (and other) patterns of traditional predators including raptors and coyotes. As recognized in the Management Plan, the prairie dog and associated species are in severe decline."</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Riparian area In staff's proposal, the trail would be moved closer to riparian area creating increased impact.</p>	<p>Partially agree. Moving the trail towards the riparian area is the tradeoff of reducing impacts to the prairie dog colony and continuing passive recreation in the area.</p>	<p>Riparian areas are an important resource in this management area and throughout Colorado. Unfortunately, past management, existing recreational activities, and nearby disturbances (Baseline Road and adjacent residential developments) have reduced the natural values of this riparian corridor. Relocating the trail closer to the riparian corridor keeps recreational activity along an existing disturbance and enhances protection of the prairie dog Habitat Conservation Area.</p> <p>Formalizing the existing undesignated trail will enable the Open Space Program to properly design and construct a trail in and adjacent to this riparian area. The trail can be properly located and maintained, enhancing the overall quality of the area. Restoration of the creek corridor will also be an important part of relocating the trail.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Dry Creek - Raptors I do not support the proposed changes in the back loop. The existing social trail has been heavily used for many years and is an extremely precious and very needed dog voice and sight area. It is an old impact that has been acknowledged and allowed by the community, Open Space, and the raptors. It is a relatively small area where we cannot afford to provide the generic 1/4 mile raptor perch buffer zone.</p> <p>----- I support, with reservations, staff's proposal to extend the Dry Creek Trail west of the creek crossing. I believe the proposed trail extension passes too close to the bald eagle perch area. Raptor biologists generally recommend an 800 meter buffer around bald eagle nests and roosts. Baseline Reservoir is a potential future bald eagle nesting site, and several eagles perch in the cottonwoods on the east side of the reservoir each winter. In my personal observations at Boulder Reservoir, I have found that raptors will often abandon perches when hikers approach within 400 meters. I would recommend at least a 600 meter buffer around the bald eagle perches...</p>	<p>Management actions under Objective 10.4.3 of the Management Plan state "Reroute the existing Dry Creek Trail to the northern perimeter of the Habitat Conservation Area (in the front or eastern field) and formally designate and improve a portion of the undesignated loop trail to provide trails and appropriate dog activities (in the second or western field). Designate a loop trail in the western field that provides a 1/4 mile buffer (Richardson and Miller 1997) for perching and nesting raptors in the cottonwood trees to the southwest (see Figure 10.2 for a map depicting trail proposals). Use of this designated trail will be encouraged through trail improvement, directional fence, and signs encouraging visitors to voluntarily limit their use of the raptor buffer area."</p> <p>Although some raptor species have adapted to the current use levels and recreational activities, creating an additional buffer by voluntarily staying on the shortened trail is a small sacrifice to enhance the natural values of this area and still maintain some of the existing recreational uses. Other raptors who could potentially use the area may not be able to adapt to the current situation.</p>	<p>Historic winter bald eagle habitat, including perch sites, exist around Baseline Reservoir. Christmas bird count data generally indicate a stable population of raptors in the Baseline Reservoir area. Besides bald eagles, golden eagles, ferruginous hawks, red-tailed, and rough-legged hawks are common around the reservoir in the winter months. The area is used by osprey and Swainson's hawks in the spring, summer, and early fall. Prairie dog colonies exist on Suits and Klein properties and are important winter food source for the bald eagles. Maintaining viable prairie dog populations and grassland habitats for other small mammals and avoiding disturbance of hunting raptors by humans will be important to protect this area.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Other disturbance I question how much impact closing off the south end of this area will really have on the raptors. There are motorized boats within 1/4 mile of the perches, as well as picnic tables/shelters, and campsites.</p> <p>----- If you decide to shorten the trail anyway, I would like to see a more creative route than just chopping off the loop. I suggest that the trail continue along the reservoir at least until the next bend so that it can include the beautiful views, and then be angled back across that southern end of the field. This would allow access to the views, and would make the loop longer so that people using the trail for exercise can get more distance out of the loop.</p>	<p>Disagree. The existing recreational uses mentioned are on adjacent private lands and occur primarily during the summer when wintering raptors are not in the area. Open Space manages the majority of the land in this area and has a responsibility to manage activities on Open Space.</p> <p>The Open Space Program will continue to work with adjacent landowners to minimize their impacts to the important natural values of this area.</p>	<p>The proposal to place a trail away from the raptor perch 1/4 mile relies on the best available scientific information and professional judgement. Based on research and experience, the Division of Wildlife recommends a 1/4 to 1/2 mile buffer for bald eagles. Taking into consideration the desire for recreational activity and variations in topography which enhance this recommended buffer distance, the proposal recommends the lesser distance. There are other activities in the area, but they are infrequent or seasonal. Activity from trail use is year-round and frequent. In addition, there are a host of factors that potentially affect area raptors in the Boulder Valley. Open Space continues to work with its neighbors to minimize impacts on adjacent lands.</p>
<p>Numbers have increased The raptors took residence in this area after the trail was opened and humans hiked in the area. It seems that they would not have done so if our presence was so disturbing.</p>	<p>Disagree.</p>	<p>Raptors have used the area for many years. This is evidenced by the Division of Wildlife recommending in 1991 that the designated trail not be constructed beyond where it now ends because the cottonwood tree in the northwest part of the "back" field was used as a bald eagle perch. The activity from the nearby social trail is likely a reason the bald eagles are now seldom seen in the tree.</p>
<p>Seasonal closure Can the area within the 1/4 mi radius of the cottonwoods with roosting raptors be closed only during roosting season as it is in Eldorado Springs on some of those trails?</p>	<p>A seasonal restriction would help to minimize further impacts to seasonal or wintering raptors, but the area is used year round by a variety of raptors and other wildlife species.</p>	<p>The area supports a variety of raptors that frequent the area throughout the year. Bald eagles winter in the area, but osprey and prairie falcon use the area primarily in spring and summer months. Swainson's hawks nest in the area and use the area throughout the spring and summer.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Short walk The Dry Creek loop is very short walk (about 30 minutes), and I would hate to see it get even shorter.</p>	<p>Agree. The Open Space Program will be further evaluating new trails in the area which may provide additional trails for visitors to enjoy (connecting to South Boulder Creek Trail and Teller Farm).</p>	<p>Open space staff acknowledges that shortening the loop would reduce the length of the walk by about 5 minutes. This is a tradeoff that enhances the natural values of the area.</p> <p>Other trailheads and trails throughout the Open Space system provide similar opportunities and additional trail distances for longer outings.</p>
<p>Vista The proposal to pull the western field loop trail away from the southern boundary of the property is objectionable to me. This section is the most spectacular portion of the entire trail experience at Dry Creek.</p>	<p>Partially agree. The Management Plan incorporates a broad spectrum of public input regarding recreational uses and attempts to balance reasonable public access with protection of sensitive natural areas.</p>	<p>The view from the trail near its western most location is impressive. Reducing the time this view is available is a tradeoff which provides raptors a reasonable buffer and enhances the natural values of the area.</p> <p>Future trails may be provided which could provide similar experiences and views.</p>
<p>Ain't Broke If it ain't broke, don't fix it.</p>	<p>Disagree. The current situation at Dry Creek is unacceptable and creates conflicts with preserving the natural values of the area (primarily prairie dogs and raptors).</p> <p>Rerouting the trail and fencing will separate recreational uses and domestic dog activities from the prairie dog Habitat Conservation Area, minimizing wildlife harassment, and allowing dogs to remain in voice and sight control.</p>	<p>The trail location is about 100 meters from the first raptor perch. The Division of Wildlife recommended buffer, based on the scientific literature and professional judgement, is 400 to 800 meters.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Trail connections - Dry Creek area To the west of the Dry Creek trailhead, the staff should be directed to provide a trail alignment on existing, available Open Space lands south of Baseline Reservoir. The alignments proposed in the management plan are unfeasible (due to the unavailability of the rights-of-way) and unacceptable (an alignment along the shoulder of a major highway does not meet any reasonable safety or quality criteria). Our review of the staff's resource studies and of the land itself indicates that a suitable trail alignment does exist south of the reservoir and parallel to the irrigation ditch. The alignment avoids the wetlands, Preble's meadow jumping mouse and Ute ladies'-tresses orchid habitats, and is out of sight or sound of adjacent private homes. The trail can be sited to avoid close proximity to the cottonwood trees that may be used for raptor perches (although the 1/4 mile radius exclusion zone suggested by the Open Space staff probably cannot be maintained, there are already private homes and recreational facilities at Baseline Reservoir that are well within that zone).</p>	<p>Disagree. An alignment along the north side of Baseline has not been thoroughly evaluated, therefore it is unknown whether the required right-of-ways are available. Staff has done a preliminary evaluation of the proposed route and it is feasible to provide a safe separated trail between the edge of the road and the high water line of Baseline Reservoir.</p> <p>The current Open Space lands south and west of Dry Creek Trailhead (the Suits and St. Walburga properties) are not suitable for trail development because of potential impacts to wintering bald eagles, raptors, Preble's meadow jumping mouse, extensive wetlands, tallgrass areas, and Ute ladies'-tresses orchid habitat. If the north of Baseline Reservoir alternative is not possible or the alignment has to be placed adjacent to the road, additional analysis of trail options south of Dry Creek Trailhead will be conducted.</p>	<p>The proposal to the north of Baseline Reservoir has the fewest environmental impacts and offers superb views of the mountain backdrop and Boulder Valley. This trail alignment does pass near Baseline Road, but the proposal is to further evaluate a separated grade trail.</p> <p>The conceptual trail corridor has been on the <i>Boulder Valley Comprehensive Plan</i> for about 12 years. It would be short-sighted to not thoroughly and patiently work towards completing the connection via the best alternative available.</p> <p>The trail alignment promoted in this comment passes through significant wetland areas, is in potential and occupied Preble's meadow jumping mouse and Ute ladies'-tresses habitat (both threatened, Endangered Species Act), and passes within 60 meters of a perch used by bald eagles (threatened, Endangered Species Act), golden eagles, ferruginous, red tailed and rough tailed hawks, osprey, and a Swainson's hawk nest. The Division of Wildlife recommends a 1/4 to 1/2 mile buffer for bald and golden eagles. Because the trail is a connector that needs to be available year round, the impacts to the bald eagles in winter, and the other raptors throughout the year, would be direct and immediate. If the trail is moved away from the raptor area it would increase impacts to wetlands. Just because there is other, largely seasonal, activity in the area does not relieve the responsibility of the Open Space program to protect these rare and sensitive resources.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>The Dry Creek area has enormous native species and habitat value, including the presence of three (four, if and when the black-tailed prairie dog is listed under the Endangered Species Act). If the Open Space Department is unable to protect this area from unacceptable impacts, it is unlikely that the Open Space Department will be able to protect any area of high ecological value from recreational and other user impacts. In short, We believe that human use of this area should be severely restricted in order to protect fully the prairie dog community, raptors, and other animal and plant communities from adverse impacts.</p>	<p>Agree (see previous response and explanation).</p>	<p>See previous response and explanation.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Trail in Dry Creek Area definitely need to go around north east of (Baseline) lake. We have already high use in this area.</p> <p>-----</p> <p>The proposal to route a trail along the north shore of Baseline Lake conveniently ignores the fact that the lake has almost undercut the road and repeated applications of rip-rap have failed to stabilize the erosion; that there is a longstanding neighborhood "Baseline Lake Recreation Group" which sub-leases the north shore from a boat club which leases it from the ditch company which is (now) controlled by the City of Lafayette; that this route would necessitate crossing private land in several locations; plus a host of other problems. Using the shoulders of Baseline Road itself is not an option, as there aren't any, and vehicular traffic is unacceptable as a trail companion anyway.</p>	<p>Agree with first comment. The best alternative is north of the Baseline Reservoir.</p> <p>Undercutting is occurring along the north side of Baseline Reservoir. The undercutting may actually provide an opportunity to efficiently combine the needed repairs to stabilize the banks with trail construction.</p> <p>The Open Space staff has met with the City of Lafayette and is exploring the possibility of a trail through this area. Creation of trail would not necessarily relinquish any short or long term recreational lease of the area.</p> <p>If these lands are unavailable the southern alternative will be examined further. If impacts from various alignments on Open Space are determined to be unacceptable, this connection may not be completed, or an on-street route on Baseline may be used (where shoulders have recently been added to both east and west bound traffic lanes).</p>	<p>The proposal to the north of Baseline Reservoir has the fewest environmental impacts and offers superb views of the mountain backdrop and Boulder Valley. This trail alignment does pass near Baseline Road, but the proposal is a separated grade trail. It is the best alternative.</p> <p>The conceptual trail corridor has been on the <i>Boulder Valley Comprehensive Plan</i> for about 12 years. It would be short-sighted to not thoroughly and patiently work towards completing the connection via the best alternative available.</p> <p>The trail alignment promoted in this comment passes through significant wetland areas, is in potential and occupied Preble's meadow jumping mouse and Ute ladies'-tresses habitat (both threatened, Endangered Species Act), and passes within 60 meters of a perch used by bald eagles (threatened, Endangered Species Act), golden eagles, ferruginous, red tailed and rough tailed hawks, osprey, and a Swainson's hawk nest. The Division of Wildlife recommends a 400 to 800 meter buffer. Because the trail is a connector that needs to be available year round, the impacts to the bald eagles in winter, and the other raptors throughout the year, would be direct and immediate. If the trail is moved away from the raptor area it would increase impacts to wetlands. Just because there are other, largely seasonal, activities in the area does not relieve the responsibility of the Open Space Program to protect these rare and sensitive resources.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Down-grade the Dry Creek Conceptual Trail Corridor north of Baseline Rd. The Dry Creek conceptual trail corridor north of Baseline Road should either be removed from the plan or down-graded from a "tier designation 2" to the lowest possible "tier designation." This comment is made in deference to the fact that a trail connection east of 75th is tentative. An "out and back" trail for dog walkers, through this wetland and riparian area, should not be consideration or even a remote possibility.</p> <p>----- Make a sincere effort to implement the <i>Boulder County Comprehensive Plan</i> trail corridor connecting the South Boulder Creek and Teller Farm trail corridor to the east of the Dry Creek trail systems. The staff should be directed to actively pursue the portions of the trail corridor to the east of the Dry Creek trailhead. This is much too important a trail connection to be allowed to fall into the cracks between two management plans.</p>	<p>The Management Plan at Objective 10.4.3 states: Further evaluate potential options for a trail which would provide a connection from Dry Creek Trail northeast to East Boulder Trail. This trail proposal, if determined to be suitable, should be constructed in its entirety from Dry Creek Trailhead to South Teller Trailhead to avoid the need for a new trailhead along 75th Street. A suitable conceptual alignment is currently available on the Open Space lands west of 75th Street to Dry Creek Trailhead. The Open Space lands east of 75th Street are not a part of this Management Area and have not been thoroughly evaluated. The remainder of this potential route should be evaluated in the near future and construction completed after existing uses and future connections at Dry Creek have been resolved (see actions above). If impacts from various alignments on Open Space are determined to be unacceptable, this connection may not be completed, or additional lands may need to be acquired, or mitigation actions may need to be taken before trails can be constructed.</p>	<p>Additional recreational access and trails within South Boulder Creek are to be further evaluated once existing problems on designated trails have been corrected and improved, and undesignated trails in sensitive areas have been closed and reclaimed.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Trail connections - other Additional Trails. Rocky Mountain Animal Defense recognize the need for the Open Space Department to develop policies that balance human recreational interests and other human uses with the protection of native, non-human species. However, increasing trail mileage and allowing for greater trail connectivity will undoubtedly increase human disturbances of wildlife. We recommend that additional trails be constructed only when they will reroute human traffic away from Habitat Conservation Areas and when they will help separate humans from sensitive wildlife areas.</p>	<p>Agree that trails should be constructed to minimize impacts to important natural areas.</p>	
<p>Regarding parking along Marshall Road - if the plan is to actually prohibit parking at the southern terminus of South Boulder Creek trail, then the plan should clearly state this. I don't think it is realistic to think that visitors to the area will drive all the way to Cherryvale to park. Is it possible to direct visitors across Highway 93 to our parking lot at the old operations center? Is there other land available that could serve as a parking area?</p>	<p>One of the management actions under 10.4.3 of the Management Plan states "Encourage visitors using South Boulder Creek Trail to park at Cherryvale Trailhead. Parking will be discouraged along the east and west sides of Marshall Road (at the southern terminus of the newly completed section of South Boulder Creek Trail) to prevent vehicles from blocking emergency access gates and minimize conflicts with adjacent landowners. Signs will be placed at this access point encouraging visitors to use Cherryvale Trailhead. Open Space staff will work with Boulder County Transportation to post no parking signs in these areas."</p>	<p>If Boulder County Transportation agrees the signs are necessary, then parking will legally be prohibited. In the interim, Open Space will discourage parking by directing visitors to park at Cherryvale Trailhead. The South Boulder Creek Trailhead on the west side of Highway 93 is not a good alternative because there are currently no reasonably safe areas to cross the highway.</p> <p>Other Open Space lands are in the immediate vicinity, but they are dominated by wetlands and staff does not feel that current use levels warrant another trailhead in this area.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Some mention should probably be made here about the proposed trail connecting the Valmont Connector with Jay Road. This trail linkage was the subject of many meetings by County Transportation staff, Open Space and Tributary Greenways staff. The potential for significant impacts remains.</p>	<p>Agree. One of the management actions under Objective 10.4.3 of the Management Plan states "Open Space will work with the Tributary Greenways Program, the City of Boulder, and Boulder County Transportation to ensure appropriate alternative transportation routes are available to access designated Open Space trails and trailheads. Priority areas for providing alternative transportation routes are the Pearl Parkway corridor and connecting lower Fourmile Canyon Creek to Cottonwood Trail. Other areas include the Boulder-Longmont Diagonal Highway right-of-way and a route along U.S. 36 right-of-way from Louisville. Alternative transportation routes are generally not provided on Open Space lands. Open Space trails are for appropriate recreational use and will be carefully evaluated on a case-by-case basis to ensure there are no significant impacts to surrounding environmental values."</p>	<p>No decisions have been made regarding the use of the Valmont Connector and Open Space will continue to work with the appropriate agencies to ensure impacts on Open Space lands are minimized.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Greenbelt Meadows Create an access from the Greenbelt Meadows Subdivision access gate, granted in the subdivision agreement, to the South Boulder Creek Trail on the opposite (east side) of the creek.</p>	<p>The Management Plan at Objective 10.4.3 states: Work with residents of Greenbelt Meadows Subdivision to designate a trail which would provide access from the east side of their subdivision to the surrounding Open Space lands and to designated trails in the area (Figure 10.4). Conduct education for homeowners and the general public about the trail, riparian area, and natural values in the area. The newly designated trail should avoid the riparian area along South Boulder Creek and connect directly to South Boulder Creek Trail via a new pedestrian bridge. The bridge should be designed to accommodate pedestrians (no bikes or horses) and minimize environmental impacts. Although public access will be allowed across the proposed bridge and the Greenbelt Meadows access, the bridge and signs should be developed to discourage general public use of this access. The Greenbelt Meadows access will not be shown on public trail maps in order to discourage parking and access through Greenbelt Meadows subdivision. Adequate public access currently exists at Bobolink Trailhead, East Boulder Community Center, and Cherryvale Trailhead. Fences will be constructed along the north and south of the new designated trail to discourage use of existing undesignated trails and surrounding sensitive natural areas. (cont.)</p>	<p>Discussions with a homeowners subcommittee identified the homeowners interests to be: (1) access to South Boulder Creek Trail, (2) access to walk dogs adjacent to the subdivision, (3) concern about increased traffic and parking from a direct connection to South Boulder Creek Trail, (4) property values, (5) protecting plant and animal habitat. Open Space interests include: (1) honoring the subdivision agreement, (2) reducing fragmentation to rich riparian habitat that supports a variety of species including the threatened Preble's meadow jumping mouse and Ute ladies'-tresses orchid, and (3) providing reasonable access to South Boulder Creek Trail.</p> <p>The bridge likely has the least impact to Preble's meadow jumping mouse and Ute ladies'-tresses' habitats. The bridge could increase traffic in the neighborhood. The bridge will be constructed to minimize its size and appearance and be designed for pedestrian use.</p> <p>If permits for the bridge can not be obtained, foot traffic from the public access will be directed to 55th Street and the East Boulder Community Center bridge using fence and signs.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>If necessary permits for the proposed bridge cannot be obtained due to environmental impacts, the existing undesignated trails along the west side of the creek should still be closed with educational signs and fences. Residents of Greenbelt Meadows would then be directed to other existing accesses or along the westerly edge of existing Open Space lands to minimize further environmental impacts.</p>	<p>Agree (see above for response and explanation).</p>	<p>The bridge likely has the least impact to Preble's meadow jumping mouse and Ute ladies'-tresses' habitats. The bridge could increase traffic in the neighborhood. The bridge will be constructed to minimize its size and appearance and be designed for pedestrian use.</p>
<p>I support the construction of a bridge across south Boulder Creek to the bobolink Trail. This accomplishes the homeowners' objective of using the Open Space trail system and may go the farthest to protect Preble's habitat. I respect the homeowners' desire to limit traffic into their development and would like to see staff work to minimize the size and visibility of the near bridge and access thereto. ----- I oppose the bridge because I believe it will bring more traffic across my yard and worsen the existing parking problem.</p>	<p>Disagree (see above for response and explanation).</p>	<p>This trail alignment would fragment habitat along the creek and through occupied Preble's meadow jumping mouse and Ute ladies'-tresses orchid habitat.</p>
<p>That compromise (at Greenbelt Meadows) would be relocating the trail 100 + feet off the creek center line, no fencing, use crusher fine as a base, and run the trail north to the existing bridge. The existing fence there might make a nice route to follow, it does however, get too close to the creek at one point.</p>		

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>TRAILS Connect Dry Creek Trail to South Boulder Creek Trail</p>	<p>Staff will evaluate trail connection options. The alignment directly south and west of Dry Creek Trailhead (the Suits and St. Walburga properties) is not suitable for a trail because of significant environmental impacts. Other connections may be possible.</p>	<p>The Draft Management Plan states: “The current Open Space lands south and west of Dry Creek Trailhead (the Suits and St. Walburga properties) are not suitable for trail development because of potential impacts to wintering bald eagles, Preble’s meadow jumping mouse, extensive wetlands, tallgrass areas, and Ute ladies’-tresses orchid habitat. Open Space will evaluate the feasibility of acquiring easements or fee ownership of lands north of Baseline Reservoir to provide a trail from Dry Creek to South Boulder Creek Trail connecting somewhere in the vicinity of Baseline and Cherryvale Roads. If these lands are unavailable or impacts from various alignments on Open Space are determined to be unacceptable, this connection may not be able to be completed, an on-street route may be used, or mitigation actions may need to be taken before this connection can be made.”</p>
<p>Create a trail from Dry Creek Trail south to trails around Marshall Mesa (Dry Creek, Clough, Marshall, South Boulder Road, Van Vleet, U.S. 36 underpass, Yunker, Damyanovitch/Hogan to South 66th Street).</p>	<p>Disagree. This connection is not a high priority at this time and other trail connections may eliminate the need for this trail.</p>	<p>“There are currently no trails or plans for trails in the area of South 66th Street where this proposed trail would end. If a suitable trail alignment is developed from Dry Creek Trailhead to South Boulder Creek Trail, Marshall Road (at the southern terminus of South Boulder Creek Trail) could be used to connect South Boulder Creek Trail to the Marshall Mesa Area eliminating the need for an easterly trail connection in this area.”</p>
<p>Connect Dry Creek Trail east to trails around Louisville (Dry Creek, Clough, Marshall, private land, 76th Street, O’Conner/Steinbach, Louisville).</p>	<p>Disagree. The current priorities to evaluate a the conceptual alignments in the <i>Boulder Valley Comprehensive Plan</i> and the <i>Boulder County Comprehensive Plan</i>.</p>	<p>The <i>Boulder Valley Comprehensive Plan</i> currently shows conceptual trail connections to Louisville using the Burlington Northern railroad grade and/or City of Boulder Open Space south of Teller Farm (Autrey, Watt, Louisville trail easement to O’Conner-Hagman, Steinbach to existing Louisville trails). This trail proposal and the trail connections proposed in the <i>Boulder Valley Comprehensive Plan</i> will be further evaluated in the development of the East Boulder Area Management Plan where most of these lands are located.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Connect Cottonwood Trail north and west to trails around North Boulder Valley (McKenzie/Belgrove, Lousberg/Nu-West, Gallagher, private land, Boulder Valley Ranch)</p>	<p>Disagree. The current priority is to connect east Boulder trails to North Boulder Valley using IBM.</p>	<p>The current priority for trail connections in this area is to connect existing trails to the east (Cottonwood Trail to Twin Lakes, Twin Lakes to IBM, and East Boulder Trail to IBM) with existing trails around Boulder Reservoir by using the new IBM Open Space purchase located along the Boulder Longmont Diagonal. Other trail connections in this area may be evaluated once higher priority connections are made and potential acquisitions have been explored.</p>
<p>Complete trail connections outlined in <i>Boulder County Comprehensive Plan</i>. Give adequate consideration to these alignments.</p>	<p>Partially agree. Trails in the <i>Boulder County Comprehensive Plan</i> will be given adequate and thorough consideration.</p>	<p>Trail connections outlined in the <i>Boulder County Comprehensive Plan</i> and <i>Boulder Valley Comprehensive Plan</i> are only conceptual. Each potential trail connection will be further evaluated in the development of the individual area management plans and balanced with other management goals. Alignments staff is evaluating or pursuing: Dry Creek to Teller, recent extension of South Boulder Creek Trail, working with the Tributary Greenways Program.</p>
<p>Do not place trails in areas where there are undesirable environmental impacts. In some areas there should be no recreational activity. Direct use by providing an alternative so undesignated trails do not develop.</p>	<p>Agree. Trails should not be placed in areas that have undesirable environmental impacts. Included are areas that effect rare species, riparian areas because of their importance to wildlife, Habitat Conservation Areas because of the effect on prairie ecosystems, and large blocks of relatively unfragmented habitat.</p>	<p>Wise placement of trails includes providing a good visitor experience, while minimizing negative environmental effects. In some instances trails should not be placed in an area because of unacceptable impacts. Reasonable alternatives should be pursued.</p>
<p>Provide access for the disabled.</p>	<p>Agree.</p>	<p>The Draft Management Plan states: "Incorporate American Disabilities Act standards into existing and new passive recreational facilities (trails, trailheads, benches, signs, etc.) whenever possible and reasonable." The Open Space Program is working with the Trail Accessibility Project, an interagency and community group effort, to identify and increase trail accessibility for people with disabilities. The newly completed South Boulder Creek Trail extension to Marshall Road is reasonably accessible to people in wheel chairs.</p>

COMMENT / ISSUE	OPEN SPACE STAFF RESPONSE	EXPLANATION OF RESPONSE
<p>Proliferation and use of undesignated/unofficial trails on Open Space lands. The Open Space Department and the South Boulder Creek Area Management Plan should vigorously discourage the creation and use of undesignated trails and other off-trail activities.</p>	<p>Agree.</p>	<p>Undesignated trails are routinely closed and allowed to revegetate. Use of designated access points and trails is strongly encouraged.</p>
EDUCATION		
<p>The Boulder County Nature Association strongly supports vigorous education efforts, especially with respect to explaining the importance of and need for restrictions on the use of open space. If open space users understand why particular use restrictions are in place, they are far more likely to support and comply with these restrictions. These education efforts must be complemented by vigorous enforcement efforts as well.</p>	<p>Agree.</p>	<p>Educational efforts such as interpretive signs will be used to inform Open Space visitors about why management actions are needed. Enforcement will be used when needed to as part of the education process.</p> <p>In conjunction with the planning project, staff is conducting an educational pilot program in the area. Through the "Leave No Trace on Open Space" program, staff will educate visitors on ways to lighten their impact on the land and resources while having a good time. A variety of education and outreach techniques are being used including: trailhead contacts, signs, brochures, newspaper articles, and a short video run on Channel 8. Various studies have evaluated the effectiveness of various management techniques upon influencing recreational behavior. These studies, public focus groups, public involvement in the planning process, and staff experience were used in determining what techniques would be the most effective. A monitoring program is being used to assess and improve the program.</p>
<p>What about the wildlife observation facility with interpretive sights at Ute to overlook the lakes?</p>	<p>The Ute Industrial property, among others, will be evaluated for a grassland ecosystem/prairie dog interpretive site.</p>	

APPENDIX 3.1: COORDINATED RESOURCE MANAGEMENT FRAMEWORK FOR THE SOUTHERN PORTION OF THE SOUTH BOULDER CREEK MANAGEMENT AREA

Introduction

The South Boulder Creek Management Area contains land with important ecological characteristics of statewide significance. Included in the area are floral, faunal, ecologic and scenic features, education and research values, relatively undisturbed areas, and trails. Based on these ecological values, the Open Space Program is working with the Colorado Natural Areas Program to designate 1,193 acres in the southern part of the area as the South Boulder Creek Natural Area. This diverse natural area at the urban edge holds potential for cooperative management approaches to enable the protection and preservation of Colorado's natural heritage consistent with ongoing recreational and agricultural land uses. This appendix provides background information and a framework to be used to manage natural resources in the area.

Designation of the South Boulder Creek floodplain as a state natural area is compatible with the Open Space charter goals of preserving/restoring natural areas, preserving water resources, and providing lands for nature studies. The site has significant floral, faunal, ecologic and scenic features, education and research values, relatively undisturbed areas, and trails. Its urban location holds potential for cooperative management approaches to enable the protection and preservation of Colorado's natural heritage consistent with ongoing recreational and agricultural land uses.

Locally and regionally important ecological elements and systems are found in the southern half of the South Boulder Creek Management Area. Natural features include a mosaic of high quality wetlands, plains riparian forests, and tallgrass prairie ecosystems. Sensitive species known in the area are Ute ladies'-tresses orchid, toothcup, American ground nut, dwarf indigo, Preble's meadow jumping mouse, bobolink, orange spotted sunfish, and plains topminnow. Rare or sensitive plant communities include tallgrass prairie, riparian areas, and wetlands. Potential habitat exists for additional rare or uncommon species that have not yet been documented in the South Boulder Creek area.

Current maintenance of this biologically rich area involves careful, active management. Fragmentation of habitat and interrupted natural processes, resulting from human influences, have created the need for ongoing human intervention. Some of the most fertile agricultural land in the Boulder Valley occurs in this southern portion of the Management Area. Agricultural operations, prescribed fire, and Integrated Pest Management encompass the primary management activities. Many native species or communities in the area have overlapping habitat, and several rare species have very specific management needs. Often the species- or community-specific management needs conflict with one another.

Providing a detailed description of management accomplishes several objectives: (1) establishes an integrated resource management “vision” for the area, (2) documents the current resource management framework, (3) creates a framework to maintain, protect, or restore the ecological quality of a complex and rich area, (4) provides current and future employees a relatively efficient way to understand and manage the area, (5) employs “adaptive management,” a process of modifying management as new information becomes available, and (6) provides a spatial framework for grouping and managing areas based on ecological similarities and management needs, rather than political or property boundaries. The Natural Area plan is oriented towards natural and agricultural resource management. The effects of recreational use on the ecological elements are included in this framework. Trail location is addressed in the Passive Recreation chapter of this Management Plan.

Open Space employs an integrated approach to natural resource management in the area. This management is described in this appendix in the following sections: background, description of the layers of information used to characterize and group ecologically similar vegetation areas or “patch” types, a set of criteria to use in fine-scale management planning, and a listing of preferred management practices for selected natural resources and patch types. By sequentially overlaying descriptive layers, and by applying evaluation criteria and preferred management practices for each resource, management tradeoffs can be made and a management prescription established for each patch type.

Considerations for natural resource management include identifying patch types and site conditions that are variable depending on irrigation water availability (and ditch seepage), weather patterns, weed population dynamics, agricultural operations (e.g., equipment and personnel availability). In addition, agricultural management practices play help maintain remnant habitat for native plants and animals. The Open Space Program places considerable demand on its agricultural lessees to be flexible and diligent in order to preserve rare species and other valuable communities. In the future, the Open Space Program will face challenges as existing lease operators retire and new individuals take over who do not necessarily understand the patterns or reasons for various management practices.

Several natural resource management goals and objectives exist for the area. These include applying an ecosystem-level approach to guide management decisions, adapting and relating Open Space management to account for activities and influences occurring on surrounding, non-Open Space lands. Others include practicing sustainable agriculture, maintenance of rare plant species and community habitat, reintroducing important ecosystem processes including fire, and managing human use so that natural resources are not adversely affected.

A comprehensive description of the complex natural resource management in area has not been documented prior to the development of the South Boulder Creek Area Management Plan. Integrated management has evolved by using adaptive management through years of experience with traditional agriculture and natural resource management. Specific activities are implemented as an annual routine by Open Space staff and lessees. This document brings together years of information from numerous files and oral sources.

The overall vision for natural resource management in the area was developed through a process for protecting, managing, and restoring natural functions in this complex area, such that the agricultural operations and natural features are sustainable. Management prescriptions that lead to restored prairie, wetland, and riparian areas are favored. Management of non-native plants and animals occurs to reduce threats to sensitive resources. The integrated management of the area combines information about rare species and communities, aesthetic beauty, agricultural practices, passive recreation, and an urban interface.

Background

Area Description

The South Boulder Creek Natural Area and similarly managed Open Space lands around it (including portions of the Colorado Tallgrass Prairie Natural Area) is essentially the southern part of the South Boulder Creek Management Area (see Appendix 3.1, Figures 1* and 2*) and includes numerous properties (see Figure 7.1): Church, Yunker, Burke I, Burke II, Gebhard, Van Vleet, Short, Church of Christ, Gallucci, Mary Hogan Clyncke, Suitts, St. Walburga, Klein, Fancher, Rolling Rock, Damyanovich, and Hogan Brothers. The properties lie along the South Boulder Creek floodplain and its older terraces, and comprise approximately 1,700 acres out of the 3,502 acres in the Management Area. The South Boulder Creek Natural Area itself includes 1,193 acres.

Historical Background: Flooding, Fire, Grazing, and Human Influence

Flooding, fire, grazing, and human settlement are disturbance processes that have shaped the landscape. Not only do these natural and human-caused processes influence the character of the landscape, but they influence the quality, extent, and dynamics of native plant and animal habitat. Many organisms evolved with these processes and in some cases have become highly specialized and dependent on specific disturbance processes. Managing for the long-term viability of native ecosystems will require the use, or simulated use, of these processes in management activities.

Flooding

Periodic flooding was a dominant process in the South Boulder Creek floodplain before permanent settlement. Seasonal flooding replenished wetlands in the floodplain, scoured the stream channel, created new stream meanders, and deposited silt. Numerous native floodplain species evolved and are adapted to seasonal high water flows, and a high water table. Plains cottonwood (*Populus deltoides*) is the dominant native overstory species of low elevation riparian forests. It depends on the scouring effects of floods for seedling establishment and successful regeneration. Some reaches of South Boulder Creek are populated by narrowleaf cottonwood (*Populus angustifolia*) which is an important overstory species of “foothills transition” riparian areas. Narrowleaf cottonwood depends on seasonally high water, and a high water table throughout the year. Ute ladies’-tresses orchid benefits from openings in taller vegetation created by the scouring and deposition resulting from periodic floods.

With EuroAmerican settlement, dams and ditches were built to support irrigated agriculture and urban development. Diversion of water primarily altered the timing and intensity of the natural

hydrograph. In addition, the irrigation headgates, dams, bridge abutments, flood control structures, and other structures were built in the stream channel and have had the effect of locking the stream channel into limited areas where before it had meandered widely. As a result of the overall reduction in flows, frequency of overbank flooding, and limits on the ability of the stream to meander, the overall number of plains cottonwood trees is declining. For other species, it is still unknown what the ultimate effect of these cumulative impacts will be, but effects on species that depend on habitat renewal from flood scouring and meandering can be expected.

Fire

Fire-adapted natural communities of plants and animals developed over time as frequent small-scale fires and periodic large-scale fires occurred on the land. The general effect of fire as a natural process was the maintenance of grassland health by nutrient cycling, removal of dead plant material and opening of seedling establishment sites. Fires probably burned in a mosaic of patches so that a diversity of habitats existed across the landscape at any given time. Grazing animals like bison and prairie dogs influenced fire regimes by reducing the amount of fuel available in grazed patches. Native Americans are reported to have influenced fire regimes by lighting fires for a variety of purposes.

Prairie grasslands had fire frequencies estimated between 3 and 15 years. Most fires in the grasslands of the Boulder Valley probably occurred during the dry summer months when thunderstorms are common. Spring may also have been a fire season in local grasslands (Colorado Natural Areas Program 1986). Fire regimes have been altered over the last century by fire suppression and land management practices. The result of the elimination or suppression of fire in tallgrass prairie has been a reduction in the competitive advantage of many perennial tallgrass species, and an increase in the likelihood of invasion by cool season, weedy species.

Grazing

Ungulate grazing has influenced the nature of grasslands in western North America for thousands of years. Large herds of bison, elk, and antelope moved seasonally across the prairies. In addition to large herds of ungulates, extensive colonies of prairie dogs stretched across the short- and mixed grass prairies of the Front Range. This burrowing and grazing had an important influence on the vegetation. Grazing created mosaics of grassland vegetation and helped to keep grazing adapted communities vigorous. Short, mixed, and tallgrass communities benefited from the natural disturbance of periodic short duration, high intensity ungulate grazing.

Human land use history

European settlers had a profound affect on the landscape over the last 150 years. The natural hydrology has been modified and stream channels altered, and periodic, natural fires have been suppressed or eliminated. In many places non-native plants, introduced by settlers, replaced native plant communities. Human communities increased in size to the point where natural processes, such as flooding, were interrupted in the name of public safety. Bison, elk, and deer populations dwindled or were extirpated from the area, and were replaced by cattle, horses, and sheep.

Agricultural land use has had a significant influence on the land and water during the last century. Some land has sustained less impact because of sound agricultural stewardship, while other areas show signs of overuse and long-term negative effects. The area covered by the South Boulder Creek Model generally escaped significant, long-lasting damage from past agricultural practices. The recent land use history for South Boulder Creek floodplain properties was summarized by Miller (1994). Ranchers and other long-time local residents reported that for more than 50 years the dominant land use within the South Boulder Creek floodplain and surrounding area has been agriculture. Most of the activity has centered around maintaining irrigated hay meadows and grazing livestock during the period from late fall through early spring. Haying times have varied from mid-July to late August. Hayfield fertilizer has varied between commercial fertilizer and spread manure. Since 1988, the current lessees have generally hayed in mid-July and grazed cattle from November through May.

Natural Resource Management by Category

The area is managed generally as one agricultural unit and contains a mosaic of habitat for native plant and animal species. Natural and agricultural resource management are combined and integrated in the area. This integration is particularly important, because the maintenance of habitat for several rare species and communities are currently dependent on the human-manipulated processes associated with agriculture.

Agricultural practices occurring in the area are: cattle grazing (predominantly dormant season: Nov. 15 to May 15), calving, haying (single-cutting), and flood irrigation. Additional management practices include prescribed fire and integrated weed management techniques. The interaction of various management practices, and their influence on natural resources, create complex management scenarios across the area.

Grazing

Cattle grazing occurs during the season when most native grassland plant species are dormant (Nov. to May). In hayfields, “aftermath” grazing takes place, where cattle forage on grass that remains after haying. Early spring grazing is used to help manage non-native plants. Integrated Pest Management focuses on reducing the need for chemical applications by controlling undesirable non-native plants with biological control, and mechanical removal. This is especially important in areas with rare plants and animals. The sensitive life cycle stages of various rare species influence the timing and location of grazing. Grazing is excluded from, or used on a limited prescriptive basis, in some areas (approximately 140 acres of the Natural Area and adjacent Open Space).

Irrigation

Flood irrigation is a major component of agricultural operations in the area. The function of flood irrigating is to support sustainable agriculture consistent with wildlife and plant management goals. The proper application and timing of irrigation water helps to control non-native weeds, support rare plant species and communities, and protect ground-nesting birds. The timing and distribution of irrigation is adjusted on a field-by-field basis based on the requirements of hay production and sensitive species, and on the availability of water.

Irrigation water is typically applied between May and August. Irrigation of some native and non-native hay fields contributes to the complexity of resource management and decision making in the area. The irrigation of hay fields and some unhayed grassland areas (Burke I, Burke II, Gebhard, Mary Hogan Clyncke, Church, Yunker, Suitts, Short, Van Vleet, Fancher, Rolling Rock, and Church of Christ) adds enough seasonal moisture to fields to create patches of favorable orchid habitat. However, spring irrigation (May to July) can be detrimental to ground nesting birds if the hay fields do not have dry hammocks for nest sites. An even application of water helps to mitigate excessively wet soil to control of Canada thistle and teasel.

In addition to affecting orchids and birds, irrigation may play an important role in the preferred habitat of Preble's meadow jumping mouse. The Preble's meadow jumping mouse is found in wet meadow and willow/shrub habitat. This type of habitat is common along irrigation ditches in the riparian, floodplain, and terrace vegetation associations in the area. Preble's have been captured at several locations within the southern end of the Management Area. Presently, little is known about how management, in particular agricultural operations, affect this mouse.

Haying

A significant portion of the area (approximately 515 acres of the Natural Area and adjacent Open Space) is used to grow non-native and native grass hay. The hay is harvested only one time per year by machinery. By not cutting the grass a second or third time, and by reapplying irrigation water, the grass produces some additional growth that is grazed later in the fall and winter. The benefit of managing the land in this way is that the grass remains vigorous and there is less need to reseed the hay fields or apply commercial fertilizer. Hay that is harvested from the fields is used to feed cattle prior to and during calving season on the same fields. This practice eliminates the introduction of new sources of weeds from outside of the management area. Further, the grass seed that is contained in the hay is returned to the fields where it originated which helps to maintain the long term vigor of the fields. Grazing also assists in removal of thatch which provides a more open vegetation canopy for new plant growth in the spring. Animal waste which accumulates during the season is dragged (harrowed) to assure even distribution of this fertilizer. These practices have allowed the Open Space program to decrease dependence on unnatural inputs such as herbicides and chemical fertilizer.

Orchids, Birds, and Haying

The complexity of this area is typified by the opposing management requirements for the Ute ladies'-tresses orchid (listed federally as a threatened species), and ground nesting birds (exhibiting the most rapid population declines of any North American avifauna group). Apparently, orchid and grassland bird habitat is maintained to an extent by human-manipulated disturbances like haying, cattle grazing, and prescribed burning. A significant portion of orchid and grassland bird habitat occurs where there is winter and early spring grazing, irrigation, and summer hay-cutting. Some future adjustments in grazing regimes, and an increase in the use of prescribed fire may improve orchid and bird habitat.

Ute ladies'-tresses orchids growing in hay fields typically begin to send up flowering stalks in late June and early July. When fields are hayed before July 1st, and the sickle height on the swather is set between 4 to 7 inches above ground level, many orchid inflorescences are missed

by the sickle. The desired outcome is achieved; the plants are afforded the opportunity to bloom and set seed. Conversely, best management for the bobolink (a ground nesting bird that is rare in Colorado) is to mow hay fields after July 15th which allows the young birds to fledge and thus escape injury or death from haying machinery. When hay fields are managed specifically for bobolink the sickle height can be set to about 4 inches above ground level, which is a preferred height for mowing because it allows the farmer to harvest a full cutting from the field.

However, weather conditions have a profound influence on the timing of haying operations. If weather conditions force changes in timing for haying, management emphasis for a given season may have to be shifted toward managing for birds rather than orchids. Thus, last minute decisions are made for managing a particular species.

Fire

Reintroduction of periodic prescribed fire is an important disturbance process for maintaining or improving native vegetation (shortgrass, mixed grass and tallgrass) health and vigor. Patches of tallgrass (mesic and xeric) benefit from periodic fires occurring in early spring (April to early May), when non-native cool season grasses have sprouted and native warm season grasses are still dormant. The resulting bare soil will benefit growing conditions for the native tallgrass species. Non-native species can be directly impacted by fire, or indirectly affected when the competitiveness of native species is enhanced by prescribed fire.

Integrated Pest Management

An integral component of native grassland restoration, and ongoing management is the control of invasive, non-native plant species. One of the major threats to sensitive species habitat is the introduction and spread of non-native plants. Canada thistle, diffuse knapweed, teasel, Russian olive, and numerous, escaped ornamental species are targets for management and control in the Model area. Commonly-used management tools are cattle grazing, mowing, prescribed fire, and herbicide. Integrated Pest Management usually involves a combination of treatments and monitoring to assess the need for continued treatment. The Integrated Pest Management section of the Vegetation chapter and Appendix 3.5 provide information on strategies for controlling non-natives in the Management Area.

A Description of the Spatial and Resource Analysis Used to Group Ecologically Similar Patches.

By looking at natural resources from a biological and geographical perspective, repeated patterns of physical and ecological characteristics are revealed throughout the area. The biogeographical analysis of this area consisted of an evaluation of landscape types, position of vegetation on the landscape, position of sensitive resources (and other key resources that Open Space manages for), natural processes, and management tools (such as location of irrigation and grazing). The analysis produced groupings of properties having similar ecological and management characteristics.

A relatively coarse level of patch types is displayed in Appendix 3.1, Figure 1*. This coarse level of analysis is practical to display in map form. A more detailed analysis of patch types will take place during the implementation of the South Boulder Creek Area Management Plan. More detailed information on sensitive species, other resource features, and management activities is available in text and graphic form in the *South Boulder Creek Management Area Inventory Report* (in particular, see Figures 7.3, 8.1, 9.1 and Tables 7.3, 8.3, 8.5. Appendix 3.1, Figure 2* displays information on grazing and annual haying that is not displayed elsewhere in the South Boulder Creek planning documents.

The components of the spatial and resource analysis for the area, summarized in Appendix 3.1, Table 1, are:

- Landscape position
 - Riparian areas
 - Valley bottom (=floodplain)
 - Terraces (above floodplain)
 - Pediments (mesas)
- Vegetation/plant community
- Selected natural resources
 - Ute ladies' -tresses orchid
 - Preble's meadow jumping mouse
 - Riparian Birds
 - Grassland birds
 - Native tallgrass prairie
 - Upland grasslands
- Management processes
 - Grazing
 - Haying
 - Integrated weed management
 - Flood irrigation
 - Prescribed fire
 - Irrigation and ditch maintenance

Landscape position

Several landforms that developed through river erosion dominate the area. These include the active riparian area, valley bottom, terraces, and pediments (mesas). The riparian area is the ground immediately adjacent to the South Boulder Creek channel. This riparian area contains predominantly native wetland, riparian forest, forest openings, and stream bank vegetation. In addition to natural riparian areas, riparian vegetation has grown up and exists along some irrigation ditches. Another landform is the valley bottom which is the area that is still affected by the overbank flood events--the "active" floodplain area. Above the valley bottom is a series of terraces which extend in steps of increasing elevation away from the creek. These terraces are

at too high an elevation above South Boulder Creek to be affected by flooding of the creek. When riparian vegetation is found on the terraces, it is more associated with ditches or irrigation than natural waterways. The highest landform is the pediments or “mesas” (e.g., Davidson Mesa) and often serve to contain the watershed between one creek and another. Distinguishing the various terraces and pediments is difficult because of subtle topographical, soil, and vegetation differences.

Vegetation/Plant Communities

Evaluations of vegetation/plant community type follow landscape position identification and classification. Vegetation in the southern end of the Management Area is described in the Vegetation chapter (Chapter 7) of the *South Boulder Creek Management Area Inventory Report* (1997b). Table 7.3, in particular, displays the general plant community types found in the Natural Area and surrounding Open Space.

Selected natural resources

Identifying the sensitive or unique plant communities, or plant and animal species, and locating where they exist on the landscape is the next (and ongoing) aspect of the evaluation process. The Open Space Program works to manage landscapes and ecosystems as complete or semi-complete units. However, there are some plant communities and plant and animal species that require more intensive management focus.

Management Tools

The combination/overlay of landform, vegetation, and selected natural resources influences management possibilities. Some obvious opportunities and limitations begin to emerge about how and where Open Space staff can manage resources. However, before management decisions can be fully determined, potential management tools (natural and anthropogenic processes) need to be added to the process. The most prevalent anthropogenic management tools used to achieve multiple resource objectives are agricultural--grazing, haying, and flood irrigation. Prescribed fire is a tool for managing native grasslands and has been a traditional agricultural management tool (e.g., irrigation ditch maintenance).

Criteria Used to Evaluate Areas and Determine Detailed Management Emphasis

In the Natural Area and vicinity, several sensitive species and/or community types may occur in close proximity to one another (i.e., their habitats overlap). Where sensitive resources with specific management needs overlap, conflicting management requirements may result. Several criteria are used to decide which resources will be the focus of management actions in a given area. The criteria include: (1) condition of the existing habitat (good, fair, marginal, poor etc), (2) historic habitat, (3) potential habitat adjacent to site, (4) presence or absence of disturbance processes (fire, flooding, agricultural practices--irrigation, haying, or grazing), (5) proximity to subdivision edges (the urban fringe), and (6) uniqueness of the habitat and resources.

Detailed decision making and the establishment of integrated resource objectives are accomplished by Open Space staff coordination. Planning and coordination meetings occur several times during the year and involve numerous interdisciplinary teams of resource specialists. Preliminary meetings are scheduled each year for late fall and early winter. Staff members meet to discuss up-coming projects, major actions, and implementation schedules. Planning for prescribed fire, grazing, Integrated Pest Management, rare species management, and other components of the Natural Area management is conducted during the winter and spring. For example, refinements to management actions are made in meetings held in early June. Meetings between staff and agricultural lessees are held the first two weeks of June to coordinate haying times and locations (fields). The meeting is used to coordinate the protection of flowering orchids and ground nesting birds.

An annual time line is attached as Appendix 3.1, Table 2 to show the sequence of coordination meetings and activities such as haying, grazing, irrigation, orchid and bird surveys, and burn seasons. The time-line provides a sense of the year-round natural resources management activities that are scheduled.

Numerous variables influence decision-making on an ongoing basis. For example, variables like weather, equipment, personnel changes, vegetation or wildlife population dynamics, require staff to be flexible in dealing with specific management actions.

Condition or Quality of the Existing Habitat (Good, Fair, Marginal, Poor)

The condition of habitat varies by species and specific location. Habitat for sensitive species is described in the *South Boulder Creek Management Area Inventory Report*. In general, good condition is characterized by dominance by native species, absence of noxious plant species, a prevalence of native plant and animal species that are not “increasers” under domestic livestock grazing and/or fire suppression, and stable soils with intact structure.

Based on observations and available information (Colorado Natural Areas Program 1986, Colorado Natural Heritage Program 1997), good quality vegetation is reflected in vigorous, diverse native wetland plant communities; patches of tallgrass composed mainly of native grass, forb and shrub species that define local tallgrass communities (Colorado Natural Areas Program 1986); pockets of the Ute ladies’-tresses orchid, and native riparian communities with species that indicate functioning fluvial processes (e.g, regeneration in plains cottonwood is occurring). Good quality grassland habitat for ground nesting birds is confirmed by the presence of bobolink and a diversity of other ground nesting birds. Preferred habitat for the Preble’s meadow jumping mouse is presumed to be moist meadows, proximity to water, and coyote willow thickets.

Patchiness and structural diversity in vegetation can lead to high animal species diversity. Even grassland patches that appear structurally homogeneous often have wetter and drier areas, variations in soil types, and topographical diversity that is reflected in the plant and animal communities. In general, a mosaic of ecological conditions at small and large scales on the landscape favors native species diversity and is therefore desirable. Conversely, relatively large areas dominated by a vegetation type with low species diversity (e.g., stands of crested wheat, smooth brome, and other non-native grasses) are considered of lower quality.

Non-native species, particularly those on the Open Space list of high priority non-native species requiring control, generally degrade the quality of agricultural and natural areas. The degree to which non-native plant species compromise the quality of an area depends on the distribution, density, and ecology of the non-natives present, and on the overall condition of the invaded native plant communities. Canada thistle, Russian olive, purple loosestrife, and knapweed are the non-native species of greatest concern in the Natural Area and vicinity.

Soil condition can be assessed by observing the presence or absence of compaction or erosion resulting from human activity (e.g., agricultural practice, ancillary trail development). Trampling (“post-holing”) by cattle during wet conditions is undesirable and should be avoided. Soils can be analyzed for mineral content, texture, and other characters that help in determining potential natural vegetation and in restoration planning.

Historic Habitat

Knowledge about the existence of specific habitats or communities in the past in a given area can assist managers in determining current management emphasis. For example, areas known to be occupied by nesting bobolink annually for many years are considered the highest priority habitat to maintain. Management emphasis may also be shaped by the knowledge that a species or community type used to exist in an area, but no longer occurs there. If habitat restoration potential is good for that area, then restoration may become an emphasis.

Potential Habitat Adjacent to the Site

The ecological context of each patch for which a management emphasis and prescription is developed is important for a variety of reasons. Examples of valuable features on adjacent land are: protected seed sources, contiguous habitat, pollinator habitat, or a buffer from the urban edge. On the other hand, influences from adjacent land may threaten natural and agricultural values. Non-native species, intense human activity, pollutants, pesticides and herbicides, and hydrologic alterations on neighboring land may compromise the quality of a habitat patch.

Presence or Absence of Disturbance Processes (e.g., Fire, Flooding, Agricultural Practices--Irrigation, Haying, or Grazing)

Key factors to evaluate when determining the management emphasis for an area are: currently functioning natural processes, potential for natural processes to be restored, and the ability to simulate natural processes. The sustainability of a given habitat is often influenced by the status of irrigation water delivery, prescribed fire plans, or other processes. Natural processes like flooding and fire have been highly modified over the last century or are no longer occurring. The restoration potential of many altered processes is constrained by human activity and urban development.

Agricultural management in the Natural Area provides disturbances that simulate some natural disturbance processes. Prescribed fire is another commonly used method of replicating natural processes in the Natural Area. Where feasible, management emphasis and planning should be derived from an assessment of the current processes functioning in an area, and the potential for restoring and or simulating processes.

Proximity to Subdivision Edges (the Urban Edge)

An evaluation of existing and potential influences from adjacent urban areas should be included as detailed management prescriptions are developed. Areas near or adjacent to the urban edge are frequently influenced by pets that become predators, ornamental plants that escape from gardens, and human activity in general. Areas distant from the urban edge are more likely to provide quality ground nesting bird habitat and probably serve as the best habitat for Preble's meadow jumping mouse.

Uniqueness of the Habitat and Natural Features

Using the best available information on natural resources in the Boulder Valley area and regionally, the uniqueness of a particular habitat or community can be assessed. The tallgrass patches included in the Colorado Tallgrass Prairie Natural Area are examples of a globally rare community type. The relative uniqueness or rarity of habitats within the South Boulder Creek Natural Area should be assessed by using local, regional, and global contexts. This contextual knowledge can be used to develop management priorities.

Key Management Practices (Best Management Practices) Required to Accomplish Ecosystem Management/conservation

Key conservation/management practices are used to guide management activities for sensitive or unique plant communities or species. The practices were developed from literature review, scientific research, and practical experience, and are modified as new information becomes available or circumstances change. The conservation/management practices were developed for: Ute ladies'-tresses orchid, Preble's meadow jumping mouse, riparian birds, grassland birds, native tallgrass prairie, upland grasslands, integrated pest management (weeds), and prescribed fire. Appendix 3.1, Table 3 details the key management practices for the area.

Summary

The southern part of the South Boulder Creek Management Area supports some of the rarest natural resources in the region. For this reason, parts of the area have been proposed for designation as a State Natural Area. Traditional agricultural practices serve an integral role in the management of natural resources in the area. In addition, the area provides high quality recreational opportunities and contributes significantly to the quality of life in the Boulder Valley.

Management of this exceptional Open Space area is complex and continues to be refined over time. The Open Space *Long Range Management Policies, City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan, South Boulder Creek Area Management Plan*, and other planning and policy documents help guide natural and agricultural management. In addition, the Program's research program funds pertinent research projects that often yield important management recommendations for this area. Adaptive management of the Natural Area will be based on research and monitoring results, and other new information. The Colorado Natural Area designation for the area will provide the Open Space Program with

technical assistance over time from the Colorado Natural Areas Program staff. By combining available resources and using adaptive management Open Space will carry out a quality management program for this unique area.

Appendix 3.1, Table 1: Landscape Position, Vegetation, Sensitive Resources, and Management

Landscape Position	Vegetation/Community	Selected Natural Resources (species and communities)	Management Type and Properties Where Located (except fire: see Appendix 3.4)	Current Management Emphasis by Management Type	Proposed Changes in Management Emphasis by Management Type*
RIPARIAN					
NATIVE	<p>Riparian forest canopy layer: narrow-leaf and plains cottonwood, alder, box elder, peach-leaved willow, cottonwood hybrids.</p> <p>Riparian shrubland layer: snowberry, hawthorne, sandbar willow.</p> <p>Herbaceous understory layer: tallgrass species, rushes and sedges.</p>	<p>Preble's meadow jumping mouse, <i>Spiranthes</i>, plains riparian forest.</p>	<p>1: Grazing (proposed changes in fencing and prescriptive grazing)--Van Vleet (all parcels adjacent to South Boulder Creek), Mary Hogan Clyncke.</p> <p>2: Recreation, trails in riparian zone--Burke II, Burke I, Van Vleet (all parcels adjacent to South Boulder Creek).</p> <p>3: Grazing and recreational influences minimized--Fancher, Mary Hogan Clynke (grazed prescriptively).</p>	<p>1, 2, 3: Protect and maintain Preble's, <i>Spiranthes</i>, bird, and other wildlife habitat.</p> <p>Maintain native plant species diversity and community structure.</p> <p>Exclude cattle from Burke I, Gebhard, and Fancher reaches, and dormant graze all other reaches.</p>	<p>1, 2, 3: Proposed fencing of all riparian corridors to allow exclusion or prescriptive grazing.</p> <p>Riparian restoration planning and implementation.</p>
NON-NATIVE	<p>Russian olive, crack willow, green ash, Chinese elm (<i>Ulmus pumila</i>).</p>	<p>Influence on natural resources: displaces or replaces native vegetation in <i>Spiranthes</i> and Preble's meadow jumping mouse habitat.</p>	<p>Same as management types above--Burke I, Gebhard, Mary Hogan Clyncke, Van Vleet, Fancher.</p>	<p>Russian olive removal.</p>	

Landscape Position	Vegetation/Community	Selected Natural Resources (species and communities)	Management Type and Properties Where Located (except fire: see Appendix 3.4)	Current Management Emphasis by Management Type	Proposed Changes in Management Emphasis by Management Type*
VALLEY BOTTOM					
NATIVE	<p>Tallgrass: cordgrass, switchgrass, big bluestem, yellow Indian grass.</p> <p>Wetland/wet meadow: rushes and sedges, cattails, waterpepper.</p>	<p>Preble's meadow jumping mouse, bobolink (and other ground-nesting birds), <i>Spiranthes</i>, <i>Aplos</i>, tallgrass communities.</p> <p>Wetland.</p>	<p>1: Grazing, no haying (some proposed changes in fencing and prescriptive grazing)--sections of Burke II, Gebhard, Van Vleet (only hayed patches in native bottomland are on parcel west of creek, north of U.S. 36), Rolling Rock, Mary Hogan Clyнке. All of Burke I. Fancher, Mary Hogan Clyнке grazed prescriptively.</p> <p>2: Grazing and haying--sections of Burke II, Van Vleet (west of creek, north of U.S. 36).</p> <p>3: No grazing or haying.</p>	<p>1, 2, 3: Protect and maintain rare species and communities (use grazing, fire, irrigation, Integrated Pest Management).</p> <p>Support and conduct rare species research.</p> <p>2: Lease for hay production and cattle grazing.</p>	<p>1, 2, 3: Fence to allow grazing exclosure or prescriptive grazing in a larger block of wet meadow (e.g., fence SW Van Vleet, exclude cattle, use fire, and monitor for 3 years).</p> <p>Enhance Preble's habitat through plantings and protection of habitat.</p>
NON-NATIVE	<p>Tall: redtop (<i>Agrostis g.</i>), timothy, meadow and tall fescues, intermediate wheatgrass, orchard grass.</p>	<p>Preble's, bobolink (and other ground-nesting birds), <i>Spiranthes</i>.</p>	<p>1: Grazing and haying--Van Vleet (east of creek, south of South Boulder Road), Gebhard (western 1/3).</p> <p>2: Grazing only--sections of Rolling Rock.</p>	<p>1, 2: Protect and maintain rare species.</p> <p>Lease for hay production (Van Vleet and Gebhard patches) and dormant grazing.</p> <p>2: Manage according to <i>City of Boulder Grassland Ecosystem Plan</i>.</p>	

Landscape Position	Vegetation/Community	Selected Natural Resources (species and communities)	Management Type and Properties Where Located (except fire: see Appendix 3.4)	Current Management Emphasis by Management Type	Proposed Changes in Management by Management Type*
TERRACES					
NATIVE	Tallgrass: big bluestem, switchgrass, yellow Indian, little bluestem, prairie cordgrass, prairie dropseed.	Preble's, bobolink (and other ground-nesting birds), <i>Spiranthes</i> , <i>Apios</i> , <i>Amorpha nana</i> , tallgrass communities.	<p>1: Grazing only-- Van Vleet (south of U.S. 36), Short, west Yunker (north of U.S. 36), sections of Church (west of Cherryvale Road, east Yunker lowland ?? (south of U.S. 36), sections of Suits).</p> <p>2: Grazed and hayed-- sections of west Yunker (south of U.S. 36) and Church (east of Cherryvale Road).</p> <p>3: Ungrazed--Colorado Tallgrass Prairie Natural Area (3) enclosure on Short.</p>	<p>1, 2, 3: Protect and maintain rare species and communities.</p> <p>Implement and update <i>Colorado Tallgrass Prairie Management Plan</i>.</p> <p>Encourage and support research.</p> <p>Manage according to <i>City of Boulder Grassland Ecosystem Plan</i>.</p>	<p>1: Evaluate and designate Van Vleet West prairie dog colony (according to <i>City of Boulder Grassland Ecosystem Plan</i>) where burrowing owl occurrence was recently discovered.</p>

Landscape Position	Vegetation/Community	Selected Natural Resources (species and communities)	Management Type and Properties Where Located (except fire: see Appendix 3.4)	Current Management Emphasis by Management Type	Proposed Changes in Management Emphasis by Management Type*
NATIVE	Mixed grass: little bluestem, sideoats grama, blue grama, big bluestem, buffalo grass, prairie dropseed, western wheatgrass.	Ground-nesting birds, xeric tallgrass communities.	<p>1: Grazing--Church of Christ, sections of Short, east Yunker north of U.S. 36.</p> <p>2: Ungrazed--none.</p>	<p>1: Protect and maintain rare species and communities (use Integrated Pest Management, fire, prescriptive grazing). Dormant graze cattle. Manage according to <i>Colorado Tallgrass Prairie Management Plan</i>. Manage according to <i>City of Boulder Grassland Ecosystem Plan</i>.</p>	<p>1: Develop rest rotation plans for grazing in upland areas.</p>
NON-NATIVE	Tall: tall and meadow fescue, smooth brome, orchard grass.	Preble's, bobolink (and other ground-nesting birds), <i>Spiranthes</i> , <i>Aptos</i> .	<p>1: Grazing--Suits, St. Walburga, Van Vleet east of Cherryvale Road and north of U.S. 36, sections of east and west Church, section of west Yunker south of U.S. 36.</p> <p>2: Ungrazed--none.</p>	<p>1: Lease for hay production and dormant grazing. Irrigate to optimally use adjudicated water rights. Protect and maintain rare species. Manage according to Grassland Ecosystem Plan (Van Vleet east and west of Cherryvale).</p>	<p>Shift Suits, St. Walburga, and sections of Klein to South Boulder Creek coordinated resource management framework over next 3 years (depending on existing leases).</p>

Landscape Position	Vegetation/Community	Selected Natural Resources (species and communities)	Management Type and Properties Where Located (except fire: see Appendix 3.4)	Current Management Emphasis by Management Type	Proposed Changes in Management Emphasis by Management Type*
PEDIMENT (Davidson Mesa)					
NATIVE	Tallgrass: big bluestem, prairie dropseed, little bluestem, switchgrass, sideoats grama, blue grama, buffalo grass.	Mesic and xeric tallgrass, <i>Amorpha nana</i> , ground-nesting birds.	<p>1: Grazed--sections of east Church, sections of east Yunker south of U.S. 36, Sections of Hogan Brothers.</p> <p>2: Ungrazed--none.</p>	<p>1: Protect and maintain rare species and communities. Implement and update <i>Colorado Tallgrass Prairie Management Plan</i>. Lease for dormant season grazing. Encourage and support research.</p>	<p>1: Develop rest rotation plan for cattle grazing.</p>
	Mixed grass: little bluestem, sideoats grama, blue grama, big bluestem, buffalo grass, prairie dropseed, western wheatgrass.	Ground-nesting birds, xeric tallgrass communities.	<p>1: Grazed--Hogan Brothers, Damyanovich.</p> <p>2: Ungrazed--Gallucci.</p>	<p>1, 2: Protect and maintain rare species and communities. Implement and update <i>Colorado Tallgrass Prairie Management Plan</i>. Encourage and support research.</p> <p>2: Lease for dormant season grazing. Manage according to <i>City of Boulder Grassland Ecosystem Plan</i>.</p>	<p>1: Develop rest rotation plan for cattle grazing.</p>

Landscape Position	Vegetation/Community	Selected Natural Resources (species and communities)	Management Type and Properties Where Located (except fire: see Appendix 3.4)	Current Management Emphasis by Management Type	Proposed Changes in Management Emphasis by Management Type*
NON-NATIVE	Canada bluegrass, cheatgrass, crested wheat.	Ground nesting birds.	1: Grazed--Richardson, Damyanovich.	Protect and maintain grassland bird populations (use Integrated Pest Management, fire, and prescriptive grazing). Lease for dormant season grazing.	Develop rest rotation plan for cattle grazing. Use prescriptive fire and grazing to shift plant species comp. toward native warm season grasses.

*The “proposed management” column is based on current knowledge of the area. Adaptive management will be used to refine management through time. The proposed management column contains a summary of management actions. For more information, consult the best management practices section.

Appendix 3.1, Table 3: Management Practices by Selected Resources

This table provides the best information available on how to manage individual selected resources. Management must be adjusted where selected resource management actions or other issues conflict.

Resource	Haying	Grazing	Water/Irrigation	Recreation	Prescribed Fire	Integrated Pest Management	Other
Ute ladies'-tresses orchid	<p>Haying should occur prior to July 1 (or as soon after as possible) to avoid cutting of flowering stalks.</p> <p>In areas that are not hayed annually, prescribed fire or mowing should be conducted on a periodic basis (3 to 5 years). Fire or mowing should occur in tallgrass areas in March, April, or October.</p>	<p>Graze livestock outside the most sensitive portion of the growing period which is May 15 to October 15.</p> <p>Use moderate intensity or high intensity and short duration stocking during the late fall, winter, and early spring.</p>	<p>In irrigated meadows, water needs to be applied in the spring (April to June) before haying, and again after haying (August, September) to maintain orchid and ground nesting bird habitat.</p> <p>Wetlands and orchid habitat are often created by leaky irrigation structures and ditches. Sensitive resources should be considered when construction or maintenance is proposed.</p>	<p>Avoid placing trails and recreational activity in occupied and potentially occupied habitat.</p>	<p>In areas that are not hayed annually, prescribed fire or mowing should be conducted on a periodic basis (3 to 5 years).</p> <p>Conduct prescribed fire in March, April, through mid-May, or in October to avoid sensitive life stages. If a fall burn is used, grazing may need to be removed for the fall, winter, spring grazing period.</p> <p>Do not use foam fire retardant in sensitive species habitat.</p>	<p>Mechanical control of non-native plants should occur prior to July 1 to avoid damaging flowering stalks.</p> <p>Herbicide (wick application) will be considered in infested areas adjacent to orchid habitat.</p> <p>Fire: conduct in March, April, through mid-May, or October.</p>	<p>Consider the effects of all management activities on orchid pollinators (mainly bumble bees).</p>

Resource	Haying	Grazing	Water/Irrigation	Recreation	Prescribed Fire	Integrated Pest Management	Other
<p>Preble's meadow jumping mouse</p>	<p>Impacts unknown. Continue current haying practices. Modify practices as data becomes available.</p>	<p>Keep grazing intensity within sustainable limits. Use prescriptive livestock grazing in the riparian area on a limited basis when selected to meet Integrated Pest Management or other vegetation management objectives. Limit use of cattle to avoid compaction of wet soils and damage to riparian woody species.</p>	<p>Continue current irrigation water management to support riparian and wet meadow vegetation. Work toward improving instream flow program for South Boulder Creek. Minimize disturbance to habitat during ditch maintenance.</p>	<p>Avoid placing trails and recreational activity in potentially occupied habitat.</p>	<p>To the extent possible, avoid prescribed fires during the active period for the mouse. Further evaluate and research the potential for using prescribed fire to enhance the quality of the riparian understory vegetation by removing thatch and managing non-natives. The proposed fire frequency would be 7 to 10 years. Sensitive life stages of rare species, and other elements (e.g., plains cottonwood seedlings) should be avoided by the burn timing.</p>	<p>Inside the activity period (April 15 to November 1) use non-chemical methods of weed control. Currently, handpulling of non-natives is primary mechanical treatment occurring during the active period for the mouse. Follow guidelines provided by Habitat Conservation Plan (plan development in progress).</p>	

Resource	Haying	Grazing	Water/Irrigation	Recreation	Prescribed Fire	Integrated Pest Management	Other
<p>Riparian birds</p>		<p>Grazing prescriptively outside of the breeding season which is May 1 to September 1.</p> <p>When grazing is selected for controlling non-natives and/or other vegetation management, minimize impact of grazing by using highly controlled short duration, high intensity regime.</p>	<p>Manage aquatic ecosystem to protect riparian bird food resources.</p>	<p>Avoid placing trails and recreational activity in wooded sections of the riparian zone and keep pets on leash (Knight et al. 1998).</p>	<p>(See prescribed fire section under Preble's meadow jumping mouse.)</p>	<p>Manage aquatic ecosystem to protect riparian bird food resources.</p> <p>Remove Russian olives outside of migration and breeding seasons.</p>	

Resource	Haying	Grazing	Water/Irrigation	Recreation	Prescribed Fire	Integrated Pest Management	Other
<p>Grassland birds</p>	<p>Hay cutting should occur later than July 15 for highest bird survival rate.</p> <p>In tallgrass areas, continue current management of hayfields (one annual hay cutting) to maintain ground nesting bird habitat. If haying does not occur during a given year, assess thatch build-up and use prescribed fire, or hay the following season.</p>	<p>Prescriptive livestock grazing should occur outside of the breeding season for grassland nesting birds which is May 1 to September 1.</p>	<p>Apply irrigation water in a heterogeneous pattern allowing high-dry areas to remain to serve as nesting sites.</p>	<p>Avoid placing trails and recreational activity in currently unfragmented blocks of grassland that serve as ground-nesting bird habitat (impacts on ground nesting birds may range up to 100 meters from the trail (Knight and Miller 1998)). Keep pets on leash where trails exist near nesting habitat. Discourage activities in grassland nesting areas (e.g., Burke I, Burke II, Gebhard).</p>	<p>Where applicable, conduct prescribed burns in key nesting areas for thatch removal outside of nesting season which is April 15 to July 15.</p> <p>Prescribed fire should be designed to mimic natural fire conditions with the use of running head fires to obtain heterogeneous patterns of burned and unburned grassland.</p>	<p>Non-native weed control should take place outside of nesting season (April 15 to July 15). This recommendation may conflict with the best timing for Canada thistle control (e.g., April and May burning; June mowing).</p>	

Resource	Haying	Grazing	Water/Irrigation	Recreation	Prescribed Fire	Integrated Pest Management	Other
<p>Native tallgrass prairie</p>	<p>For hayed areas, modify the rotation of haying (i.e., start and end field locations) every 3 to 5 years to benefit seed set for different plant populations.</p> <p>For areas that are not hayed on an annual basis, use prescribed fire or haying every 3 to 5 years to reduce thatch buildup.</p> <p>Follow management practices for grassland birds.</p>	<p>Use moderate intensity, or high intensity and short duration stocking during the dormant season for many native grassland species (November 1 to May 1).</p> <p>Follow guidelines in <i>Colorado Tallgrass Prairie Management Plan</i>.</p> <p>Livestock grazing can be used up until May 15 to control non-native weeds, to remove or break-up thatch, or to set back non-native cool season species and thus give a competitive edge to native warm season species.</p> <p>Incorporate rest every 3 to 5 years to benefit native cool season species.</p>	<p>Continue traditional irrigation delivery and practices. Some mesic tallgrass patches are supported at least in part by irrigation water.</p>	<p>Avoid placing trails and recreational activity in Colorado Tallgrass Prairie Natural Area patches.</p>	<p>Maintain a fire frequency of 3 to 5 years in tallgrass. Design a patch mosaic of different -aged burns. Base burn plans on monitoring results and rare species status.</p> <p>Coordinate grazing and prescribed fire plans.</p> <p>Follow management practices for grassland birds.</p> <p>Artificial surfactant (foam) should not be used when conducting prescribed fires.</p>	<p>Mechanical or animal control is preferred over herbicide. Follow guidelines in <i>Colorado Tallgrass Prairie Management Plan</i>.</p> <p>Mow for Canada thistle control in June.</p> <p>Discourage the planting of smooth brome for forage hay.</p> <p>To minimize impacts on seed production, mowing for non-native weed control should occur in June or after October 1.</p>	

Resource	Haying	Grazing	Water/Irrigation	Recreation	Prescribed Fire	Integrated Pest Management	Other
<p>Upland grasslands</p>		<p>Use a variety of livestock grazing times, durations, stocking rates, and rest periods. Incorporate rest for each discreet field at least every 3 years. Base grazing regime on monitoring results.</p>		<p>Avoid fragmentation and weed introduction by either avoiding trails or, where trails are planned, leaving large blocks of grasslands with out trails (see Miller et al. 1994, Vierling 1998). Keep pets on a leash (Knight et al. 1998).</p>	<p>Use fire to remove thatch on a 5 to 7 year frequency. Base prescribed fire schedule on monitoring results.</p>	<p>Avoid use of "broad spectrum" chemicals to protect native forbs. Apply herbicide outside of active growing season for most grassland plant species. When necessary, use selective (hand wicking) application during growing season (May 1 to Sept 15). Discourage the planting of smooth brome for forage hay. Handpull patches of ornamental species.</p>	<p>Follow management practices for grassland birds.</p>

Resource	Haying	Grazing	Water/Irrigation	Recreation	Prescribed Fire	Integrated Pest Management	Other
Riparian areas		Use highly controlled short duration, high intensity livestock grazing prescriptively for weed control and vegetation management. Control livestock watering areas to minimize stream side erosion.	Identify and remove point and non-point pollution sources. Enhance stream flow, particularly in winter. Modify water diversion structures to allow passage of fish upstream.	Avoid placing trails and recreational activity in wooded sections of the riparian zone and keep pets on leash (Knight et al. 1998).	(See prescribed fire section under Preble's meadow jumping mouse).	Use non-chemical weed control where ever possible to protect sensitive species and water quality. Control Russian olives.	Revegetation plans should include structural diversity consisting of open meadows and patches along stream banks (for <i>spiranthes</i> and associates).
Integrated Pest Management	Canada thistle: use mowing if burning is done earlier in the season (early June) and the thistle have a chance to rebud. Canada Thistle: use haying and other mechanical control in late bud stage (late June). Mowing should be done in a mosaic if possible.	To control Canada thistle, use high intensity short duration grazing in late spring (mid to late May).	If chemicals are used, select appropriate herbicide for use in wetland and aquatic areas.	Monitor and treat infestations spreading along trails.	To control Canada thistle, burn during mid-bolt (early June).	Follow prevention and treatment strategies presented in Appendix 3.5, except where these strategies conflict with protection and management of sensitive species and communities. In other words, the most effective Integrated Pest Management is developed, while following guidelines for sensitive species protection and management.	

Resource	Haying	Grazing	Water/Irrigation	Recreation	Prescribed Fire	Integrated Pest Management	Other
<p>Fire</p>	<p>Areas that are hayed annually generally not burned. Occasionally, prescribed fire may be used in hayfields that have been held out of haying for sensitive species protection and management.</p>		<p>In irrigated meadows, prescribed fires must be conducted prior to irrigation, because conditions are usually too wet when irrigation water is applied.</p>		<p>Plan prescribed fire by coordinating with sensitive species management, general wildlife and vegetation management, agricultural operations, Integrated Pest Management, research program.</p> <p>Use the minimum number of vehicles necessary for conducting fires.</p> <p>Do not use foam or other chemical fire suppressant.</p> <p>Conduct pre- and post monitoring, and record fire weather and behavior information during burn. Do not conduct burn in sensitive species or riparian habitat unless pre-burn monitoring has been conducted and post-burn monitoring is designed for the site. Include monitoring plans in burn plans.</p>		

APPENDIX 3.2 INTERIM WILDFIRE MANAGEMENT PLAN

The Open Space Program engages in wildfire prevention and suppression and uses prescribed fire to meet resource management objectives. The fire management program is conducted following the guidance provided by the *Long Range Management Policies, Boulder Fire Department Master Plan* (City of Boulder 1996a), and the *Wildland Fire Management Operations Plan* (City of Boulder 1996e). The Open Space Wildland Fire Hazard Mitigation Project and annual prescribed burn planning are based on these documents. An additional fire management plan is needed to provide a framework for integrating Open Space fire management with other resource management activities. In the absence of a system-wide fire management document, this section of the South Boulder Creek Area Management Plan includes guidelines for protecting natural resources and outlines basic considerations and constraints for fire management planning. Recommendations for managing wildfire in the South Boulder Creek Management Area are presented.

Wildfires are those fires which result from a natural cause such as lightning or human carelessness (e.g., a cigarette thrown from a car). Suppression of fires during the past 100 years, combined with residential development in the Management Area, creates a high risk of wildfires or fire hazard. Fire hazards will be reduced through a variety of appropriate management actions that are consistent with accomplishing the resource management objectives of the South Boulder Creek Area Management Plan. Fire suppression will continue where natural fires threaten human lives and property and where natural fires do not meet resource management goals or prescriptions. Wildfire management involves three major components: prevention and mitigation, suppression, and post-fire follow-up.

Fire Management Constraints and Considerations

Implementing any phase of the fire management program within the Management Area includes:

- Weather
- Air quality conditions/status
- Site conditions addressed by Best Management Practices (e.g., wet and muddy conditions)
- Proximity to urban interface
- Hazardous materials
- Resource management conflicts (e.g., grazing rotations, weed control treatments, sensitive wildlife habitat, rare plant habitat)
- Species biology (e.g., timing in terms of plant growth stages and animal life cycles)
- Fire ecology of a particular plant community

Wildfire Management

Wildfires are of natural or unauthorized human origin and do not meet an approved management prescription or resource management plan (City of Boulder 1995). The Wildland Fire

Management Operations Plan states that, “All wildfires will be suppressed where and when possible” (City of Boulder 1996e). The *Long Range Management Policies* direct Open Space staff to “work with adjacent landowners, land managers, and local agencies to reduce the potential impacts of wildfire on human life, private property, and the cultural and natural resources of Open Space” (City of Boulder 1995).

Uncontrolled wildfires near the urban interface can result in high economic costs and environmental and aesthetic consequences (City of Boulder 1995). An urban interface occurs where urban development is adjacent to undeveloped areas such as publicly-owned land. Vegetation occurring throughout the Management Area has the potential for sustaining wildfire. Fire-adapted plants like ponderosa pine and native grasses are common, and in some areas fire suppression has resulted in accumulated fuels. The *South Boulder Creek Management Area Inventory Report* (City of Boulder 1997b) describes some of the fire history and ecology in the Management Area.

Certain weather conditions can promote destructive wildfires that may affect neighboring land. Boulder’s weather has a strong influence on fire behavior. The Front Range experiences strong winds, thunderstorms, high temperatures, and low relative humidities. Climatic conditions and combustible vegetation combine to create an environment susceptible to wildfires. In addition, as the number of Open Space visitors increases each year, the chance for human-ignited wildfires increases.

Recommended management actions for this sub-section will be grouped under the major components of wildfire management: prevention and mitigation, suppression, and post-fire follow-up.

Prevention and Mitigation

The Wildfire Prevention Program informs citizens of wildfire hazards and of ways to mitigate fire effects through planning and education. The Wildland Fire Hazard Mitigation Project defines the wildfire threat and provides the public with information on wildfire mitigation and prevention. The important elements of this project are public education, technical training, planning, and mitigation activities.

Recommended Management Actions

- Continue to participate in the interagency development of public education. Important topics include wildfire hazard awareness, prevention and mitigation strategies, and fire ecology (see Education and Outreach chapter).
- Participate in the interagency coordination of technical training in wildfire prevention and suppression. Target fire managers, fire fighters, resource managers, volunteer fire departments, police departments, American Red Cross, and other support personnel (see “Suppression” below).
- Participate in the development of interagency goals, policies, and procedures for wildfire management. Current planning documents include the Wildland Fire Management section within the Boulder Fire Department’s Master Plan and the Wildland Fire Management Operations Plan.

- Continue to participate in interagency wildfire prevention and mitigation programs. Integrate natural and cultural resource management goals and objectives for the South Boulder Creek with mitigation planning and implementation. Mitigation involves:
 - Identifying and assessing wildfire hazard
 - Prioritizing mitigation projects
 - Identifying key audiences in the community and providing them with information on wildfire hazards and mitigation techniques
 - Identifying and protecting sensitive species and communities, other native plants and wildlife, water quality, and air quality through Best Management Practices
 - Using multiple tools to physically mitigate wildfire hazards, including mechanical methods (e.g., trimming, downed wood removal) and prescribed fire
 - Developing long-term plans to assess wildfire risk and implementing mitigation techniques

Suppression

The Wildland Fire Management Operations Plan provides guidelines and procedures for interagency wildfire suppression in the Boulder Valley. All fires that are not defined as prescribed or prescribed natural fires are suppressed where possible. The *Long Range Management Policies* specify the use of suppression techniques that minimize damage to natural resources and ensure fire fighter and citizen safety. Open Space policies require a staff resource advisor to participate in the evaluation and implementation of fire suppression alternatives on Open Space land. In the South Boulder Creek, fire suppression will focus on fire fighter and public safety, protection of structures and private property, fire fighter training, planning and resource protection, and public education.

Recommended Management Actions

- Ensure fire fighter and public safety.
 - Evacuate public and pets to predetermined staging, sheltering, or safety zones.
 - Enforce and ensure that all safety guidelines taught in fire fighter training are strictly adhered to by fire fighters and cooperators.
 - Identify and avoid threats to human health such as hazardous materials.
 - Continue implementation of safety measures throughout the complete burn period.
- Use appropriate suppression tactics to protect homes and other structures and to prevent the spread of fire to private lands.
- Participate in the interagency coordination and development of technical training in wildfire suppression. Target fire managers, fire fighters, resource managers, volunteer fire departments, police departments, American Red Cross, and other support personnel.
 - Train using nationally recognized fire courses designed by the National Wildfire Coordinating Group that incorporate up-to-date methods and technology.
 - Include Best Management Practices in training for protecting natural resources and preventing the spread of non-native plant species of concern during fire suppression.
 - Provide fire fighters with background information on local site conditions and sensitive resources.
 - Develop resource advisor training.
 - Use prescribed fires, practice burns, and other field training whenever possible.
 - Provide regular training opportunities to refresh basic fire fighter skills.

- Protect natural resources through pre-suppression planning and use of a resource advisor during fire suppression.
 - Characterize the Management Area for fire management purposes by identifying sensitive resources, access points, and potential staging and safety zones, structures, physical barriers to fire spread, and land ownership. The Wildland Fire Hazard Mitigation Project and the South Boulder Creek fire planning and management zone descriptions are designed to provide most of this information.
 - Incorporate information for fire management in a Geographic Information System database. Generate maps that display pertinent information.
 - Use suppression techniques that least damage natural resources and consider fire fighter and citizen safety. Implement Best Management Practices.
 - Ensure full extinguishment, when necessary, and allow for natural extinguishment when possible.
 - Use a resource advisor to coordinate with the fire Incident Commander.
 - Keep the community well-informed about fire management tactics and objectives.

Post-fire Suppression

Recommended Management Actions

- Identify areas of concern for soil stabilization.
- Identify areas of concern for vegetation and wildlife recovery.
- Identify areas of concern for water movement and erosion.
- Incorporate operational guidelines for addressing these issues. Use a resource advisor to determine whether preliminary reclamation activities (e.g., mitigation of fire line construction disturbance) are appropriate.
- Inform the public about post-fire activities.

Best Management Practices for General Fire Management

Fire Operations/Resource Protection

Recommended Management Actions

- Formally identify roads, trails, emergency access, and other access and egresses prior to fire event.
- Incorporate into the fire operations plan different suppression strategies, control, contain, and confinement, based on ecosystem needs.
- Allow for natural extinguishment when possible.
- Assess the need for post-fire preliminary reclamation as directed by the fire operations plan. Implement reclamation during the mop-up phase of fire suppression under the direction of a resource advisor.
- Follow the guidance of resource advisors within the structure of the fire management operations.
- Before a fire event, identify sensitive areas within the planning unit which require special protection.
- Identify staging areas in a pre-plan to reduce unnecessary ground disturbance.
- Continue training and educational programs for fire fighters on Best Management Practices within the Management Area.

- Reduce the risk of wildfire and protect natural resources and public property through implementation of the fire mitigation program.

APPENDIX 3.3 PRESCRIBED BURN PLAN OUTLINE

Introduction

Goals/Objectives

Public Awareness/Education

Environmental/Weather Conditions

Environmental Considerations

Burn Area Description

- A. Location
- B. Drainage
- C. Exposure
- D. Slope
- E. Size of burn area
- F. Elevation
- G. Fire behavior fuel model
- H. Fuel loading by class
- I. Economic constraints
- J. Target date
- K. Time of day

Burn Prescription

- A. Air temperature
- B. Relative humidity
- C. 20-foot wind speed
- D. Fine dead fuel moisture
- E. Precipitation

Prescribed Fire Behavior

- A. Predicted fire behavior
- B. Flame length
- C. Rate of spread
- D. Wind direction
- E. Smoke dispersion
- F. Fire characteristics
- G. Vegetation characteristics

Site Preparation

Pre-Burn Work List

- A. Burn plan approved
- B. 10-hour fuel sticks in place
- C. Area weather forecasts
- D. Identify water sources
- E. Inform local fire districts, communications, and residents
- F. Identify access/egress and potential hazards
- G. Notify City Manager's Office and Public Relations
- H. Burn team assembled/briefed
- I. Contingency plan/safety zones identified
- J. Any site specific needs identified

Public Information/Pre-burn Contacts

- A. Air quality
- B. Local media
- C. Boulder County Public Information Officer
- D. Boulder County Communications
- E. Boulder County Sheriff's Department
- F. Local fire districts
- G. City of Boulder Fire Department
- H. Local residents/adjacent landowners

Organizational Structure

- A. Prescribed fire incident commander
- B. Public Information Officer
- C. Resource advisor
- D. Safety officer
- E. Ignition specialist
- F. Holding boss
- G. Holding crew
- H. Mop-up crew
- I. Field observers

Resource Coordination

Time Tables

Cooperating Agencies

Maps

APPENDIX 3.4 (DRAFT) FIRE MANAGEMENT PLANNING IN THE SOUTHERN PORTION OF THE MANAGEMENT AREA

Property, area on property, acreage	Current land use	General vegetation type	Land-scape position	Fire Management Goals/Objectives	Timing/Season	Recommended burn interval (range)	Past burns	Next burn	Priority (annual evaluation)	Fire effects monitoring schedule	Special concerns and Considerations
Burke II	Haying and grazing.	Grassland (dominantly native with non-native elements) and wet meadow complex.		Refer to Plan.	Late winter through May 15. Mid-fall.	3-5 years.					Bobolink and orchid habitat.
Burke I	No haying.	Like Burke II except for riparian corridor.			Like Burke II.	3-5 years.					Known Preble's habitat.
Gebhardt	SW 1/3 hayed.	Non-native dominated hayfield in western 1/3. Otherwise similar to Burke I.			Like Burke II.	3-5 years.					

Property, area on property, acreage	Current land use	General vegetation type	Land-scape position	Fire Management Goals/Objectives	Timing/Season	Recommended burn interval (range)	Past burns	Next burn	Priority (annual evaluation)	Fire effects monitoring schedule	Special concerns and Considerations
Suits	Grazing, haying (proposed)	Irrigated hay meadows, wet meadow, tallgrass patches.			Like Burke II.	3-5 years.					Orchids, Preble's, bobolink.
Klein	Haying in south half (proposed); occasional, prescriptive grazing for weed control, not leased.	Native/non-native mix - upland and riparian.			Like Burke II.	3-5 years.					Prairie dogs, raptors.
St. Walburga	Grazing.	Irrigated hay fields.			Like Burke II.	3-5 years.					Orchids in SW corner.
Mary Hogan Clynke	Prescriptive grazing.	Riparian, native-dominated grassland patches.			Like Burke II.	Only if needed.					Orchids, Preble's.
Van Vleet: W of South Boulder Creek, N of U.S. 36 (orchid research area)	Occasional prescriptive grazing.	Riparian area - protective fencing proposed.			Like Burke II.	3-5 years.					Like Burke II, but more orchid habitat.

Property, area on property, acreage	Current land use	General vegetation type	Land-scape position	Fire Management Goals/Objectives	Timing/Season	Recommended burn interval (range)	Past burns	Next burn	Priority (annual evaluation)	Fire effects monitoring schedule	Special concerns and Considerations
Van Vleet: First block W of South Boulder Creek, S of U.S. 36	Not hayed for >5 years.	Like Burke II.			Like Burke II.	3-5 years.					Orchids, Preble's, bobolink (?).
Van Vleet: Second block W of South Boulder Creek, S of U.S. 36	No haying and (proposed) occasional, prescriptive grazing.	Like Burke II riparian reach.			Like Burke II.	3-5 years.					Orchids.
Fancher	Occasional prescriptive grazing.	Riparian complex; proposed protective fencing.			Like Burke II.	Only if needed.					
Rolling Rock	Grazing.	Wet meadow complex with uplands.			Like Burke II.	3-5 years.					Prairie dogs, orchids.
Van Vleet: N of U.S. 36, E of South Boulder Creek, floodplain	Grazing, haying.	Non-native irrigated.			Like Burke II.	3-5 years.					

Property, area on property, acreage	Current land use	General vegetation type	Land-scape position	Fire Management Goals/Objectives	Timing/Season	Recommended burn interval (range)	Past burns	Next burn	Priority (annual evaluation)	Fire effects monitoring schedule	Special concerns and Considerations
Van Vleet: Operations fields, W of Cherryvale Road	Grazing, haying.	Non-native irrigated.			Like Burke II.	3-5 years.					
Van Vleet: First block S of U.S. 36, E of South Boulder Creek	Grazing.	Native upland, lowland terrace complex and riparian.			Like Burke II.	3-5 years.					Bobolink habitat; orchids (riparian and ditch); Preble's (riparian).
Van Vleet: Second block S of U.S. 36, E of South Boulder Creek		Native upland, lowland terrace complex and riparian.			Like Burke II.	3-5 years.					Same as above without documented orchid or Preble's.

Property, area on property, acreage	Current land use	General vegetation type	Land-scape position	Fire Management Goals/Objectives	Timing/Season	Recommended burn interval (range)	Past burns	Next burn	Priority (annual evaluation)	Fire effects monitoring schedule	Special concerns and Considerations
Church W of Cherryvale Road	Grazing.	(1) West half: native upland terrace grassland and riparian. Colorado Tallgrass Prairie Natural Area patches. (2) East half: non-native irrigated hay field (terrace).			Like Burke II.	3-5 years.					Orchid, bobolink.
Van Vleet: E of Cherryvale Road	Haying, grazing.	Non-native irrigated hay field (terrace).			Like Burke II.	3-5 years.					Bobolink, orchids, Preble's.
Yunker: West block, N of U.S. 36	Grazing enclosure (6 acres). Patch grazing.	Tallgrass, wet meadow complex. Colorado Tallgrass Prairie Natural Area.			Like Burke II.	5-8 years.					Bobolink.
Short	Grazing.	Tallgrass, mixed grass.			Like Burke II.	3-5 years.					Orchid, bobolink.
Church of Christ	Grazing.	Mixed grass, upland terrace.			Spring/Fall.	3-5 years.					

Property, area on property, acreage	Current land use	General vegetation type	Land-scape position	Fire Management Goals/Objectives	Timing/Season	Recommended burn interval (range)	Past burns	Next burn	Priority (annual evaluation)	Fire effects monitoring schedule	Special concerns and Considerations
Yunker: East block, N of U.S. 36		Mixed grass and tallgrass, upland terrace. Eastern 2/3 is Habitat Conservation Area (with Gallucci).			Spring/ Fall.	5-8 years.					
Gallucci		Native mixed grass, upland terrace.			Spring/ Fall.	5-8 years.					Prairie dogs (Habitat Conservation Area).
Church E of Cherryvale Road		NW section is irrigated hay.			Like Burke II.	3-5 years.					
Yunker: West block, S of U.S. 36	Haying, grazing.	Native and non-native, irrigated terrace. Colorado Tallgrass Prairie Natural Area patch. Wetland.			Like Burke II.	5-8 years.					Orchids (8,000+).

Property, area on property, acreage	Current land use	General vegetation type	Land-scape position	Fire Management Goals/Objectives	Timing/Season	Recommended burn interval (range)	Past burns	Next burn	Priority (annual evaluation)	Fire effects monitoring schedule	Special concerns and Considerations
Yunker: East block, S of U.S. 36	Grazing.	Colorado Tallgrass Prairie Natural Area (western 2/3).			Like Burke II.	5-8 years.					Orchids.
Damyanovich	Grazing.	Tallgrass, mixed grass and non-native patches, mesa top and slopes.			Spring/ Fall.	5-8 years.					
Hogan Brothers	Grazing.	Tallgrass, mixed grass and non-native patches, mesa top and slopes.			Spring/ Fall.	5-8 years.					
Richardson I	Grazing.	Mixed grass (high non-native), shrubland, and ponderosa savannah.			Spring/ Fall.	5-8 years.					

APPENDIX 3.5 PREVENTION AND CONTROL OF TARGET WEED SPECIES

This appendix is a summary of species-specific prevention and control strategies for target weed species in the South Boulder Creek Management Area. General information about weeds, Integrated Pest Management, and relevant governing policies can be found in the body of the management plan.

These guidelines for controlling high priority weed species in South Boulder Creek are not intended to limit the control and prevention strategies available to Open Space resource managers. As new equipment and information becomes available, they will be evaluated for possible integration into the Integrated Pest Management program, following City of Boulder and Open Space policies. Control and prevention techniques must be coordinated with irrigation, grazing, fire, and sensitive land and animal species.

Education is a critical component of preventing weeds from becoming established. Education about exotic species and their deleterious ecological and economical effects creates the awareness for successful, long-term weed control. Open Space has frequent opportunities to educate the public and private sector about integrated weed management through public programs and printed materials.

Priority 1

Canada Thistle (*Breca arvensis* L.) (syn. *Cirsium arvense* L.)

General Information

Description/biology: Canada thistle is a 1 to 6 foot tall colony forming perennial. It has an extensive root system and reproduces both vegetatively and by seed. Its leaves are alternate, lance-shaped, and divided into spiny tipped irregular lobes. Multiple seed heads occur on each plant. Flowers are usually pink and occasionally purple. Seeds are dispersed by the wind.

Habitat: Canada thistle is widespread throughout the Management Area, especially around agricultural areas, irrigation ditches, and riparian corridors.

Threats to Open Space: Canada thistle is a very aggressive and difficult to control weed which spreads rapidly and forms very dense patches. It out competes most native species and will form monocultures under the right conditions. Canada thistle is a major threat to *Spiranthes* habitat along South Boulder Creek. Delicate wetland ecosystems are especially vulnerable to invasion, but meadows, rangelands, cropland, and riparian areas are vulnerable as well.

Prevention Strategies

The use of weed-free fill dirt, hay, and crop seed is critical to the prevention of new Canada thistle infestations.

Control Strategies

There are a number of factors to keep in mind when choosing a control strategy for Canada thistle. First, every piece of the root system is capable of generating a new plant. Second, seeds may remain viable in the soil for up to 20 years. Third, Canada thistle maintains large root reserves that help it recover from stress. Finally, one of the best ways to control perennial weeds is a long-term program of stressing the plant, thereby depleting its root reserves. A combination of the following methods will achieve the best results.

Cultural: Under optimum conditions in an agricultural setting, cultivated grasses and alfalfa can compete with Canada thistle.

Mechanical: Frequent (e.g., monthly) mowing before seedset is effective in keeping Canada thistle's root reserves reduced. This method is especially effective when followed by a fall herbicide treatment. Mowing by itself is only effective at high frequencies over a number of years. Hand pulling isn't effective because of Canada thistle's regeneration capabilities.

Chemical: Herbicides should be used in conjunction with other control strategies. Application methods and herbicide selection vary with infestation density and environmental factors. Small infestations or infestations in ecologically sensitive areas may require the use of wick applicators and/or specialized herbicides. Larger infestations in less sensitive areas can be ground sprayed using a backpack sprayer or a tractor. In agricultural areas, Open Space currently uses Roundup (glyphosphate), Banvel (dicamba), Bronate, Bladex (cyanazine), and Buctril (bromoxynil). For natural areas, Open Space currently uses Rodeo (glyphosphate), with an added surfactant in ecologically sensitive areas, Telar (chlorsulfuron), and Roundup (glyphosphate) in less sensitive areas. Rodeo and Roundup are generally applied with a wick. Other herbicides which could potentially be used include 2,4-D.

Biological: Insect controls are currently being experimented with, but should be used with caution due to the possible negative impact on native thistle species.

Other: Spring burning or livestock grazing in Canada thistle infested communities can be effective when used in conjunction with other control strategies. An effective combination of treatments involves grazing or burning in early to mid-spring, followed by a summer mowing that is timed according to thistle development.

Purple loosestrife (*Lythrum salicaria*)

General Information

Description/biology: Purple loosestrife is an ornamental perennial which can reach 8 feet in height. It has square stems and lance shaped leaves which occur oppositely or in whorls. Its flowers are rose to purple colored, have five to six petals, bloom in vertical "spikes" from bottom to top and occur from June through September. Purple loosestrife reproduces both vegetatively from cut stems and root stocks and by seed. It is a very prolific seed producer. One mature plant can produce up to 3 million seeds in one season. Seeds are dispersed mainly by water but is also spread by wind, animals and inadvertently by humans.

Habitat: Purple loosestrife invades stream and ditch banks, shorelines and wetlands. The Management Area holds the bulk of the Open Space loosestrife populations including infestations in a cattail marsh and in wet meadows containing orchid populations.

Threats to Open Space: Purple loosestrife spreads very rapidly and very aggressively. It

quickly chokes out native vegetation and destroys animal habitat. Especially vulnerable are wetlands and riparian corridors. Infestations can become dense enough to impede water flow in streams and ditches.

Prevention Strategies

Purple loosestrife is a popular ornamental. Therefore, the best way to prevent future infestations is to educate the public as to its dangers and to encourage them to use alternatives when landscaping. Native alternatives include gayfeather/blazing star (*Liatris punctata*) and horsemint/pink bergamot (*Monarda fistulosa*). To help prevent the spread of existing infestations flowering heads need to be removed and destroyed prior to seed set.

Control Strategies

A couple factors need to be kept in mind when choosing and implementing a control method for purple loosestrife. It tends to invade delicate ecosystems such as wetlands and riparian corridors. These ecosystems tend to be sensitive to many control strategies. Care must be taken when physically removing purple loosestrife plants from an area because of its ability to reproduce from small pieces of cut stems and roots. And because its seeds can be spread by water and mud care should be taken to clean equipment and personnel before leaving the site of an infestation.

Mechanical: Hand pulling can be effective on small populations of purple loosestrife, but care must be taken to remove and destroy *all* plant material. All hand pulling should occur before seed set. Mowing is not recommended because it leaves plant matter behind and may actually facilitate the spread of the infestation.

Chemical: Rodeo (glyphosphate) is the most commonly used herbicide in purple loosestrife control. Because Rodeo is a broad spectrum herbicide it should be applied directly to individual plants. Broadcast spraying of glyphosphate may actually increase the density of purple loosestrife by reducing its competitors. 2-4D is also used to control plants in the seedling stage. The chemical control method that Open Space currently uses is to cut partially flowering heads off of individual plants and apply Rodeo by hand to the cut stems. Cuttings are removed and destroyed.

Biological: Several insects have shown promise in helping to control purple loosestrife infestations including the root eating weevil *Hylobius transversovittatus* and the leaf eating weevils *Galerucella californiensis* and *G. pusilla*. Further research is necessary in order to determine the potential for these insects to attack native loosestrife populations. Open Space does not currently use any biological control methods.

Other: Burning and flooding on their own have not shown much promise for controlling purple loosestrife and may actually enhance its competitive edge. Cutting followed by flooding has shown a little success.

Diffuse Knapweed (*Acosta diffusa* L.) (syn. *Centaurea diffusa* L.)

General Information

Description/biology: Diffuse knapweed is a biennial, occasionally annual, or short-lived perennial, that grows 1 to 3 feet tall. It is diffusely branched and has pinnately divided leaves. Its flowers range in color from white to rose to purplish. First year plants take the form of a rosette which “bolt” into a mature plant the following growing season. Each plant

is capable of producing 1,000 to 18,000 seeds (a dense stand of knapweed can produce 40,000 seeds per square meter) which spread when the mature plant breaks off at the base and tumbles with the wind. Seeds can remain viable in the soil for up to 10 years. Humans also disperse seeds by way of vehicles, contaminated fill dirt, and contaminated hay.

Habitat: Diffuse knapweed was introduced from Eurasia and is now common throughout the arid west. It infests roadsides, waste areas, dry rangelands, pastures, and other upland areas.

Threats to Open Space: Diffuse knapweed is relatively new to this area of Boulder although major infestations can be found a few miles to the south. It is having detrimental effects on mostly dry, upland habitats although isolated infestations currently threaten the edges of the moist tallgrass/orchid communities. Knapweed is highly competitive and displaces native vegetation by competing for moisture and nutrients. In addition, there is some evidence which indicates that knapweeds produce an allelopathic substance (a chemical substance which inhibits surrounding vegetation) thereby reducing competition (Whitson et al 1992).

Prevention Strategies

Special care should be taken to use only weed-free fill dirt and hay where possible. Fences may be used to contain an infestation. Mature plants collect along fence lines and can be burned preventing further seed dispersal. Knapweed has the ability to spread into stable plant communities, but the rate of spread is reduced. Therefore, prevention includes careful land management decisions that reduce the probability of weed populations becoming established (e.g, prevention of overgrazing).

Control Strategies

When selecting a control strategy for diffuse knapweed, the quantity of seed produced, and the length of seed viability are important considerations.

Cultural: Irrigation, where possible, can be effective in controlling diffuse knapweed and has the added benefit of stimulating grass competition. Where disturbance has occurred, seeding of native vegetation may be necessary to prevent further infestation.

Mechanical: Small populations can be hand pulled if care is taken to extract as much of the root as possible. Gloves should be worn when hand pulling to prevent any possible allergic reaction to the plant. If seed set has already occurred, the plants should be bagged and removed. Mowing can reduce seed production if timed correctly. This will not kill the knapweed plant and will often turn this species into a perennial

Chemical: Herbicide application can be effective when used in conjunction with other control and prevention strategies. *Spring applications, before flowering, are most effective.* The choice of application technique depends on the density of the infestation, terrain, and other factors. For small or scattered infestations, or on rough terrain, herbicides can be applied with a wick. On larger or denser infestations, they can be ground sprayed by way of a backpack or tractor. In the case of very large, dense populations, aerial spraying may be the most efficient method. Open Space currently uses Transline (clopyralid) or Tordon 22k (picloram) on knapweed. Herbicides which could potentially be used include 2,4-D, Banvel (dicamba), or tank mixes of any of the above.

Biological: Livestock (cows, sheep, and goats) will eat diffuse knapweed at certain times of

the year but the efficacy of grazing as a control method requires further study. Results from current, ongoing research on the effects of cattle grazing on knapweed (Beck 1996), will be incorporated into the Open Space Integrated Pest Management program. Insect control of diffuse knapweed is being researched and may prove an effective method of control. In 1992 Open Space released two types of insects on diffuse knapweed in the North Boulder Valley. A seedhead fly, *Euphoria affinis*, is a knapweed predator that is common throughout Colorado.

Other: Burning or cultivation can temporarily reduce knapweed populations, but they need to be used in conjunction with other methods to achieve any lasting control. Burning to stimulate native plant growth, improve competition, and remove dead knapweed skeletons is a promising control strategy. Research on effects of fire on knapweed is needed. Burning can also be used to get rid of dried knapweed plants after handpulling.

Russian Olive (*Elaeagnus angustifolia* L.)

General Information

Description/biology: Russian olive is a moderate sized (10 to 25 feet) tree with narrow, 2 to 3 inch, long silvery-green leaves. Its trunks and branches are armed with sharp, woody thorns. Russian olive reproduces by way of root suckers and seeds. Seeds are silver to green initially, turning tan to brown upon maturity, and olive shaped. Seed dispersal occurs mainly through birds.

Habitat: Russian olive was originally promoted to provide wind breaks and help prevent soil erosion. Its occurrence in the Management Area reflects these uses, but it has also spread to ditch, pond, and stream banks, tallgrass communities, and other areas frequented by birds.

Threats to Open Space: Russian olive is one of the hardiest and most aggressive trees introduced into the United States. This aggressive species displaces native cottonwood and willow trees along stream sides. Russian olive seedlings thrive in the shaded riparian understory and out compete native seedlings that are intolerant of shade. An estimated 1/3 of bird species who utilize cottonwoods and willows cannot use Russian olives. Russian olive trees affect agricultural operations by invading pastures and clogging irrigation ditches.

Prevention Strategies

Russian olive is still planted locally as an ornamental tree and a wind break. Public education concerning responsible landscaping may be an effective strategy for preventing new infestations.

Control Strategies

Mechanical: The complete removal of smaller (<3 inches in diameter) trees can be achieved using a weed wrench. If seeds are present, the tree should be removed. Girdling, partial girdling, or cutting larger trees down is only effective if an herbicide is immediately applied to the cambium to kill the roots, otherwise new branches will sprout from the roots and stump creating a "bush" that is even more difficult to eradicate. Partial girdling or cutting into the cambium with a saw or ax around the entire trunk every 2 to 4 inches apart and following with herbicide seems more effective than girdling the whole tree. Success rate is highest when you can manipulate the tree down close to ground level. Downed trees should be removed whether or not they contain seeds. Downed trees not only create a visual blight, but

they also kill underlying vegetation, creating an ideal disturbance for invasion by opportunistic weeds. Killed trees can be left standing where appropriate to serve as perch sites or wildlife trees in the distant future.

Chemical: As mentioned above, an herbicide should be applied to the cambium of cut trees. It can be applied with a brush, sponge, or large gauge hypodermic needle. Herbicides used by Open Space for this purpose include: Garlon (triclopyr) and Roundup (glyphosphate). Other chemical methods include basal bark treatment and foliar spraying of the whole tree.

Other: The burning of dense populations of Russian olive has been experimented with by other agencies with marginal success.

Cheatgrass a.k.a. Downy Brome (*Bromus tectorum* L.)

General Information

Description/biology: Cheatgrass is an annual, or winter annual, 4 to 30 inches in height which reproduces by seed. Its stems and leaves are covered by soft “downy” hairs. It has a “drooping” inflorescence which contains many seeds. Cheatgrass seeds germinate in the fall, overwinter as seedlings, and flower in the spring. Seeds remain viable in the soil for 2 to 5 years.

Habitat: Within the Management Area, cheatgrass is found along roadsides, on rangeland, pastures, cropland, disturbed and waste areas. It has the potential to invade the majority of ecosystems found in the Management Area.

Threats to Open Space: Cheatgrass is a very efficient competitor for early spring soil moisture which would otherwise be used by native perennial grasses. In this way, the species can displace native vegetation and inhibit natural succession. Dried, mature plants pose a fire hazard. Young plants can be utilized as forage in some areas, but as they mature, seeds can cause injury to the mouths and eyes of grazing animals. Cheatgrass is also a common crop seed contaminant.

Prevention Strategies

The use of weed-free seed, hay and fill dirt is critical to the prevention of new cheatgrass infestations.

Control Strategies

When choosing a control strategy, it is important to keep a couple of factors in mind. First, cheatgrass produces copious numbers of seeds (300+ per plant) and those seeds have a viability of 2 to 5 years. Second, strategies which cause wide scale disturbance (e.g., create patches of bare soil) may need to be coupled with activities that promote regeneration of native species. For example, applying an herbicide to an area with a dense cheatgrass population will result in a large area of bare ground which is then susceptible to reintroduction or to invasion by another weedy species. Therefore, reseeding with native plant species may be necessary to obtain lasting results.

Mechanical: Spring mowing can reduce seed production, but should be used in conjunction with other methods to achieve the best results.

Chemical: Chemical control of cheatgrass is generally only used in agricultural areas. Open Space currently uses the following herbicides to control cheat grass in agricultural areas:

Roundup (glyphosphate), Pursuit (imazethapyr), and Velpar (hexazinone). These herbicides are generally applied by tractor spraying. Herbicides which could potentially be used to control cheatgrass include: atrazine, bromacil, cynazine, chloroprotham, diclofop, matribuzin, promamide, protham, simazine, terbacil, and trifluralin. Open Space does not currently use herbicides for cheatgrass control in natural areas (i.e., areas other than agricultural fields).

Biological: There is limited information on insect control methods, but it has been shown that some migratory grasshoppers will feed on cheatgrass. Spring grazing, as with spring mowing, can reduce seed production, but needs to be used in conjunction with other control strategies.

Other: Prescribed burns will kill seedlings and may reduce the seed bank, but surviving plants may produce seed more vigorously and more prolifically. These burns need to occur in the early spring in order to achieve the best results. Research has indicated that soil sucrose treatments (1600C/hectare/year) may be effective in combating annual plants such as cheatgrass.

Musk thistle (*Carduus nutans macrolepis*)

General Information

Description/biology: Musk thistle is a taprooted biennial, or winter annual, which can grow up to 7 feet in height. It has alternate leaves that are evenly lobed with long sharp spines around the margins. The leaves are dark green with a light midrib, and are hairless on both sides. Musk thistle produces solitary, terminal flowers in the spring of its second year. The flowers occur on nodding heads and are deep rose to violet to purple in color.

Habitat: Musk thistle is native to southern Europe and western Asia and was introduced into North America early in the 20th century. It is now widespread throughout the U.S. and Canada. This aggressive weed has infested thousands of acres in Boulder County. It invades roadsides, pastures, range and forest lands, stream banks and grain fields.

Threats to Open Space: Musk thistle decreases the natural food supply of foraging wildlife by crowding out native grasses and shrubs. It spreads quickly forming dense stands. Seeds can be in excess of 20,000 per plant, however, according to Colorado State University Cooperative Extension's data "only 1/3 of the seeds are viable". Musk thistle seeds disperse over an extended period of time via wind and water as well as by hitching rides on passing animals and vehicles.

Prevention Strategies

The use of weed-free fill dirt, hay, and crop seed is important to the prevention of new musk thistle infestations.

Control Strategies

Cultural: Minimizing soil disturbance, especially in pastures and rangelands, helps to prevent new infestations.

Mechanical: Repeated hand pulling can be effective on smaller populations. Repeated mowing can be used on larger populations. Mowing can also be used to reduce seed output if the crown is completely removed in the late flowering stage. Seed heads must be deeply

buried or burned because seeds will continue to mature on the ground. Mowing is the main control method utilized by Open Space.

Chemical: 2,4-D is the most commonly used herbicide and should be applied to the rosette 10 to 14 days before the plant bolts. Tordon 22k is also used with less effect on non-target species. Open Space does not currently target musk thistle with chemical control.

Biological: A number of insects have been used, with varying degrees of success, to help control musk thistle. Seed head weevils such as *Rhinocyllus conicus* can be very effective when used in conjunction with herbicides or mowing, but may not be very effective on their own. Open Space has released root boring beetles in the past.

Other: Burning isn't directly effective in controlling musk thistle but it may increase the competitiveness of warm season grasses.

Priority 2

Dalmatian Toadflax (*Linaria genistifolia* ssp. *dalmatica* L.)

Dalmatian toadflax is a perennial which can reach 3 feet in height. It has waxy heart-shaped leaves and yellow snap dragon type flowers with long spurs. It reproduces by seeds and underground root stocks. This toadflax was introduced from Europe as an ornamental. It aggressively invades roadsides and rangeland crowding out desirable species. Deep roots and waxy leaves make it hard to control. Repeated hand pulling (before flowering occurs) is the control technique most often used by Open Space. Large infestations are occasionally sprayed with Tordon 22k (picloram).

Yellow Toadflax a.k.a. Butter and Eggs (*Linaria vulgaris* Mill.)

Yellow toadflax is a 1 to 2 foot tall perennial with thin, 2 to 2 1/2 inch leaves. It reproduces by seeds and underground root stocks. This toadflax was also introduced from Europe as an ornamental. It has yellow snap dragon type flowers with long spurs. Yellow toadflax invades roadsides, disturbed sites, cultivated fields and rangeland. It displaces desirable forage plants and therefore the species which depend on them. It is very difficult to control due to its extensive root system. Open Space has utilized the herbicide Tordon 22k (picloram) to control yellow toadflax in the past.

Myrtle Spurge (*Tithymalus myrsinites* L. {syn. *Euphorbia myrsinites* L.})

Myrtle spurge is a low-growing perennial. Its short, broad leaves clasp the stem. Flowers are yellow-green and are surrounded by yellow-green bracts. Stems and leaves contain a milky white latex which is a serious irritant to the skin and eyes. Myrtle spurge was introduced from Europe as an ornamental. Open Space hand pulls infestations of myrtle spurge. In order to gain some control over a population it must be pulled over multiple years. Care must be taken to avoid direct contact with the latex.

Sulfur Cinquefoil (*Potentilla recta*)

Sulfur cinquefoil is a 1 to 1 1/2 foot tall perennial. It has palmately compound leaves which climb the stem. It has light yellow flowers with five petals that bloom between May and July. It is often found in disturbed areas, but many colonies have been observed in undisturbed sites as well. This species can quickly dominate an area and is a direct threat to rare orchid (*spiranthes*

diluvialis) habitat. Tordon 22k (picloram) has occasionally been used by Open Space to help control sulfur cinquefoil.

Tansy (*Tanacetum vulgare*)

Common tansy is a perennial which ranges in height from 1 1/2 to 6 feet tall. It is an aromatic plant which reproduces from both seeds and root stocks. Petal less yellow flower heads appear in dense clusters. Common tansy was introduced from Europe as an ornamental and as a medicinal plant. It is found throughout the U.S. in pastures, along roads and along stream banks. As of yet Open Space control efforts have been minimal. Small infestations have been removed by hand digging.

Tamarisk a.k.a. Saltcedar (*Tamarix ramosissima*)

Tamarisk is a deciduous or evergreen shrub or small tree which grows to between 5 and 20 feet. Tamarisk has small scale-like leaves on dark brown to reddish brown stems. Flowers grow in elongated clusters and are white to pink. Tamarisk was introduced from Eurasia as an ornamental. It subsequently escaped and now grows along stream banks, ditches and reservoirs throughout most of the West. Open Space hand pulls seedlings and cuts down and applies herbicide (usu Roundup/glyphosphate) to the cut stems of larger plants.

Scotch Thistle (*Onopordum acanthium*)

Scotch thistle is a biennial which can grow to 12 feet in height. Stems have spiny wings. Leaves are large, spiny and covered with silvery hairs giving the plant a grey-green color. Scotch thistle grows many flower heads each 1 to 2 inches wide with violet to reddish flowers. Scotch thistle is a native of Eurasia but has become established in much of the U.S. It is fairly aggressive and can form extremely dense stands. Mowing and hand chopping have been used by Open Space to help control this plant.

Oxeye Daisy (*Leucanthemum vulgare* L{syn *Chryanthemum leucanthemum* L})

Oxeye daisy is a 1 to 2 foot tall perennial introduced from Eurasia as an ornamental. Its leaves become progressively smaller from the bottom of the plant up. Flower heads are solitary at the ends of branches. Flowers appear June to August and have white petals and a yellow center. Oxeye daisy is found in meadows, along roadsides and in many disturbed areas. Oxeye daisy populations have been steadily increasing in the Boulder Valley in recent years and will soon need to be managed.

Bouncing Bet a.k.a. Soapwort (*Saponaria officinalis*)

Bouncing bet is a perennial which can reach 3 feet in height. Leaves are 2 to 4 inches long, narrow, opposite and have three distinct veins. Flowers are generally pink and crowded at the ends of the branches. Bouncing bet is another escaped ornamental from Europe. It is an aggressive invader of riparian areas and roadsides. Bouncing bet is quickly reaching the population threshold at which it will need to be managed.

Dames Rocket (*Hesperis matronalis*)

Dames rocket is a biennial or short lived perennial which has escaped cultivation. It can grow up to 3 1/2 feet in height. It has alternate, lance-shaped leaves with small teeth. Its flowers are pink

to purple and appear between May and August. It tends to grow along roadsides and other disturbed areas as well as in open woods and thickets.

Perennial Pepperweed (*Cardaria latifolia* {syn *Lepidium latifolium*})

Perennial pepperweed has lance shaped, alternate, grey-green leaves and grows to 1 to 3+ feet tall. Flowers are white and grow in dense clusters near the ends of the branches. Perennial pepperweed reproduces both by seed and root stocks. It is a native of Eurasia that has been declared a noxious weed by a number of western states. Its deep seated root stocks make it a very difficult weed to control. Open Space has used Telar (chlorsulfuron) and Escort (metsulfuron methyl) to help control perennial pepperweed in agricultural areas.

Houndstongue (*Cynoglossum officinale*)

Houndstongue is a 1 to 3 foot tall biennial. Leaves are alternate, up to 12 inches long, rough and hairy. Flowers are reddish-purple, small, five petaled and appear between May and July. Seeds are prickly nutlets which cling to fur and clothing. Houndstongue grows in pastures, rangelands, roadsides and disturbed areas. Open Space has hand-pulled houndstongue in the past.

Hoary Cress a.k.a. Whitetop (*Cardaria draba*)

Hoary cress is a 1 to 2 foot tall perennial. Leaves are alternate, clasp the stem, oval or oblong and are 1/2 to 2 inches long. Flowers grow in white, flat-topped clusters. Hoary cress grows in pastures, meadows, along roads and in disturbed areas. Open Space has used Telar (chlorsulfuron) and Escort (metsulfuron methyl) to help control hoary cress in agricultural areas.

Crack Willow (*Salix fragilis* L.)

Crack willow is an invasive tree introduced from Europe. It invades wetlands and riparian corridors and can out compete many native trees.

Smooth Brome (*Bromus inermis* Leyss.)

Smooth brome is a 1 to 4 foot tall perennial grass introduced from Europe. Smooth brome is often planted as a pasture or hay grass as well as along roadsides and ditch banks to prevent erosion. Unfortunately, it has escaped into prairies and is a strong competitor with native vegetation.

Dalmatian toadflax, yellow toadflax, and myrtle spurge occur in the Management Area in isolated patches. They are of greater concern in other parts of Open Space, but have the potential to become serious problems in the South Boulder Creek. Of greatest concern is the ability for myrtle spurge to invade the habitat of the rare Bell's twinpod.

These species should be hand pulled, bagged, and removed. Care should be taken to extract as much of their roots as possible as all three species can reproduce from root fragments. Care should also be taken to prevent or minimize skin contact with the milky latex of these plants, especially that of myrtle spurge, because it can be a serious irritant.

APPENDIX 3.6 UNDESIRABLE PLANT SPECIES

Current plant species, as of 1996, that are designated as undesirable and must be managed under the Colorado Weed Management Act:

leafy spurge	<i>Tithymalus esula</i> (L.) Scopoli <i>Euphorbia esula</i> L.
Russian knapweed	<i>Acroptilon repens</i> (L.) De Candolle <i>Centaurea repens</i> L.
spotted knapweed	<i>Acosta maculosa</i> (L.) Holub <i>Centaurea maculosa</i> L.
diffuse knapweed	<i>Acosta diffusa</i> (Lamarck) Sojak <i>Centaurea diffusa</i> Lamarck

Additional plant species designated as undesirable plants under the Boulder County Undesirable Plant Management Plan:

Canada thistle	<i>Breea arvensis</i> L. <i>Cirsium arvensis</i> (L.) Scopolic
musk thistle	<i>Carduus nutans</i> L.
purple loosestrife	<i>Lythrum salicaria</i> L.
Mediterranean sage	<i>Salvia aethiopsis</i> L.

Additional plant species designated as undesirable plants by the City of Boulder Open Space Program:

Russian olive	<i>Elaeagnus angustifolia</i> L.
dalmatian toadflax	<i>Linaria genistifolia</i> (L.) P. Miller subsp. <i>dalmatica</i> (L.) Maire et al. <i>Linaria dalmatica</i> (L.) P. Miller var. <i>macedonica</i> Fenzl
yellow toadflax	<i>Linaria vulgaris</i> P. Miller
hoary cress	<i>Cardaria draba</i> (L.) Desv.
perennial pepperweed	<i>Lepidium latifolium</i> L.

Species of concern: (important, but not on state, County, or City list)

myrtle spurge	<i>Euphorbia myrsinitis</i> L.
bouncing bet	<i>Saponaria officinalis</i> L.
dames rocket	<i>Hesperis matronalis</i> L.
tamarisk	<i>Tamarix ramosissima</i> Ledeb.

APPENDIX 3.7 COLORADO TALLGRASS PRAIRIE NATURAL AREA ARTICLES OF DESIGNATION

COLORADO NATURAL AREAS PROGRAM
DEPARTMENT OF NATURAL RESOURCES
STATE OF COLORADO
COLORADO TALLGRASS PRAIRIE NATURAL AREA
ARTICLES OF DESIGNATION

These Articles of Designation, made this 20th of November 1984, by and between the Department of Natural Resources, State of Colorado, 1313 Sherman Street, Room 718, Denver, Colorado 80203, hereinafter the Department, and the City of Boulder, Municipal Building, 1777 Broadway, Boulder, Colorado 80302, hereinafter the City of Boulder.

WHEREAS, the City of Boulder owns and manages certain lands as open space in eight parcels and totaling 269 acres as described in Exhibits A and B, attached hereto and incorporated herein by reference, and known as the Colorado Tallgrass Prairie Natural Area situated in the County of Boulder, State of Colorado, hereinafter the Property; and

WHEREAS, the City of Boulder has declared that the best use of the Property is that it be preserved and protected, as evidenced by the proposed designation of the areas by the City as a "protected area;" and

WHEREAS, the Department is authorized to conduct and administer the provisions of the Colorado Natural Areas Act (C.R.S. 1973, 36-10-101, et seq.) which established within the Department the Colorado Natural Areas Program, hereinafter the Program, and the Colorado Natural Areas Council, hereinafter the Council; and

WHEREAS, the Department has determined, pursuant to its criteria, that the Property is a natural area and that it would be desirable to include the Property within the Colorado Natural Areas Systems as a designated State Natural Area; and

WHEREAS, as a result of the attributes of the Property, the Property provides one or more of the benefits described in C.R.S 1973, 36-10-104(2).

NOW THEREFORE, it is hereby granted that:

1. Designation of the Property as a Natural Area. Upon filing of these Articles of Designation with, and acceptance of same by the Department, with the advice and approval of the Council, the Property described in Exhibits A and B, attached hereto and incorporated herein by reference, shall become a designated natural area and thereby shall become part of the

Colorado Natural Areas System. Said designated natural area shall be known as the Colorado Tallgrass Prairie Natural Area.

2. Purpose of Designation. The Department has determined, upon recommendation by the Council, that the Property qualifies as a natural area to be included in the Colorado Natural Areas System due to the following:
 - A. Botanically, the Property represents good quality examples of, and the largest known area in Colorado, for:
 - 1) Andropogon gerardii - Panicum virgatum - Schizachyrium scoparium - Sorghastrum nutans Mesic Tallgrass Prairie (Big bluestem - switchgrass - little bluestem - yellow Indiangrass Mesic Tallgrass Prairie).
 - 2) Andropogon gerardii - Bouteloua curtipendula - Bouteloua gracilis - Schizachyrium scoparium Xeric Tallgrass Prairie (Big bluestem - sideoats grama - blue grama - little bluestem Xeric Tallgrass Prairie).
 - B. The Property contains grasslands which are known to be rare nationally and statewide. The tallgrass prairie remnants contain a unique Colorado flora similar to flora in the tallgrass prairie areas of the eastern Great Plains (eastern Kansas, Nebraska, Minnesota, Wisconsin, and Illinois).
 - C. The Property contains several unique animals, including the grasshopper sparrow (Ammodramus savannarum) (uncommon in Colorado).
 - D. The Property provides, among other benefits, the following benefits:
 - 1) It serves as an example of the native condition in studies relating to air, water, and soil quality and habitat productivity and can serve as a baseline for re-establishing or restoring the native condition.
 - 2) It provides outstanding opportunities for scientific research and study in the fields of botany, ecology, and zoology.
 - 3) It serves as a resource from which new knowledge may be derived and as a reservoir of genetic material which has present and future value to scientific inquiry.
 - 4) It serves as an area of high aesthetic value, scenic grandeur, and exemplary natural features.
3. Rights and Duties of the Department. The Department shall list the Property as a designated natural area of the Colorado Natural Areas Program and shall provide the City of Boulder with a Certificate of Designation and a signed copy of the Articles of Designation indicating said designation. This designation evidences the desire of the Department that the Property

be protected from impacts adversely affecting the attributes for which the Property is designated.

A. Access.

The Department agrees that user-access to the Property will be the responsibility of the City of Boulder.

B. Visitation.

The Department may visit the site at any time to determine current uses and conditions for consistency with the Program. Following the visitation, the Department will consult with land provide any resulting reports to the City of Boulder.

4. Rights and Duties of the City of Boulder. The management of the Property shall be the responsibility of the City of Boulder, which agrees to preclude all development of the Property except as deemed necessary to protect the area for the purpose for which it is established and to protect the natural features of the Property.

A. A management plan for the Property will be completed by December 31, 1985, to provide management guidelines for each of the eight parcels. The management plan will detail the control or restriction of grazing of domestic animals and the cutting of grass for hay, on a parcel-by-parcel basis. The objective of the management plan is to increase the viability of the native grassland species on the Property. The plan will include, but not be limited, to:

1. A parcel-by-parcel detail of how the grazing of domestic animals and the cutting of grass for hay will be controlled or restricted from the Property. Cutting frequencies and grazing levels will be reviewed upon expiration or renewal of grazing leases. Parcels number 3 and 6, as described in Exhibit A and on the attached map of the Property, will be used to establish ecological baselines for monitoring the Property. Grazing and haying will be excluded from parcels 3 and 6 by January 1, 1985.
2. Various grassland management techniques which will be used on the Property. Options will include, but not be limited to: periodic burning, cutting, and planting.
3. In the development of the management plan, expertise will be sought from the Department and from researchers familiar with management of native prairie ecosystems.

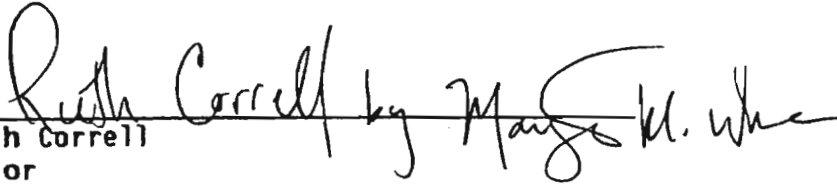
B. No hunting will be allowed within the Property.

C. No spraying of chemicals banned by the United States Environmental Protection Agency will be allowed within the Property, except when necessary as required by law. Hand spraying, where feasible, will be used.


-
- D. No surface occupancy will be allowed for oil and gas leasing or extraction on those areas having City of boulder-owned minerals. Any mineral leasing agreements for City of Boulder-owned minerals will include no surface occupancy stipulations.
 - E. No public use of motorized vehicles will be authorized within the boundaries of the Property.
 - F. The City of Boulder will provide the Department with basic information on the condition and uses of the Property based on a brief form provided annually to the City of Boulder by the Department.
 - G. The City of Boulder will continue to exercise all of its legally mandated rights and duties regarding the Property.
5. Default. If either party reasonably believes that the other party is in default in any of its obligations under this Agreement, it may give the other party written notice of the alleged default. Promptly thereafter, the parties shall confer and make a good faith effort to correct the default and to resolve any difference of opinion which may exist as to the respective rights and duties under this Agreement. Default by the City of Boulder may result in the removal of the Property from the Colorado Natural Area Systems.
 6. Termination. If either party desires to terminate this Agreement, it shall so notify the other party and give said other party an opportunity to confer regarding the reasons for termination. No less than 30 days after said initial notice, the notifying party may terminate this Agreement by notice to said other party. At the request of the City of Boulder, following termination of this Agreement, the Department shall execute and deliver to the City of Boulder a release of all its rights, title, and interest in the Property which may arise out of this Agreement.
 7. Notice. All notices to be given pursuant to this Agreement shall be in writing and shall be sent postage prepaid by registered or certified mail, return receipt requested, to the addresses first listed above or to such other person or address as the party to be notified may have designated prior thereto by written notice to the other party. Any notice so mailed shall be effective upon receipt.
 8. Amendments. These Articles may be amended in writing by the parties hereto with approval of the Council.

IN WITNESS THEREOF, the parties hereto have executed this Agreement of the first day written above.

CITY OF BOULDER

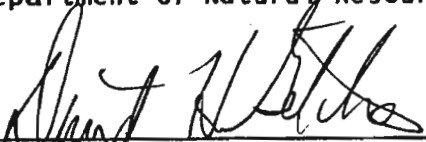


Ruth Correll
Mayor



Joseph N. de Raismes
City of Boulder Attorney

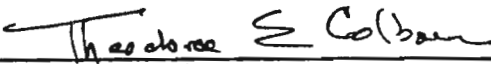
STATE OF COLORADO
Department of Natural Resources



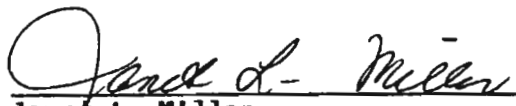
David H. Getches
Executive Director

APPROVED:

Colorado Natural Areas Council



Theodora Colborn
Chair



Janet L. Miller
Deputy Attorney General.

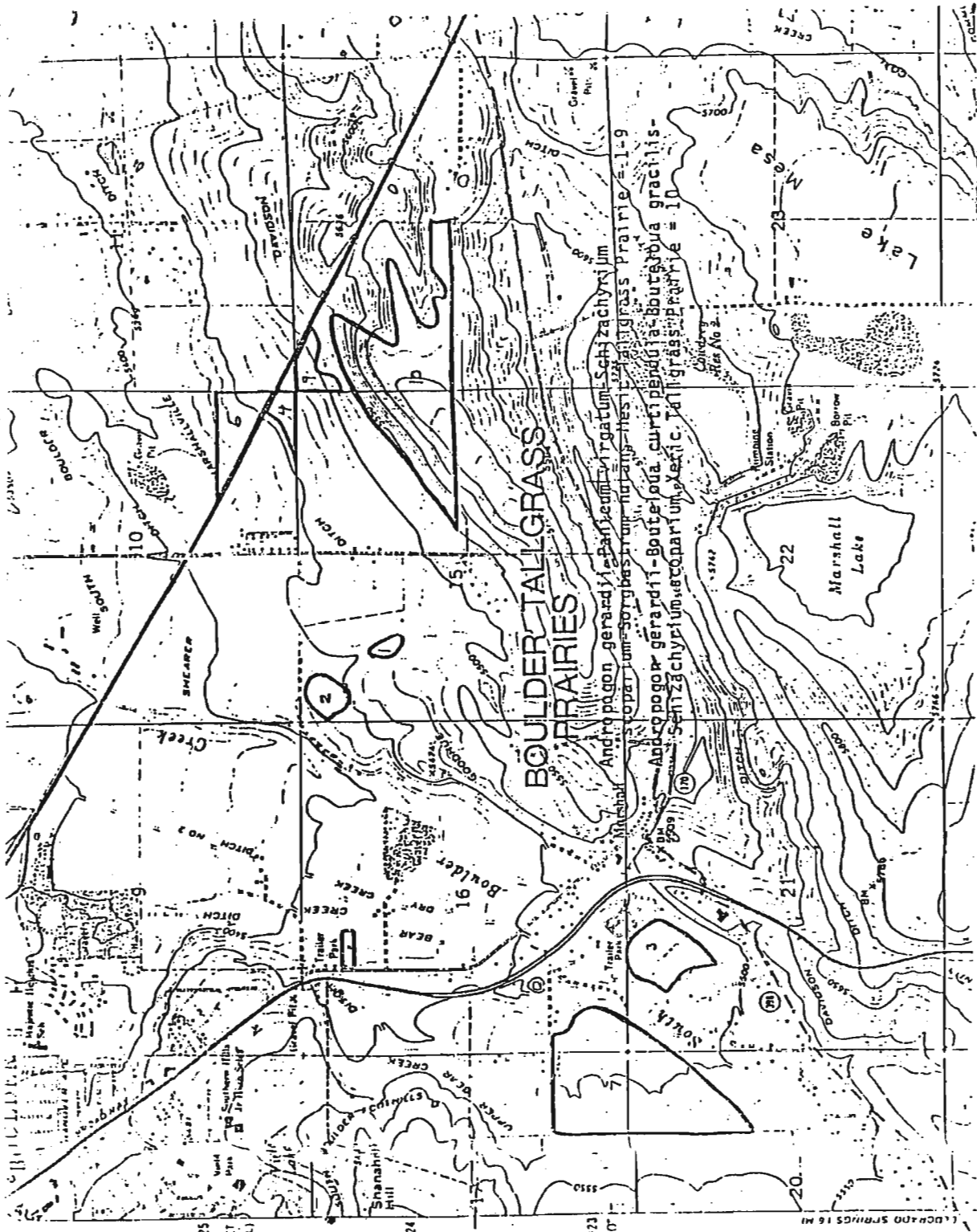
EXHIBIT A:

Boulder Tallgrass Prairie Natural Area
Legal Description

- Parcel 1: Approximately 4 acres located in the Northwest quarter of Section 15, Township 1 South, Range 70 West as outlined on the attached map.
- Parcel 2: Approximately 8 acres located in the Northwest quarter of the Northwest quarter of Section 15, Township 1 South, Range 70 West as outlined on the attached map.
- Parcel 3: Approximately 22 acres located in the Northwest quarter of Section 21, Township 1 South, Range 70 West as outlined on the attached map.
- Parcel 4: Approximately 6 acres located on the Southeast quarter of the Southeast quarter of Section 10, Township 1 South, Range 70 West as outlined on the attached map.
- Parcel 6: Approximately 17 acres located in the South half of the Southeast quarter of Section 10, Township 1 South, Range 70 West as outlined on the attached map.
- Parcel 7: Approximately 99 acres located in the Southwest quarter of the Southwest quarter of Section 16, Township 1 South, Range 70 West; and in the Southeast quarter of the Southeast quarter of Section 17, Township 1 South, Range 70 West; and in the East half of the Northeast quarter of Section 20, Township 1 South, Range 70 West; and in the Northwest quarter of the Northwest quarter of Section 21, Township 1 South, Range 70 West as outlined on the attached map.
- Parcel 9: Approximately 13 acres located in the Northwest quarter of the Northwest quarter of Section 14, Township 1 South, Range 70 West as outlined on the attached map.
- Parcel 10: Approximately 100 acres located in the Northwest quarter of Section 14, Township 1 South, Range 70 West and in the Northeast quarter of Section 15, Township 1 South, Range 70 West as outlined on the attached map.

EXHIBIT "B"

MAP ATTACHMENT TO
COLORADO NATURAL AREAS PROGRAM
DEPARTMENT OF NATURAL RESOURCES
STATE OF COLORADO
COLORADO TALLGRASS PRAIRIE NATURAL AREA
ARTICLES OF DESIGNATION



**APPENDIX 3.8 SOUTH BOULDER CREEK NATURAL AREA
DRAFT ARTICLES OF DESIGNATION****DRAFT**

**Colorado Natural Areas Program
Division of Parks and Outdoor Recreation
Department of Natural Resources
State of Colorado**

SOUTH BOULDER CREEK NATURAL AREA**DRAFT
ARTICLES OF DESIGNATION**

These Articles of Designation, made this ____ day of _____, 199_, by and between the State of Colorado, Department of Natural Resources, Division of Parks and Outdoor Recreation, Colorado Natural Areas Program, 1313 Sherman Street, Room 618, Denver, Colorado 80203, hereinafter the Division; and the City of Boulder Department of Open Space and Real Estate, P.O. Box 791 Boulder, Colorado 80303, hereinafter Open Space;

WHEREAS, Open Space owns and manages certain lands along and near South Boulder Creek totaling 1193.5 acres as described in Exhibit A and illustrated in Exhibit B and known as the South Boulder Creek Natural Area, situated in the County of Boulder, State of Colorado, hereinafter the Property; and

WHEREAS, The property provides an opportunity to manage an area for the benefit of multiple species in balance with traditional agriculture and recreational uses of the land; and

WHEREAS, Open Space has declared, through its South Boulder Creek Area Management Plan, that the property is to be managed for protection of its many values including biological resources; and

WHEREAS, Open Space is committed to working with the Colorado Department of Natural Resources to preserve declining species in Colorado to help avoid the need to list such species as threatened or endangered under the Federal Endangered Species Act, and if listed to work cooperatively for the conservation and recovery of those species; and

WHEREAS, Open Space requested that the Division register the Property as a State Natural Area on July 3, 1997; and

WHEREAS, the Board of Parks and Outdoor Recreation, hereinafter the Board, is authorized to conduct and administer the provisions of the Colorado Natural Areas Act as set forth at C.R.S. 33-33-101, et seq.; and

WHEREAS, the Colorado Natural Areas Act established a statewide Colorado Natural Areas Program, hereinafter the Program, to provide a means by which specific examples of Colorado's natural features and ecological phenomena can be identified, evaluated, and protected through a statewide system of designated natural areas; and

WHEREAS, the Act established a Colorado Natural Areas Council, hereinafter the Council, which advises the Board on the administration of the Program and which recommends the designation of Natural Areas by the Board; and

WHEREAS, Colorado Department of Natural Resources is committed to working with local governments to preserve declining species in Colorado to help avoid the need to list such species as threatened or endangered under the Federal Endangered Species Act, and if listed to work cooperatively for the conservation and recovery of those species; and

WHEREAS, The Colorado Natural Areas Council added the Property to the registry of Colorado Natural Areas on March 13, 1998; and

WHEREAS, the Boulder Board of County Commissioners was notified of this action on XXXXX, 199X and a public hearing was requested and held on XXXXX, 199X; and

WHEREAS, the Board has determined, pursuant to its criteria, that the Property is a natural area and that it would be desirable to include the Property within the Colorado Natural Areas System as a designated Colorado Natural Area; and

WHEREAS, as a result of the natural features of the Property, the Property provides one or more of the benefits described in C.R.S. 33-33-104 (2).

NOW THEREFORE, it is hereby agreed that:

- 1. Designation of Property as a Natural Area.** Upon filing of these Articles of Designation with, and the acceptance of same by, the Board, with the advice and approval of the Council, the Property described in Exhibit A and illustrated in Exhibit B, attached hereto and incorporated herein by reference, shall become a designated scientific Natural Area and part of the Colorado Natural Areas System. Said designated Natural Area shall be known as the South Boulder Creek Natural Area.
- 2. Purpose of Designation.** The Board has determined, upon recommendation by the Council, that the Property qualifies as a natural area to be included in the Colorado Natural Areas System because of the presence of the following biological resources:

-
- A. The Property contains an important occurrence of a federally threatened plant species:
1) *Spiranthes diluvialis* (Ute ladies'-tresses orchid)
- B. The Property contains an important population of a federally threatened animal species:
1) *Zapus hudsonius prebeli* (Preble's meadow jumping mouse)
- C. The Property contains an important population of two fish species believed to be in decline in Colorado:
1) *Fundulus sciadicus* (plains topminnow), and,
2) *Lepomis humilis* (orange-spotted sunfish)
- D. The Property contains a population of a declining grassland nesting bird at the western margin of its range:
1) *Dolichonyx oryzivorus* (bobolink)
- E. The Property contains a remnant of the plains cottonwood riparian ecosystem. This riparian community provides essential wildlife habitat and contributes to the biological diversity of floodplains along Colorado's eastern plains. It is recognized as a significant natural community by the Colorado Natural Heritage Program.
- F. The Property contains relicts of the tallgrass prairie ecosystem scattered throughout the area. Mesic grassland communities occur in relatively good condition along South Boulder Creek and make a significant contribution to the species and structural diversity of the vegetation in the area.
- G. The Property contains wetlands that are considered to be among the best preserved and most ecologically significant in the Boulder Valley.
- H. As a result of the presence of these valuable natural features the Property provides the following benefits:
- (1) It provides habitat for rare and threatened plant and animal species; and
 - (2) It serves as an area having resource material from which new knowledge may be derived and as a reservoir of genetic material which has present and future value to scientific inquiry; and
 - (3) It provides an opportunity to protect rare biological resources for future generations; and
 - (4) It serves as an outdoor classroom and laboratory for scientific research and study in the biological, hydrological, and ecological sciences.

-
3. **Rights and Duties of the Board.** The Board shall list the Property as a designated Natural Area of the Colorado Natural Areas System and shall provide Open Space with a certificate and a signed copy of these Articles of Designation indicating said designation. This designation evidences the desire of the Board that the Property be protected from impacts adversely affecting the natural features for which the Property is designated.
- A. The Division may visit the Property at any time to evaluate current uses and conditions for consistency with the Program. The Division will give advance notice of visitation to Open Space of any visits. Following the visit, the Division will consult with and provide any resulting observations and suggestions to Open Space.
 - B. The Division will cooperate with Open Space in developing, reviewing and updating the management plans applicable to the Property.
 - C. The Division will cooperate with Open Space in producing a periodic report on the condition of the Property and the status of the special natural features of the Property.
4. **Rights and Duties of Open Space.** The management of the Property shall be the responsibility of Open Space, which agrees to provide special management to protect unique geological, scenic, special status plant and animal values, and other significant resources. Management of the Property shall be in consistent with all applicable federal and state law and the South Boulder Creek Area Management Plan, its amendments and revisions.
- A. User-access to the Property will be the responsibility of Open Space where controlled by Open Space. Persons wishing to perform research of any kind must obtain permission from the Open Space Director or his designee. Open Space may approve access to the site and the undertaking of scientific research by qualified persons, if said research is deemed important and is compatible with the preservation of the natural features within the boundaries of the Property.
 - B. Vehicle access will be restricted to existing roads.
 - C. Mining of locatable minerals owned by Open Space will be not be allowed on the Property.
 - D. Leasing of oil and gas rights owned by Open Space will not be allowed on the Property.
 - E. The Property will be managed to protect its scenic qualities and the natural features identified in Paragraph 4, above.
 - F. Open Space will monitor and manage recreational uses of the Property in such a way as to protect the significant natural features on the Property.
 - G. When feasible Open Space will cooperate with the Division in inventorying, mapping and monitoring the plant species of special concern on the Property.

- H. Open Space will cooperate with the Division in updating and amending the portions of the South Boulder Creek Management Area Plan applicable to the Property.
 - I. Open Space will cooperate with the Division in producing a periodic report on the condition and use of the site.
5. **Default**. If either party reasonably believes that the other party is in default in any of its obligations under this Agreement, it may give the other party written notice of the alleged default. Within 30 days of receipt of notice, the parties shall confer and make a good faith effort to correct the default and to resolve any difference of opinion which may exist as to the respective rights and duties under this Agreement. In the event that default is not cured, notice of default shall constitute notice for purposes of termination. Default by Open Space may result in the removal of the Property from the Colorado Natural Areas System.
 6. **Termination**. If either party desires to terminate these Articles, it shall so notify the other party and give said other party an opportunity to confer regarding the reasons for termination. No less than 90 days after said initial notice, the notifying party may terminate these Articles by notice to said other party.
 7. **Notice**. All notices to be given pursuant to these Articles shall be in writing and shall be sent postage prepaid by registered or certified mail, return receipt requested to the addresses first listed above or to such other person or address as the party to be notified may have designated prior thereto by written notice to the other party. Any notice so mailed shall be effective upon receipt.
 8. **Amendments**. These Articles may be amended in writing by the parties hereto with approval of the Council.

IN WITNESS WHEREOF, the partners hereto have executed this agreement as of the last written date below:

CITY OF BOULDER

Open Space and Real Estate

James C. Crain
Director

STATE OF COLORADO

Colorado Department of Natural Resources
Colorado Division of Parks and Outdoor Recreation

Laurie A. Mathews
Director

APPROVED:

COLORADO NATURAL AREAS COUNCIL

Lee Shropshire
Chair

EXHIBIT A**SOUTH BOULDER CREEK NATURAL AREA**

All City of Boulder Open Space fee title lands acquired on or before the date of this agreement located in the following areas:

<u>Sixth Principal Meridian</u>		<u>Acres</u>
T. 1 N. R. 70 W.		
	Sec. 34	68
T. 1 S. R. 70 W.		
	Sec. 2, SW1/4, All land south of the Dry Creek #2 Ditch	48
	Sec. 3	268
	Sec. 4	4
	Sec. 9	142
	Sec. 10, All land north of the Marshallville Ditch, and all land south of U.S. 36, west of Cherryvale Road, and north of the Goodhue Ditch	526
	Sec. 15, All land north of the Marshallville Ditch	.5
	Sec. 16, All land north of the Marshallville Ditch and east of Colorado State Highway 93	137
	TOTAL	1193.5

APPENDIX 4.1 ACTION ITEMS IN THE SOUTH BOULDER CREEK MANAGEMENT PLAN APPLICABLE TO THE INSTREAM FLOW AND RIPARIAN MANAGEMENT STRATEGY

VEGETATION GOAL: Preserve and maintain native plant communities, protect rare species and communities, and restore native vegetation in suitable areas.
<i>Objective #1: Integrate vegetation management with other resource goals and policies.</i>
Participate in interagency Integrated Pest Management planning and management.
<i>Objective #2: Protect native plant community health using or simulating natural processes where possible.</i>
Fire
Enhance wildlife habitat and species diversity by improving or restoring sensitive species habitat and by creating patch mosaics of different composition and structure.
Control exotic plant species of concern, such as Canada thistle and cheat grass, by using carefully-timed fire and follow-up treatments.
<i>South Boulder Creek/Dry Creek subarea</i>
Burn wet meadow and tallgrass communities with a 3 to 8 year frequency. Base burn schedule and timing on grassland community monitoring results, Integrated Pest Management regime, grassland bird life cycle stage, orchid phenological stage, and the emergence of Preble's meadow jumping mouse from hibernation. Coordinate cattle grazing regime with burn plans.
Maintain a habitat mosaic that manages for biological and landscape diversity. Create a patch mosaic of 1-year, 3-year, 6-year, and older prescribed burns. (Identify specific locations and design for long-term burn planning.)
Grazing
Monitor plant species richness and cover and stream bank condition in riparian corridors and bottomland grassland patches that are exclosed from cattle grazing. Monitor Canada thistle densities. Survey annually for <i>Spiranthes diluvialis</i> . Monitoring priorities are in the second Van Vleet field south of U.S. 36 and riparian reaches that will be fenced upon implementation of this plan.
Coordinate prescribed burn planning and Integrated Pest Management planning with grazing plans.
<i>Objective # 3: Prevent new infestations and manage existing infestations of priority non-native species of concern using the Integrated Pest Management planning process.</i>

Prevention
<i>Open Space Lands</i>
Design livestock grazing regimes (timing, duration, stocking rate) to prevent overgrazing, erosion, and trailing. Place salt blocks, water sources, and supplemental forage to minimize erosion. When possible, use supplemental feed (hay) that is produced on the same property containing the livestock. Use weed-free hay, whenever possible, if hay is brought in from outside the leased area. If weed infested hay is used to feed contained livestock, manure should be composted for 1 year before depositing onto hay fields.
Prevent over-fertilization of cropland and transport of excess fertilizer by runoff (high soil nitrogen levels can increase the competitive ability of some weed species over most native species).
Prevent weeds from becoming established along ditches and laterals. Incorporate more burning into ditch management.
Plan the timing and frequency of prescribed burns to optimize native plant growth and reproduction.
Implement timely reclamation in areas where ground disturbance has occurred. Native plant species should be used in post-burn reclamation seedings or plantings.
Control (Specific)
<i>Purple loosestrife</i>
Intensify control efforts at Flatiron Industrial Park.
Continue to assist in the control of purple loosestrife at East Boulder Community Center to eliminate purple loosestrife from the property.
<i>Bouncing bet</i>
Develop and implement a management plan for bouncing bet in the South Boulder Creek floodplain. Involve appropriate staff.
<i>Objective #4: Protect and maintain rare species and communities of special concern.</i>
General
Plan recreational development to avoid or minimize direct, indirect, and cumulative negative effects on rare species, communities, and potential habitat.
Integrate rare plant management and weed management. Use control techniques that avoid negative impacts to species of special concern.
Integrate rare plant management and livestock grazing management. Prevent negative impacts to species and communities of special concern by excluding livestock or by employing prescriptive grazing only.
Specific
Survey for <i>Spiranthes romanzoffiana</i> throughout <i>Spiranthes diluvialis</i> habitat, particularly in the South Boulder Creek floodplain. Verify and document any occurrences.

Objective #5: Establish and manage Special Land Designations (e.g., State Natural Areas) to highlight areas and communities with exceptional natural value.

Designate South Boulder Creek Natural Area in cooperation with the Colorado Natural Areas Program.

WETLANDS GOAL: Preserve significant wetlands and riparian areas, minimize impacts to important ecological functions, and restore or enhance suitable wetlands and riparian areas.

Objective #1: Preserve and protect important wetland and riparian areas.

Avoid trail development and undesignated trail use through significant wetlands and riparian corridors.

Establish fencing priorities to protect other wetlands and riparian areas susceptible to livestock disturbance.

Work with Public Service Company to coordinate with Open Space prior to conducting maintenance on the headgate for the East Boulder Ditch. Historically, clearing and dredging of this structure have impacted the riparian and stream habitat.

Reclaim social trails south of the end of the South Boulder Creek Trail and discourage public and livestock access to this reach of South Boulder Creek.

Fence South Boulder Creek to restrict cattle from the riparian area. Grazing should only be permitted or specific management actions such as weed control. Grazing will be used only when other Integrated Pest Management methods are not practicable.

Work with ditch companies to implement wetland Best Management Practices to minimize adverse natural resource impacts.

Draft an agreement with Flatiron Industrial Park for South Boulder Creek channel maintenance north of the Burlington Northern railroad bridge.

Track floodplain management issues as they affect Open Space interests regarding riparian and wetland resource values.

Objective #2: Restore or enhance suitable wetlands and riparian areas.

Use prescribed burns and grazing management to maintain or enhance wetland and riparian plant community diversity.

Utilize Integrated Pest Management practices to control weeds and non-native vegetation in wetlands and riparian areas.

Design and implement an instream flow and riparian management program for South Boulder Creek.

Develop a formal planting and maintenance program through the Tributary Greenways Program to establish native riparian trees and facilitate efficient removal of hazard trees from the channel. Trees that are not deemed a hazard should be allowed to remain to provide aquatic and wildlife habitat.

Consult with a fluvial hydrologist/engineer to evaluate the feasibility of reestablishing natural processes that lead to stream meandering on South Boulder Creek and, where feasible, implement projects to rejuvenate and sustain healthy riparian communities.

Inventory streams and wetlands to identify degraded areas that may have restoration potential.

Investigate the feasibility of relocating or removing existing trails out of wetlands and riparian areas and implement where practicable to protect sensitive areas.
<i>Objective #3: Monitor wetland and riparian related issues.</i>
Monitor the occurrence and spread of weeds in wetlands and riparian areas.
Establish protocols for long-term monitoring of wetland and riparian functions, values, vegetation, and wildlife.
Monitor regulatory compliance that affects wetland and riparian values and function in the Management Area.
WILDLIFE GOAL: Preserve wildlife and wildlife habitat through proper land stewardship that incorporates strategies of habitat enhancement and minimizes the impacts of land use harmful to wildlife.
<i>Objective #1: Inventory wildlife species to establish accurate and replicable monitoring and evaluate effectiveness of land management techniques</i>
Conduct surveys of for mammals, fish, birds, reptiles, amphibians, invertebrates as part of system-wide surveys.
Conduct and coordinate surveys for the Preble's meadow jumping mouse in the following locations: South Boulder Creek, Dry Creek, Straty-Cline, Short and Milne, Viele Channel, Lousberg, and any other properties which might contain suitable habitat.
Conduct and coordinate surveys for rare fish (orange-spotted sunfish and plains topminnow) in appropriate stream reaches.
<i>Objective #2: Maintain and/or restore wildlife habitat and/or populations at risk, based upon results of ecological research and site specific monitoring.</i>
Evaluate the ecological conditions that support rare fish with the Division of Wildlife and other interested agencies and coordinate aquatic resource restoration activities.
Create and/or enhance habitat for Preble's meadow jumping mouse.
<i>Objective #4: Integrate wildlife population and habitat protection/enhancement into other resource management actions.</i>
Protect wildlife from impacts of short-term construction activities (i.e., utility construction).
Encourage protection of large tracts of land unfragmented from trails.
Use seasonal closures to protect sensitive wildlife species where appropriate.
Develop and implement an instream flow program during low-flow winter months to enhance fish and wildlife habitat.
Identify parcels of land for potential acquisition to decrease habitat fragmentation.
AGRICULTURE GOAL: Refine, focus, and implement sustainable agricultural practices that enhance multiple resource management objectives.
<i>Objective #1: Enhance the balance between natural resources and agricultural practices.</i>

<i>Fencing</i>
Install or realign fences to protect resources and better manage grazing in or near riparian areas along the South Boulder Creek, Dry Creek, and Fourmile Canyon Creek floodplains.
Fence the riparian area (corridor) of South Boulder Creek from South Boulder Road to U.S. 36. Locate the fence between the trail and creek.
Install fence on Fancher to exclude grazing which will facilitate vegetation recovery and protect Preble's meadow jumping mouse habitat.
<i>Vegetation Management</i>
Maintain irrigated grasslands to support the populations of the Ute ladies'-tresses orchid.
Maintain irrigated grasslands to support tallgrass communities and irrigated hay pastures.
Continue to coordinate and evaluate the effectiveness of the timing of haying to protect ground-nesting birds and the reproduction of Ute ladies'-tresses.
<i>Objective #3: Use the City's adjudicated water rights effectively and efficiently to sustain the natural values of the area.</i>
Utilize water rights or ditch company shares to ensure sustainable agricultural operations or to maintain or enhance instream flows and high-quality wetlands, and sensitive species.
Acquire additional water rights or ditch company shares where needed to ensure sustainable agricultural operations or to maintain or enhance instream flows and high-quality wetlands, sensitive species, and plant communities.
Work with ditch companies to implement Best Management Practices to ensure that ditch maintenance activities do not adversely affect natural resource values.
Work with ditch companies to ensure that when new headgates and diversion structures are installed or old headgates and diversion structures are refurbished that the design accommodates fish passage if appropriate.
Coordinate and communicate with the Water Quality Division of the City Utilities Department to identify and implement agricultural Best Management Practices to prevent water quality degradation.
Identify and monitor sources of water quality impairment.
Track Gross Reservoir relicensing to help ensure that reservoir operations avoid adverse impacts to the City's Open Space water resources and natural resource interests.
Track the development of the University of Colorado Gateway property to ensure that development does not adversely affect water flows and natural resources on adjacent Open Space properties.
<i>PASSIVE RECREATION GOAL: Manage and preserve land for passive recreational use, its aesthetic or passive recreational value, and its contribution to the quality of life of the community.</i>
<i>Objective #5: Minimize passive recreational impacts to natural, cultural, and agricultural resources.</i>

Minimize passive recreational impacts by focusing public education and outreach on awareness and understanding of the natural, cultural, and agricultural resources located within South Boulder Creek.

Strongly encourage use of designated trails and access points.

Direct visitor use away from sensitive areas by closing and reclaiming undesignated trails and access points. Priority areas for discouraging visitor use and removing pedestrian gates include the Gallucci property (Habitat Conservation Areas) and off-designated trail areas on the Burke I, Burke II, and Gebhard properties (these properties contain extensive wetlands, tallgrass communities, rare plant species, and ground-nesting bird habitat). Direct recreational use away from the Open Space lands south and east of Baseline Reservoir (the Suitts and St. Walburga properties) to prevent potential impacts to wintering bald eagles, raptors, Preble's meadow jumping mouse, wetlands, tallgrass communities, and Ute ladies'-tresses habitat.

EDUCATION AND OUTREACH GOAL: Establish education and management measures in a reasonable, responsible, timely way to ensure that the Open Space system remains ecologically, agriculturally, and recreationally viable.

Objective #1: Disseminate information concerning the ecology, natural history, and cultural history of the area.

Disseminate additional information on focus topics, including stay-on-designated trail, dog management, agriculture, prairie dogs, rare plants and animals, wetlands, and weed infestation and control.

Develop and install interpretive signs in several locations along the South Boulder Creek and Dry Creek Trails to inform visitors about the native grass, rare plant and animal, agriculture, and wetland communities.

Objective #3: Disseminate information about the situations that arise when humans interact with natural systems and about ways of lessening or eliminating the impact of these interactions.

Conduct "Do the Wild Thing...Leave No Trace on Open Space" pilot educational project in the Management Area to educate visitors on ways to reduce their impacts to natural resources and reduce conflicts between visitors, including riparian habitats, prairie dogs, raptors, and amphibians.

APPENDIX 5.1 PRAIRIE DOG COLONY DESIGNATIONS AND BOUNDARY CHANGES

Designations for Prairie Dog Colonies in the South Boulder Creek Management Area That Were Not Previously Designated under the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan*.

Van Vleet Southwest Transitional Area (formerly Sam's Lane colony)

Management Action

Designate the Van Vleet Southwest colony as a Transitional Area due to burrowing owl activity and proximity to Colorado Tallgrass Prairie Natural Area.

Description/Justification for Transitional Area Status

This colony is on the Van Vleet property just to the north of the Church property and west of South Cherryvale Road. This colony has historically been controlled through extermination and relocation efforts. Due to burrowing owl activity at this site during 1998 and the proximity of this colony to the Colorado Tallgrass Prairie Natural Area, further evaluation is needed.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The borders of this Transitional Area are Marshallville Ditch to the north/northwest, the fence/South Cherryvale Road to the east, and the fence to the south. The need for a visual barrier on the south fence will need to be investigated.

Van Vleet Northwest Transitional Area (formerly horse pasture colony)

Management Action

Designate the Van Vleet Northwest colony as a Transitional Area until further evaluation.

Description/Justification for Transitional Area Status

This colony is located north of U.S. 36 and west of South Cherryvale Road. This area was determined to be unsuitable habitat in the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan* (Figure 13). Further evaluation is therefore needed.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The borders of this

Transitional Area are the South Boulder Canyon Ditch to the north, the fence to the east, and U.S. 36 to the south/southwest.

Aweida II Transitional Area

Management Action

Designate the Aweida II colony as a Transitional Area due to possible conflicts with reclamation efforts on the property.

Description/Justification for Transitional Area Status

This colony is an historic colony that was re-established in 1997. Transitional Area status is recommended due to on-going vegetation reclamation efforts on the property.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The boundaries of this Transitional Area are the fences of the property.

Suits South Habitat Conservation Area

Management Action

Designate the Suits South colony as a Habitat Conservation Area due to the isolation of the colony.

Description

This Habitat Conservation Area is located in the southwest corner of the Suits property near the intersection of South Boulder Road and South Cherryvale Road. This colony is isolated from other colonies by roads, ditches, and lush vegetation.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The boundaries of this Habitat Conservation Area are the McGinn Ditch to the north/northeast, the fence to the east, fence/South Boulder Road to the south, and fence/South Cherryvale Road to the west/northwest. The need for a visual barrier on all fence boundaries will need to be investigated.

Issues/Opportunities

- Visual barrier may be needed on the fences of this property. Existing fences are suitable for a visual barrier construction. The ditch to the north of the colony provides a sufficient barrier to the spread of the colony as well as the high berm and South Boulder Road to the south.
- This Habitat Conservation Area complements the Habitat Conservation Areas of Suits North, Klein, and Marshall, and serves to protect raptors and other wildlife using the area.

Gallagher Habitat Conservation Area

Management Action

Designate the Gallagher colony as a Habitat Conservation Area due to its large size.

Description

The Gallagher property is located south of Kelso Road and west of 51st Street. This large colony inhabits approximately the northern third of the property. Kelso Road and 51st Street are significant boundaries to the north and east and a wetland and lush vegetation provide a boundary to the south.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The borders of this Habitat Conservation Area are fence/Kelso Road to the north, fence/51st Street to the east, a wetland to the south, and the fence to the west. The need for a visual barrier on all fence boundaries will need to be investigated.

Issues/Opportunities

- The colony has already spread onto private property to the west.
- A visual barrier may need to be constructed on the north, east, and west fence lines surrounding this colony.

Belgrove Habitat Conservation Area***Management Action***

Designate the Belgrove colony as a Habitat Conservation Area due proximity to the Independence Road Habitat Conservation Area.

Description

The Belgrove property is located south of Jay Road between 47th Street and the Boulder-Longmont Diagonal Highway. This colony is in close proximity to the Independence Road Habitat Conservation Area.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The borders of this Habitat Conservation Area are the fence/wet meadow to the north, fence/Boulder-Longmont Diagonal Highway to the east/southeast, Fourmile Canyon Creek to the south, and fence/47th Street to the west. The need for a visual barrier on the fence boundaries will need to be investigated.

Issues/Opportunities

- This property is leased for grazing purposes. This activity does not need to be terminated.
- The north field of this property is leased for haying purposes. A wet meadow exists between the colony and the hay field that may deter the spread of the colony, but additional efforts may need to be made to protect this agricultural use.
- This Habitat Conservation Area complements the Independence Road Habitat Conservation Area and serves to protect habitat for raptors and other wildlife in the area.

Marshall Habitat Conservation Area

Management Action

Designate the newly acquired Marshall colonies as a Habitat Conservation Area due to their isolation and large size.

Description

The Marshall property is located just north of South Boulder Road and extends to the southeast corner of Clough. The prairie dog colonies cover most of this property.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The borders of this Habitat Conservation Area are the fence to the north, the fence to the east, and South Boulder Canyon Ditch to the south and west. The need for a visual barrier on the north and east fences will need to be investigated..

Issues/Opportunities

- This Habitat Conservation Area complements the Dry Creek and Suitts South Habitat Conservation Areas and serves to protect habitat for raptors and other wildlife in the area.

Changes in Designation and Determination of Designation Boundaries for Prairie Dog Colonies in the South Boulder Creek Management Area

McKenzie North Transitional Area (previously a Removal Area)

Management Action

Designate the McKenzie North colony as a Transitional Area.

Description

The McKenzie property is located along the Boulder-Longmont Diagonal Highway between Independence Road and Jay Road. This particular colony inhabits the northernmost field of McKenzie and the alfalfa Horseshoe Field immediately to the south. A visual barrier has been constructed along the western and eastern borders of this colony. Due to failed attempts at removing this colony in the past and the subsequent increase in the size of the colony, Open Space staff has decided to refrain from further removal efforts at this time. As a result, a Removal Area designation is no longer accurate for this area. Should natural processes such as sylvatic plague remove the prairie dog colony from the alfalfa field, this area will be reclaimed.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The boundaries of this

Transitional Area are fence/Jay Road to the north, fence/visual barrier to the east, fence/Fourmile Canyon Creek/trees/trail to the south, and fence/Boulder-Longmont Diagonal Highway to the west.

Issues/Opportunities

- The visual barrier to the west and the ditch separating this colony from the cropland to the south have not been effective barriers in the past. A colony has been established in the McKenzie Horseshoe Field as a result.
- The lessee of the Horseshoe Field has been notified that additional removal efforts of this colony will not occur at this time.
- The colony north of the Horseshoe Field mostly inhabits suitable habitat according to the *City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan* (see Figure 11, 13). However, parts of this field are a seasonal wetland. This situation forces the prairie dogs to abandon some of their burrows during the wetter months which makes it even more difficult to prevent them from moving into the Horseshoe Field. The prairie dogs do not interfere with the quality of this wetland, however.
- A well-used trail skirts the edge of this colony as well as the Independence Road Habitat Conservation Area to the south. This trail provides excellent viewing and interpretive opportunities.

Dry Creek Habitat Conservation Area (previously a Transitional Area)

Management Action

Designate the Klein and Suitts North colonies as Habitat Conservation Areas due to their isolation from other colonies.

Description (excerpted, in part, from the “City of Boulder Grassland Management: Black-tailed Prairie Dog Habitat Conservation Plan”)

These colonies are located on the east side of Baseline Reservoir. The prairie dogs in this area have been active since at least 1976 when the City began to record prairie dog activity. This colony has also survived recent plague epizootics, probably due to its isolation from other colonies. During the winter, bald eagles roost in a small grove of cottonwood trees in the southeast corner of Baseline Reservoir. These eagles may depend to some degree upon stealing prairie dog carcasses from other raptors hunting in the area.

Boundary Designations

Designation boundaries are determined by the nearest existing boundaries (fence, road, wetland, etc.) that provide a realistic barrier to the spread of the prairie dog colony. The original designations for the Suitts North colony were maintained. The Klein colony has expanded beyond the original designation boundaries. The new boundaries are Dry Creek #3 to the north, the fence to the east, the fence to the south, and Dry Creek Ditch to the west. A visual barrier has been installed on the south fence and portions of the east and west fences.

Changes in designation boundaries for prairie dog colonies in the South Boulder Creek Management Area.

Gallucci/Yunker Habitat Conservation Area

Rationale for Boundary Change

The prairie dog colony on Yunker has spread beyond the existing boundary of the Habitat Conservation Area.

New Boundary

Extend the north boundary to Davidson Ditch.

Andrus Habitat Conservation Area

Rationale for Boundary Change

The prairie dog colony on Andrus has spread beyond the existing boundaries of the Habitat Conservation Area.

New Boundary

Extend the northeast boundary to the ditch.

Rolling Rock Transitional Area

Rationale for Boundary Change

The prairie dog colony on Rolling Rock has spread beyond the existing boundary of the Transitional Area.

New Boundaries

The new boundaries follow the fences of the northwest, north, and east parts of the property, the trail to the south, and the ditch to the west. The need for a visual barrier on the fence boundaries will need to be investigated.

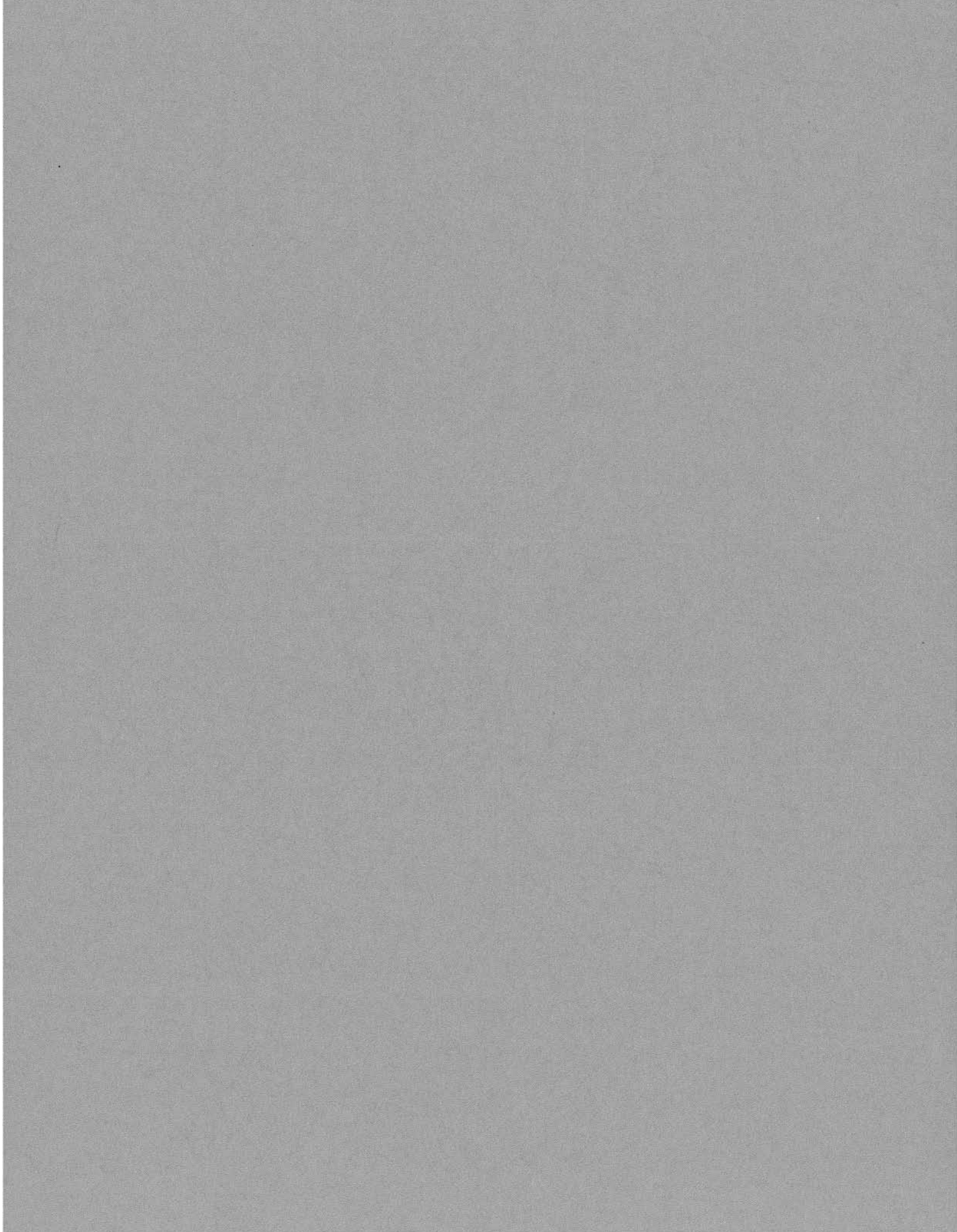
Van Vleet Northeast Transitional Area (formerly gravel pit colony)

Rationale for Boundary Change

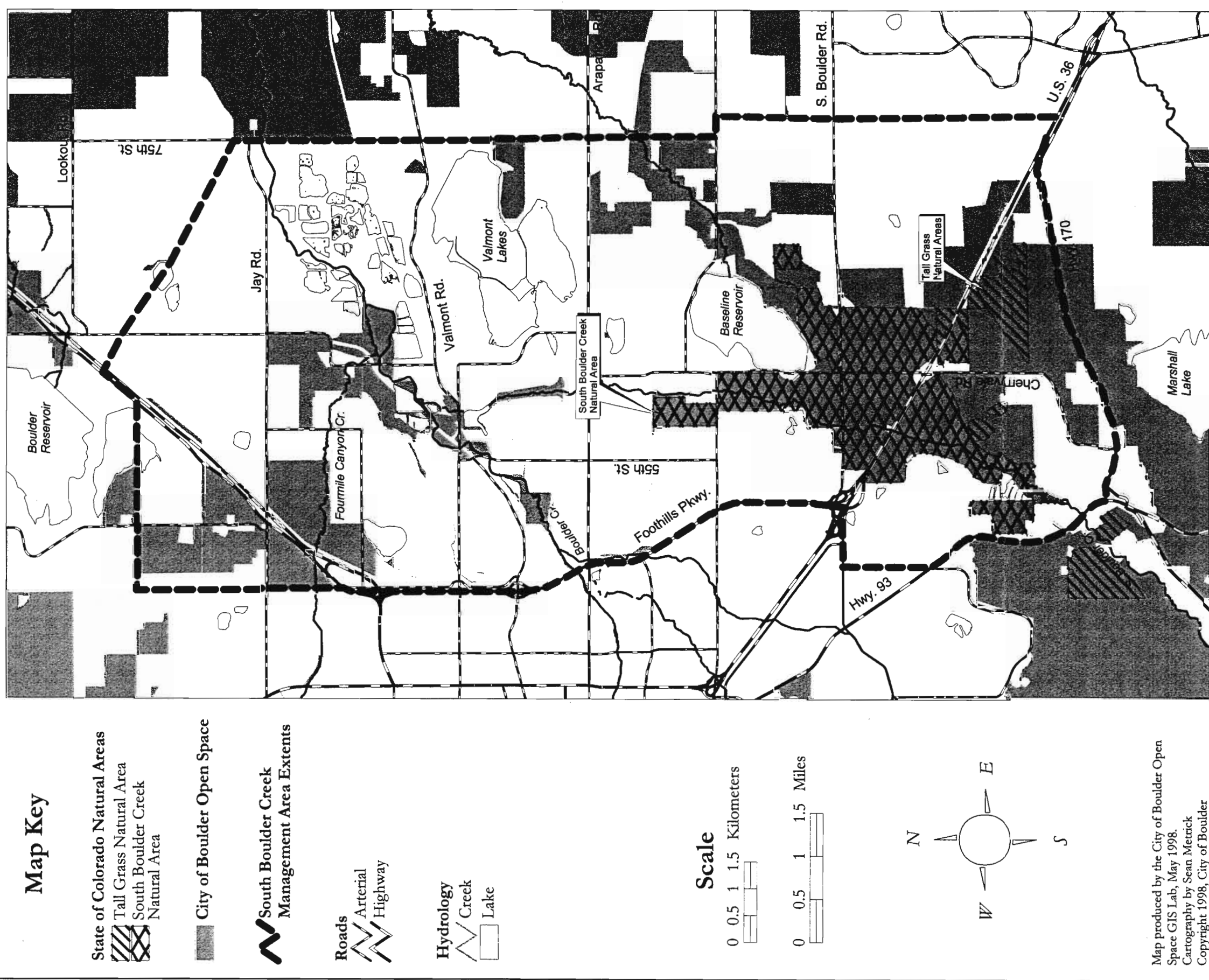
The prairie dog colony on Van Vleet Northeast has moved to a location completely south of the existing designated Transitional Area.

New Boundaries

The new boundaries are the fence to the east/northeast, fence/U.S. 36 to the south, and fence/Marshallville Ditch to the west/northwest.

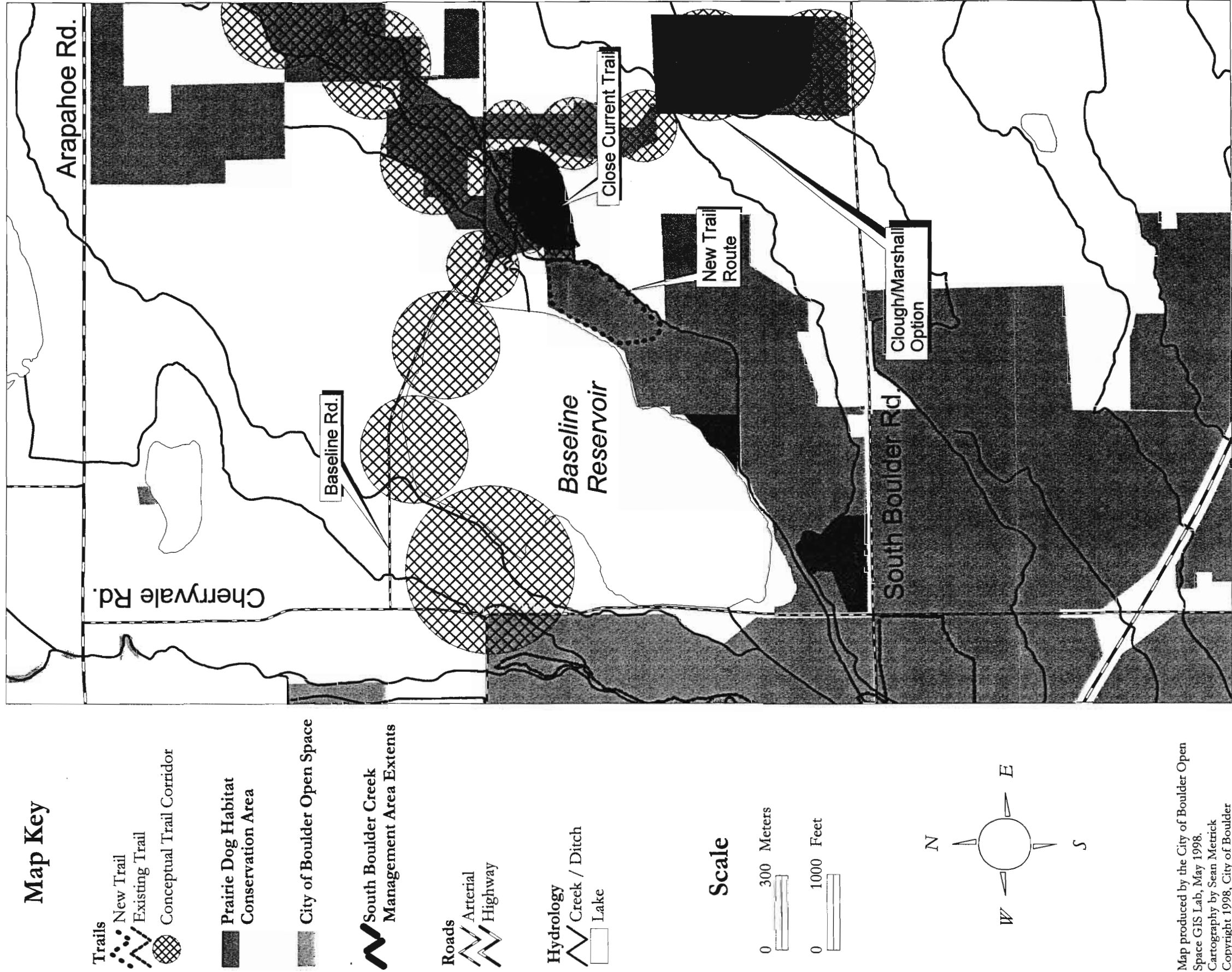


**Figure 1.3: Natural Areas
South Boulder Creek Management Area**



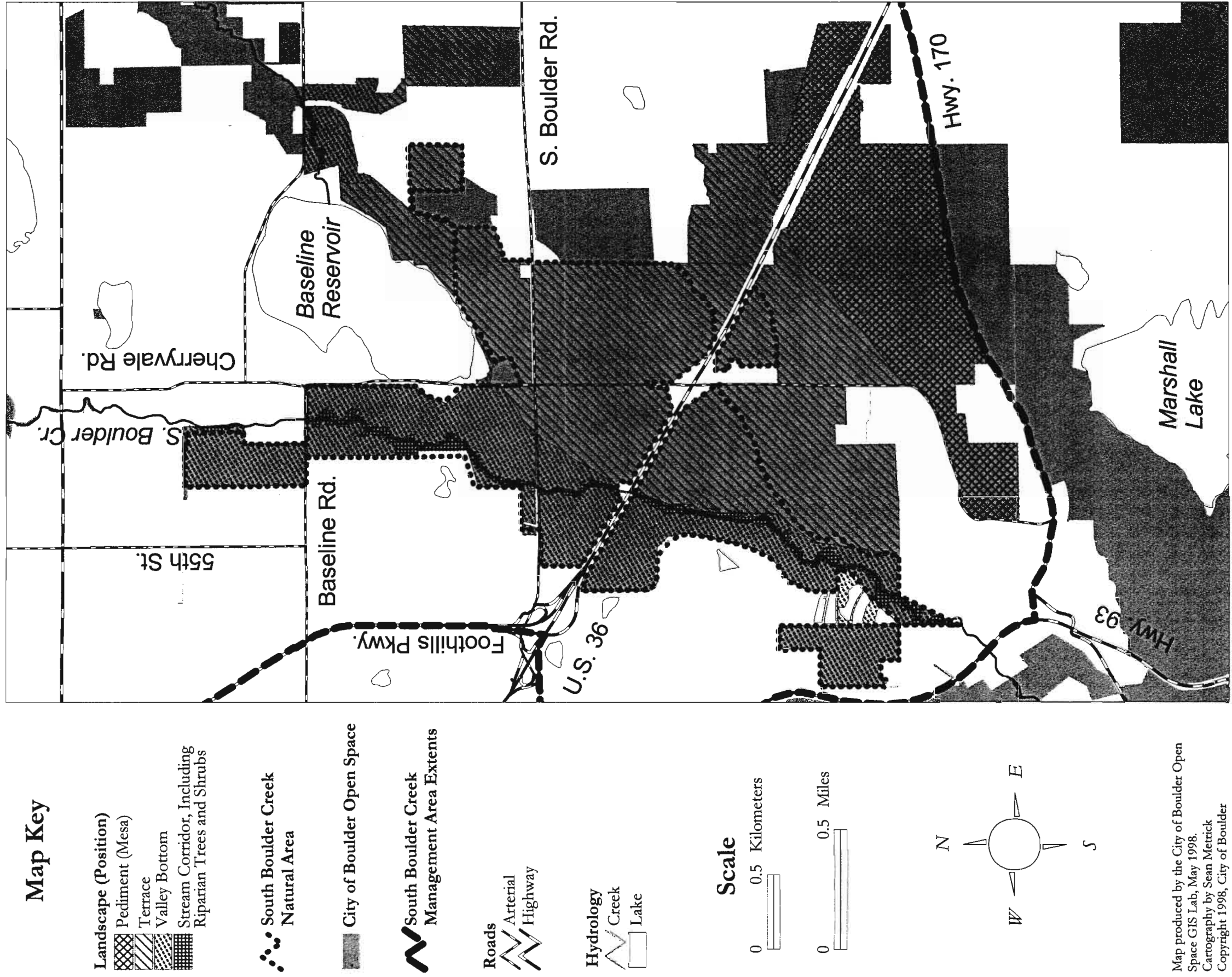
Map produced by the City of Boulder Open Space GIS Lab, May 1998.
Cartography by Sean Metrick
Copyright 1998, City of Boulder

**Figure 10.3: Dry Creek Options
South Boulder Creek Management Area**

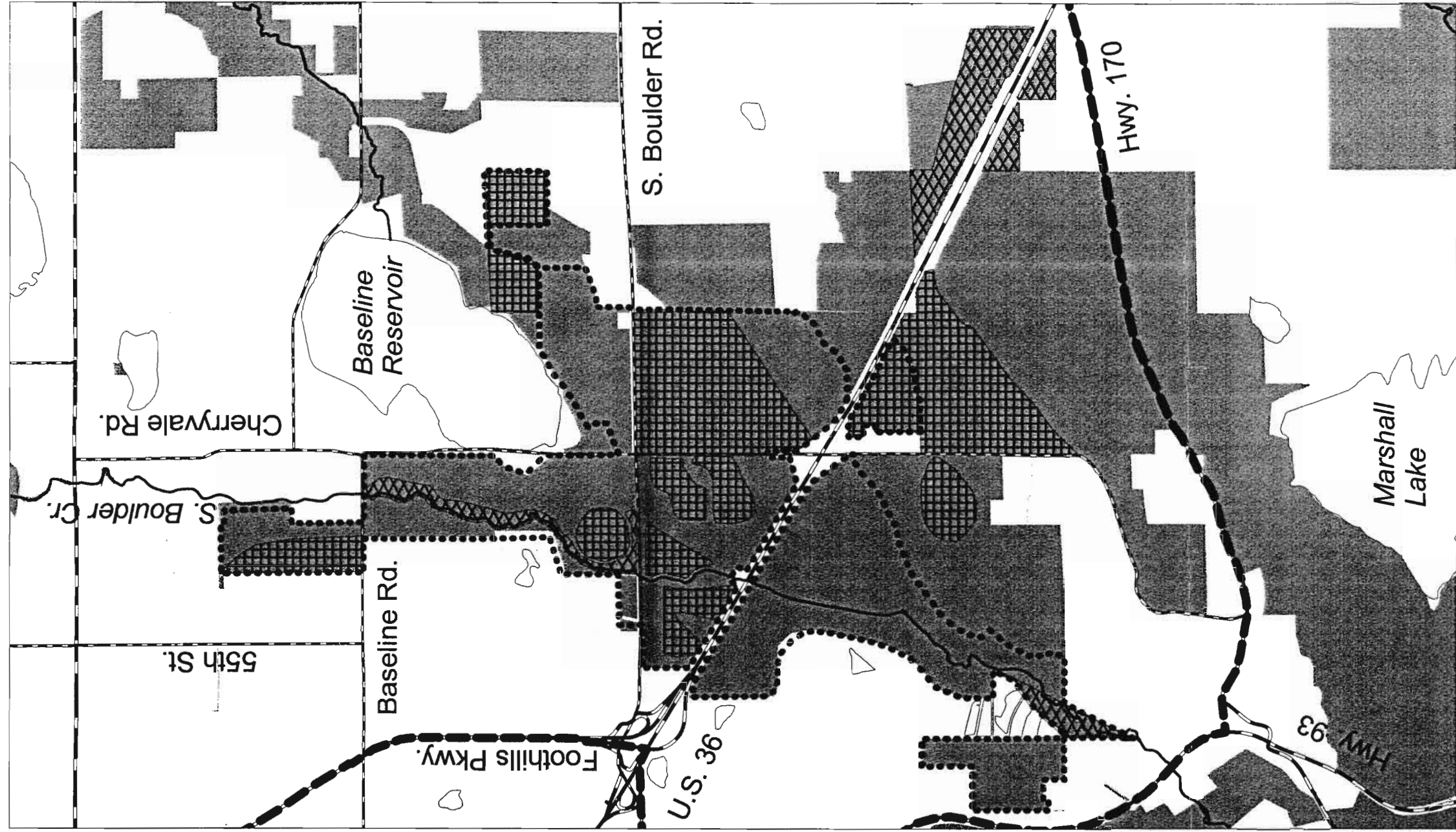


Map produced by the City of Boulder Open Space GIS Lab, May 1998.
Cartography by Sean Metrick
Copyright 1998, City of Boulder

Appendix 3.1, Figure 1: Landscape and Vegetation of the South Boulder Creek Natural Area and Adjoining Open Space



Appendix 3.1, Figure 2:
**Selected Agricultural Management of the South Boulder Creek
 Natural Area and Adjoining Open Space**



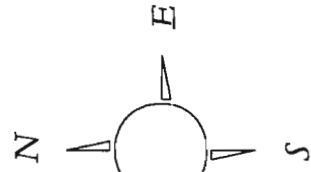
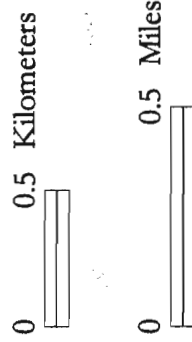
Map Key

- Selected Agricultural Management
 - Hayed
 - Not Grazed
- South Boulder Creek Natural Area
- City of Boulder Open Space
- South Boulder Creek Management Area Extents

- Roads
 - Arterial
 - Highway

- Hydrology
 - Creek
 - Lake

Scale



Map produced by the City of Boulder Open Space GIS Lab, May 1998.
 Cartography by Sean Metrick
 Copyright 1998, City of Boulder



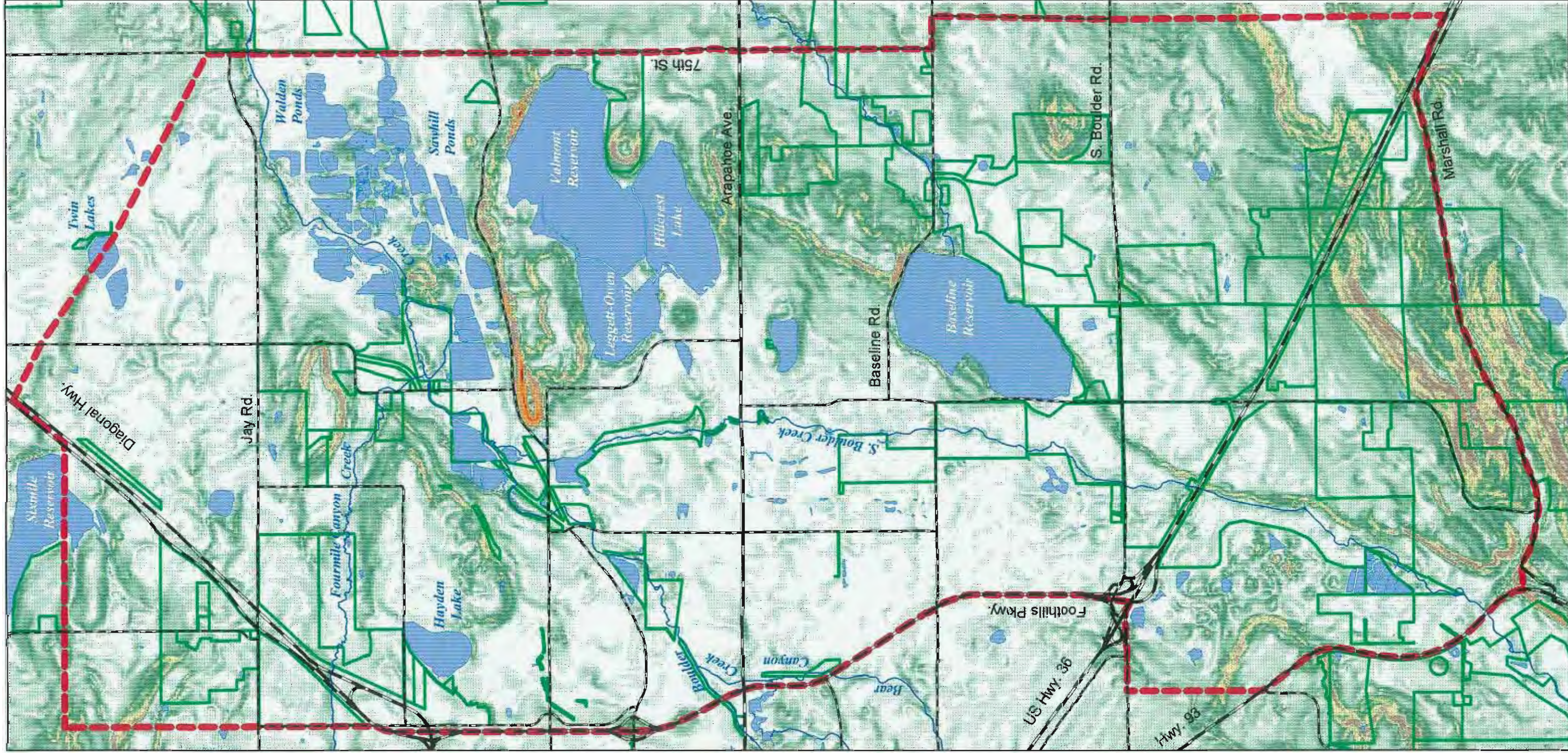
SOUTH BOULDER CREEK INVENTORY REPORT AND AREA MANAGEMENT PLAN

October 28, 1998

**City of Boulder
Open Space/Real Estate Department
P.O. Box 791
Boulder, Colorado 80306
(303) 441-3440
<http://openspace.ci.boulder.co.us>**

Figure 3.1:

Percent Slope



Map Key

Percent Slope



 South Boulder Creek
Management Area Extents

 City of Boulder Open Space

Roads
 Arterial
 Highway

Hydrology
 Creek
 Lake

Scale



1:33000

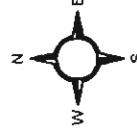
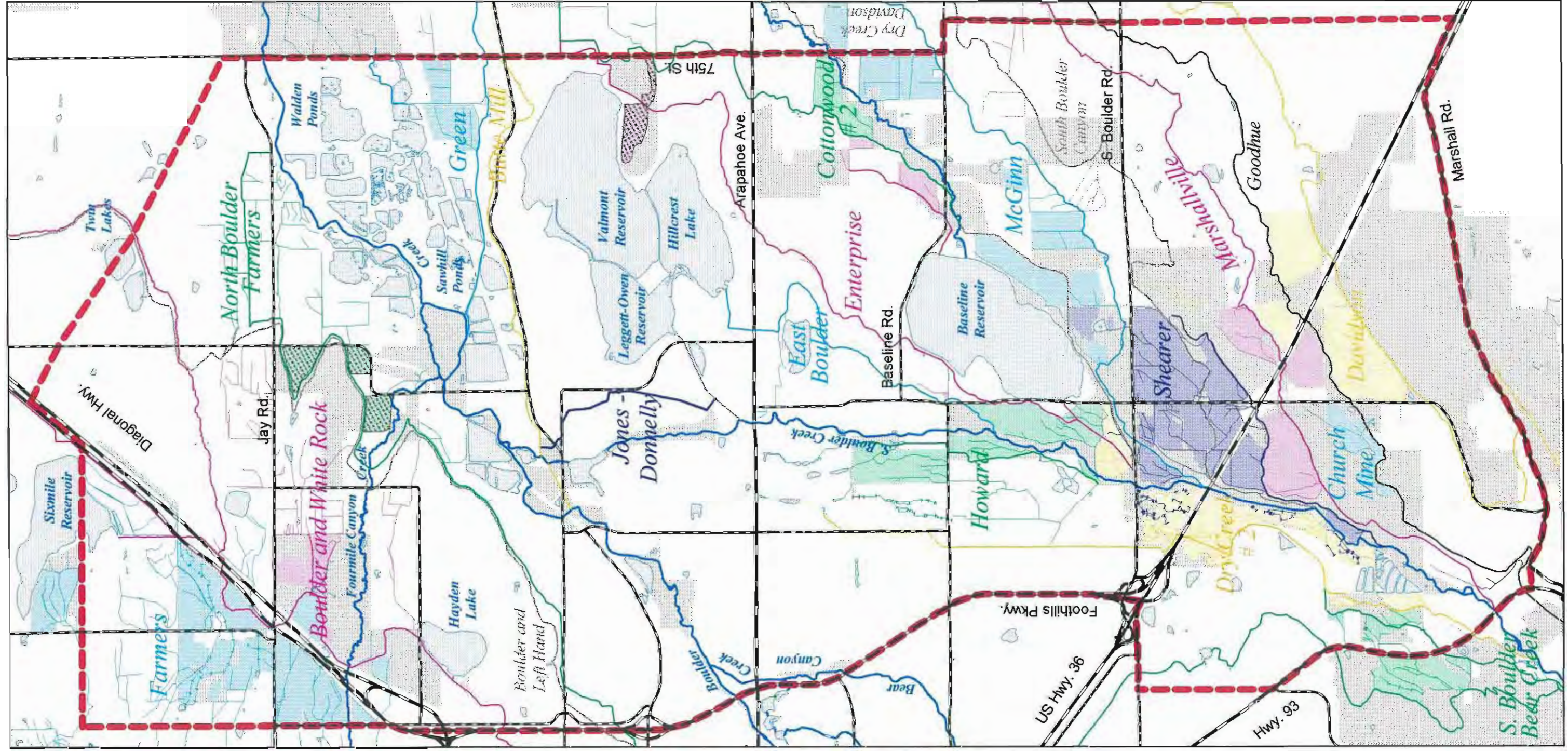


Figure 3.1 Percent Slope

Figure 5.1: Ditches and Related Irrigation Features



Map Key

Irrigated Field	Ditch	Ditch Name
[Green Box]	[Green Zigzag]	Howard
[Blue Box]	[Blue Zigzag]	McGinn
[Purple Box]	[Purple Zigzag]	Schearer
[Light Green Box]	[Light Green Zigzag]	East Boulder
[Light Blue Box]	[Light Blue Zigzag]	So. Boulder Bear Creek
[Light Purple Box]	[Light Purple Zigzag]	No. Boulder Farmers
[Light Green Box]	[Light Green Zigzag]	Green Farmers
[Light Blue Box]	[Light Blue Zigzag]	Cottonwood #2
[Light Purple Box]	[Light Purple Zigzag]	Dry Creek #2
[Light Green Box]	[Light Green Zigzag]	Enterprise
[Light Blue Box]	[Light Blue Zigzag]	Butte Mill
[Light Purple Box]	[Light Purple Zigzag]	Marshallville
[Light Green Box]	[Light Green Zigzag]	Davidson
[Light Blue Box]	[Light Blue Zigzag]	Boulder and White Rock
[Light Purple Box]	[Light Purple Zigzag]	Jones - Donnelly
[Light Green Box]	[Light Green Zigzag]	Goodhue
[Light Blue Box]	[Light Blue Zigzag]	South Boulder Canyon
[Light Purple Box]	[Light Purple Zigzag]	Boulder and Left Hand
[Light Green Box]	[Light Green Zigzag]	Dry Creek Davidson

Historically Irrigated Field
Not Currently Irrigated In 1996/97

Laterals
Line type example. Color corresponds with the associated ditch.

Tailwater
Line type example. Color corresponds with the associated ditch.

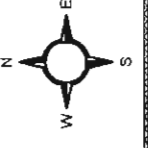
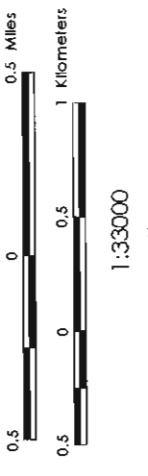
Water Right Priority Date by Ditch

1860-Apr.	Howard
1860-May	McGinn
1860-June	Schearer
1862-Apr.	East Boulder
1862-May	So. Boulder Bear Creek
1862-June	No. Boulder Farmers
1862-Sept.	Green
1862-Oct.	Farmers
1863-Apr.	Cottonwood #2
1864-May	Dry Creek #2
1865-Feb.	Enterprise
1865-Mar.	Butte Mill
1865-June	Marshallville
1872-Apr.	Davidson
1873-Nov.	Boulder and White Rock
1873-June	Goodhue

South Boulder Creek Management Area Extents
City of Boulder Open Space

Other Hydrology
Roads
Lake
Creek
Arterial
Highway

Scale



*** NOTE ON IRRIGATED FIELDS ***
Includes current and historically irrigated fields. Some fields are irrigated by more than one ditch. The ditch that is more commonly used is identified.
City of Boulder Open Space GIS Lab, Sean Metrick, 8/29/97 (ebhydro.apr. Copyright 1997 City of Boulder)

Figure 5.1 Ditches and Related Irrigation Features

Figure 6.3:

Soil Series

Map Key

Soil Series	Color
Ascalon	Light Brown
Calkins	Light Yellow
Colby	Yellow
Gaynor	Light Green
Hargreave	Light Blue
Heldt	Light Purple
Kutch	Light Blue-Gray
Longmont	Light Green
Loveland	Light Purple
Manter	Light Brown
McClave	Light Green
Nederland	Light Purple
Niwot	Light Green
Nunn	Light Purple
Otero	Light Green
Renohill	Light Purple
Rock Outcrop	Light Green
Samsil	Light Purple
Shingle	Light Green
Terrace Escarpments	Light Purple
Valmont	Light Green
Non Soil	White

South Boulder Creek Management Aerea Extents

City of Boulder Open Space lands are outlined in white.

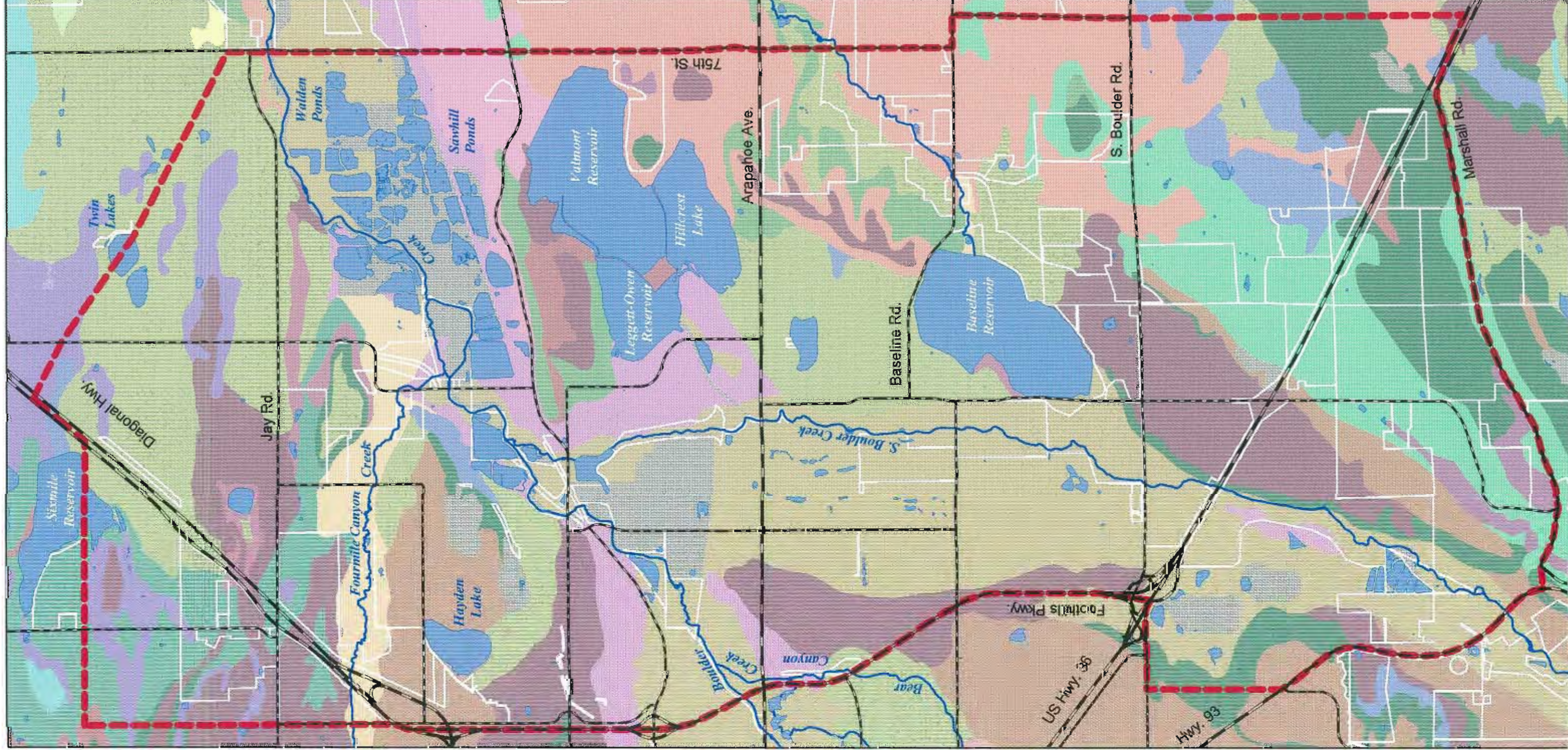
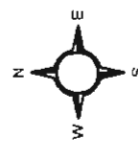
Roads
Arterial
Highway

Hydrology
Creek
Lake

Scale



1:33000



Soil data digitized by the City of Boulder Open Space GIS Lab with data provided by the USDA Soil Conservation Service in cooperation with the Colorado Agricultural Experiment Station. All other data is maintained in house by the City of Boulder Open Space GIS Lab.

Figure 6.3 Soil Series



Figure 7.1: Conceptual Vegetation by Ecosystem

Classified from LANDSAT imagery
30 meter resolution
not field verified

Map Key

- Vegetation by Ecosystem**
- Agricultural Land
 - Forest/Woodland
 - Grassland
 - Irrigated Turf
 - Non-Vegetated
 - Riparian
 - Shrubland
 - Urban Vegetation
 - Wetland



- Roads**
- Arterial
 - Highway

- Hydrology**
- Creek
 - Lake

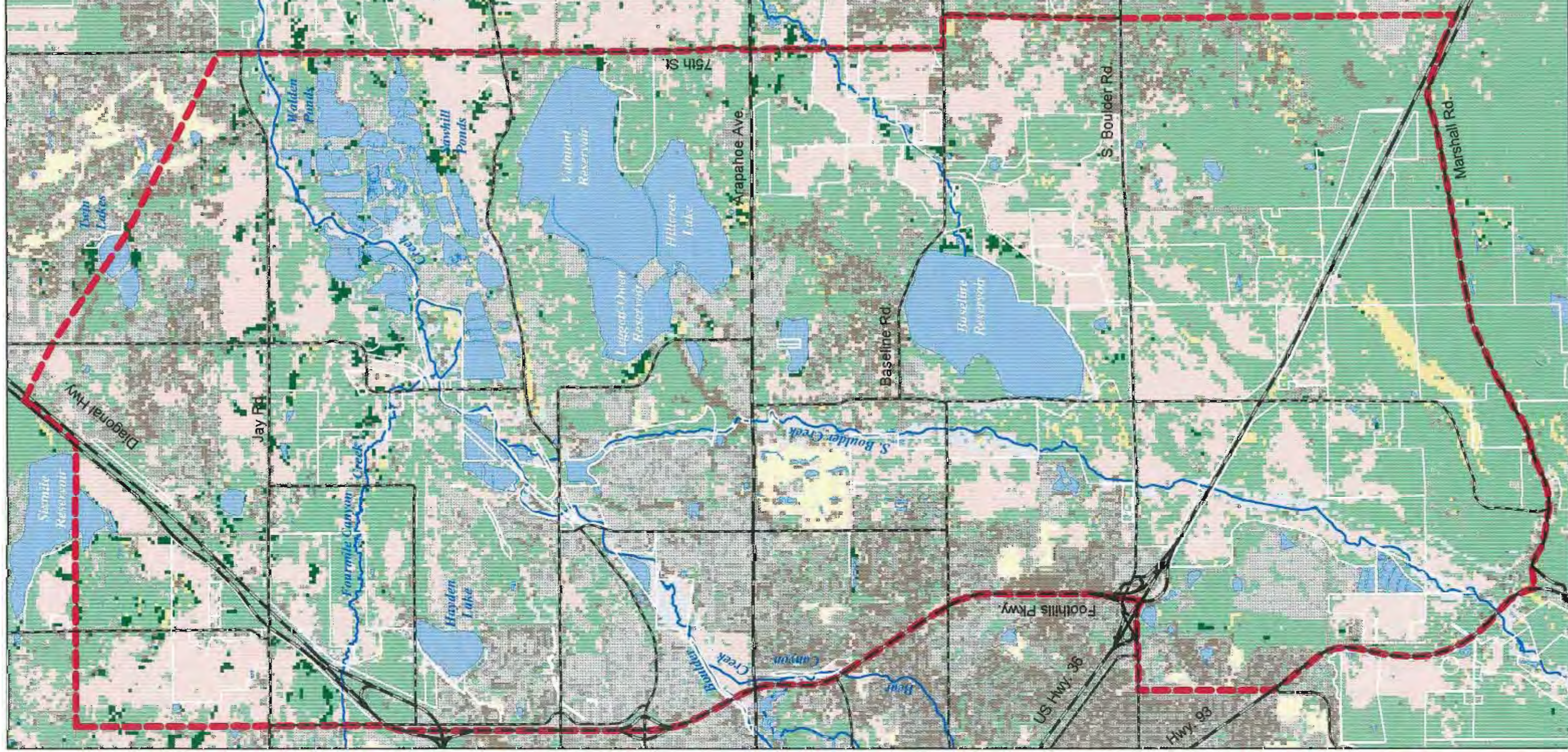
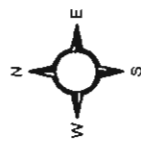
City of Boulder Open Space properties are outlined in white.

Scale

0.5 0 0.5 Miles

0.5 0 0.5 1 Kilometers

1:33000




















City of Boulder Open Space GIS Lab, Sean Melnick, 8/29/97 (bco-vegetation.apo). Copyright 1997, City of Boulder.

Figure 7.1 Conceptual Vegetation by Ecosystem

Figure 7.2: Conceptual Vegetation by Wildlife Habitat

Classified from LANDSAT imagery
 30 meter resolution
 not field verified

Map Key

- Vegetation by Wildlife Habitat**
-  Douglas Fir Forest
 -  Ponderoso Pine Forest
 -  Savannah
 -  Mixed Grass Prairie
 -  Tall Grass Prairie
 -  Wet Meadow
 -  Non-native Hay/Pasture
 -  Plains Riparian
 -  Foothills Riparian
 -  Shrubland
 -  Cliff
 -  Irrigated Turf
 -  Standing Water
 -  Mudflats
 -  Annual Crops
 -  Urban Vegetation
 -  Urban

 South Boulder Creek
 Management Area Extents

Roads

-  Arterial
-  Highway

Hydrology

-  Creek
-  Lake

Scale

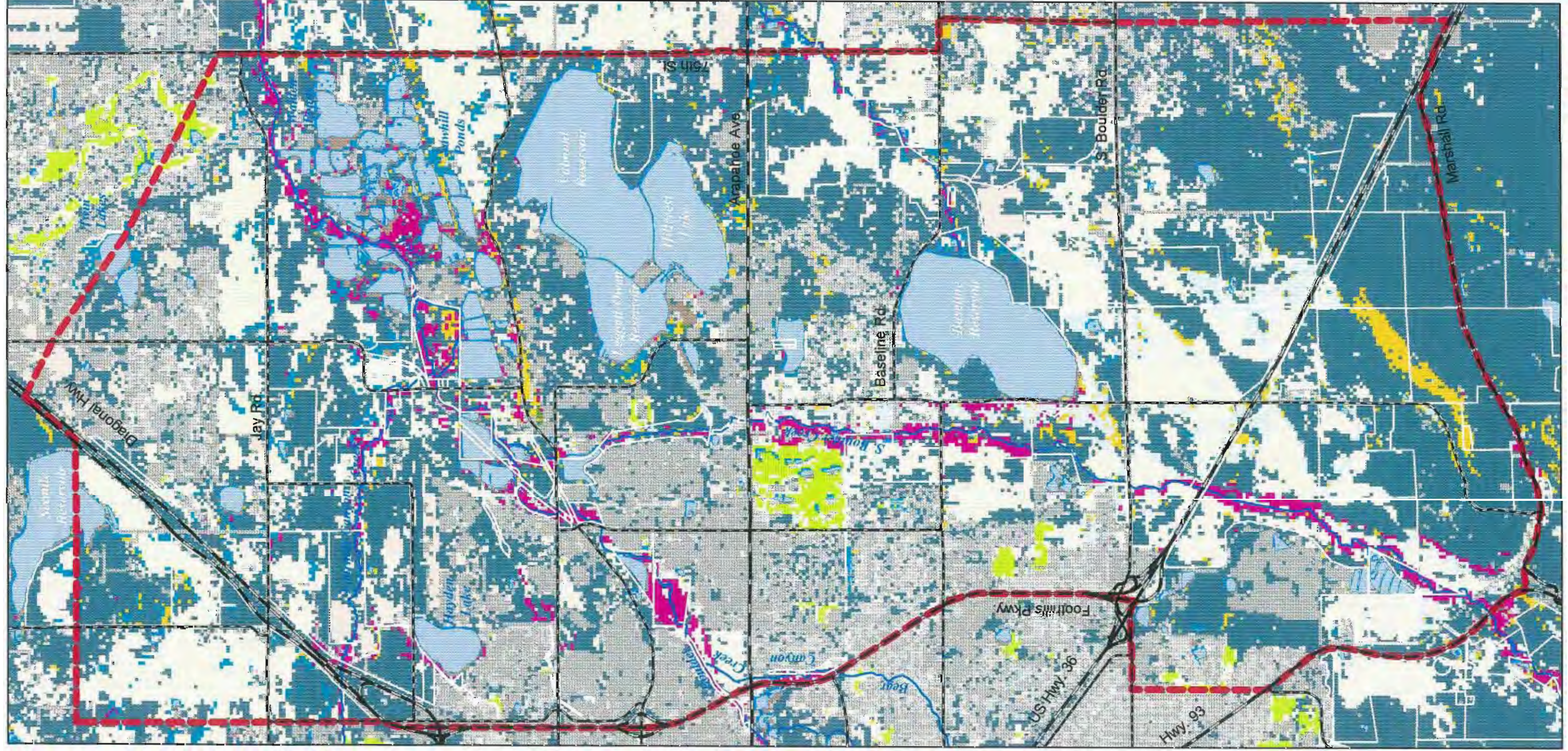
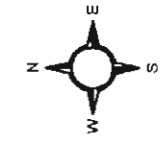
0.5 Miles



0.5 1 Kilometers



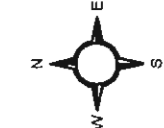
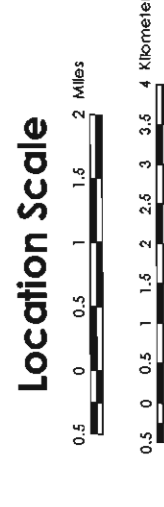
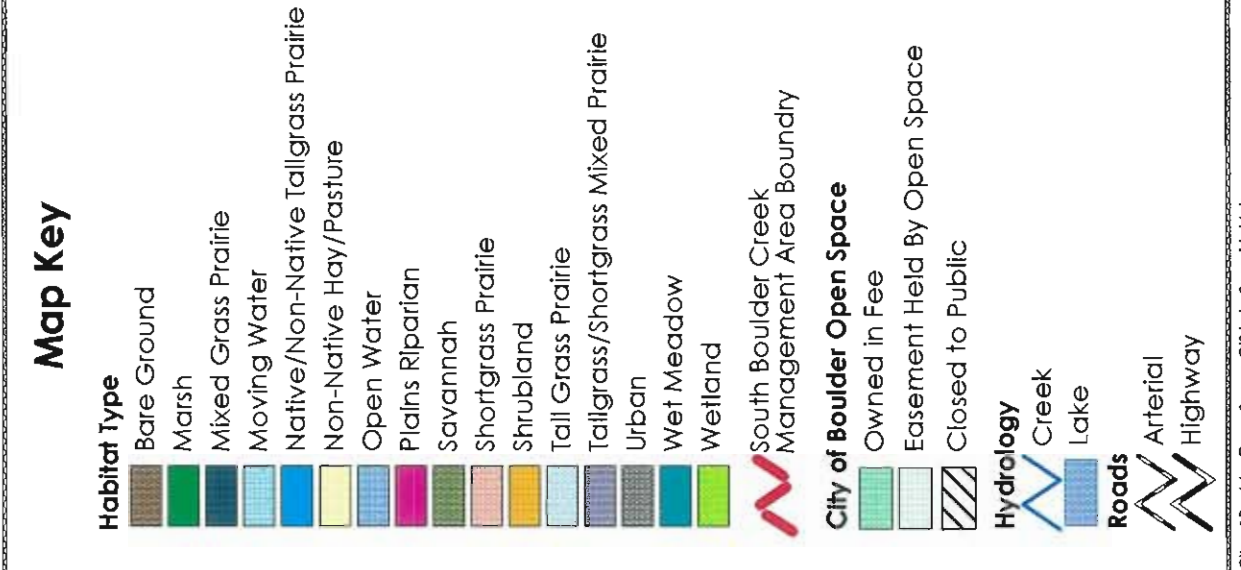
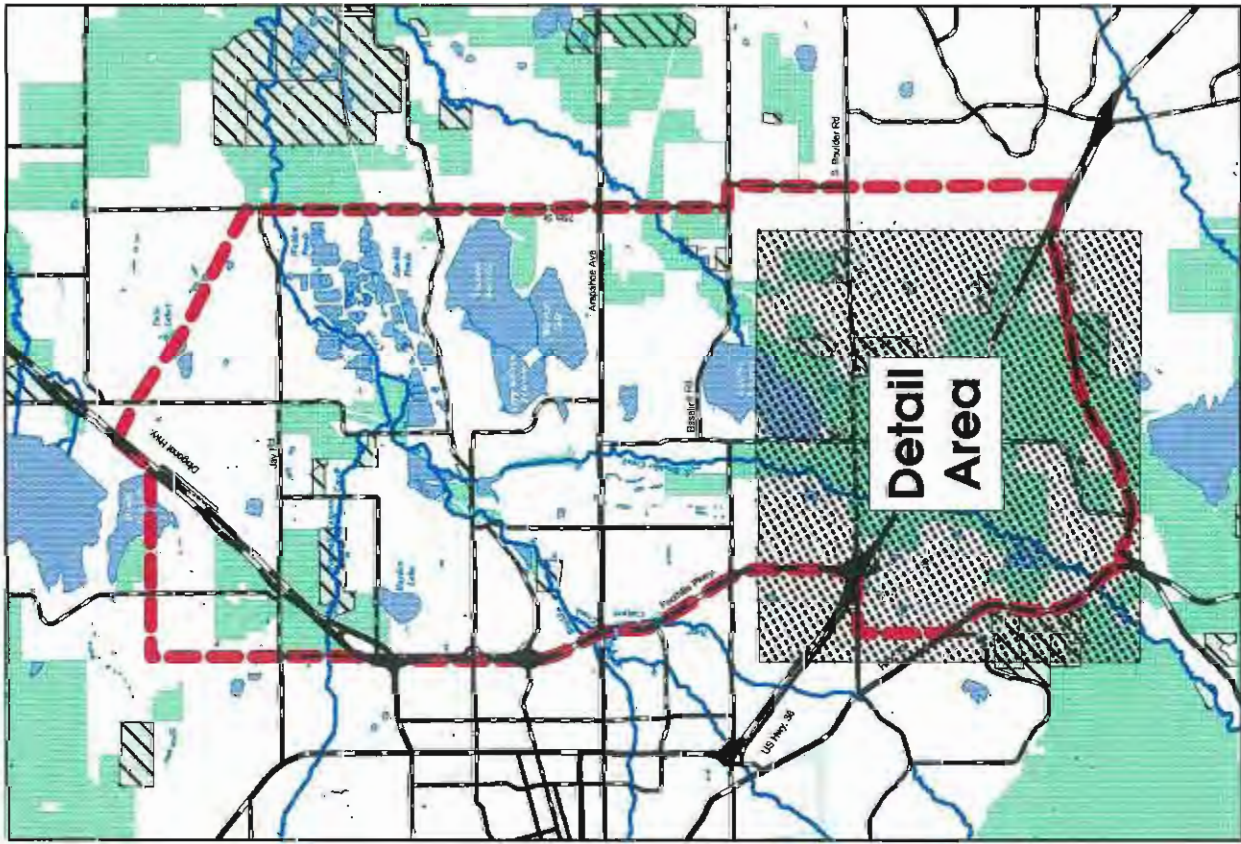
1:33000



City of Boulder Open Space GIS Lab, Sean Mierlick,
 8/29/97 (abvegetation.apr). Copyright 1997, City of Boulder.

Figure 7.2 Conceptual Vegetation by Wildlife Habitat

Figure 7.3: Detailed Vegetation Displayed by Habitat



City of Boulder Open Spaces GIS Lab, Sean Matfick
8/27/17, abcvegetaled.aprx, Copyright 1997 City of Boulder

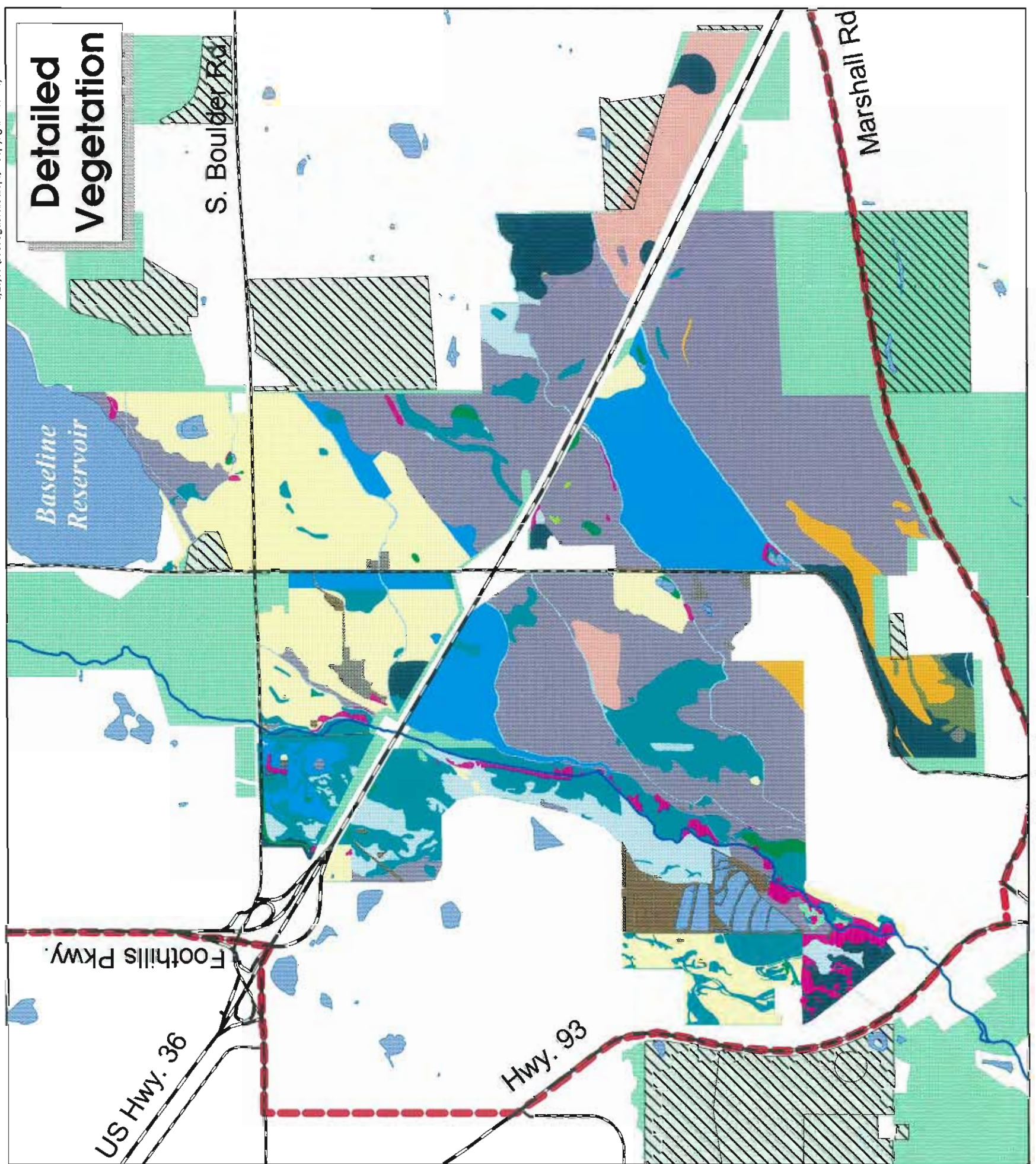


Figure 7.3 Detailed Vegetation Displayed by Habitat

Figure 7.5: Mapped Extent of Exotic Plants Current thru 1997

Map Key

- Exotic Plants**
- Russian Olive
 - Musk Thistle
 - Canada Thistle
 - Myrtle Spurge
 - Diffuse Knapweed
 - Dalmation/Yellow Toadflax

**South Boulder Creek
Management Area Extents**

- City of Boulder Open Space**
- Owned In Fee
 - Easement Held By Open Space
 - Closed to Public

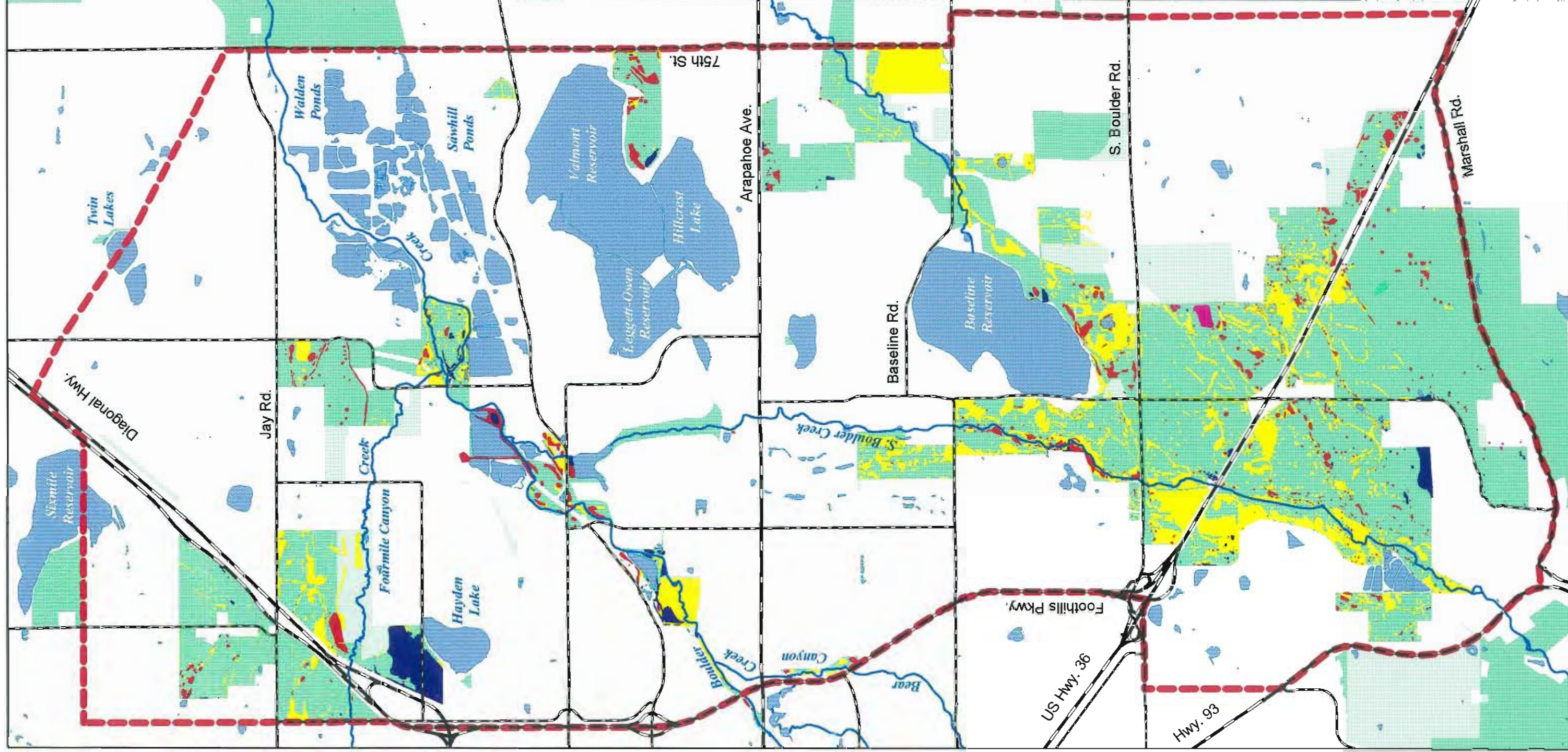
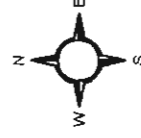
- Roads**
- Arterial
 - Highway

- Hydrology**
- Lake
 - Creek

Scale



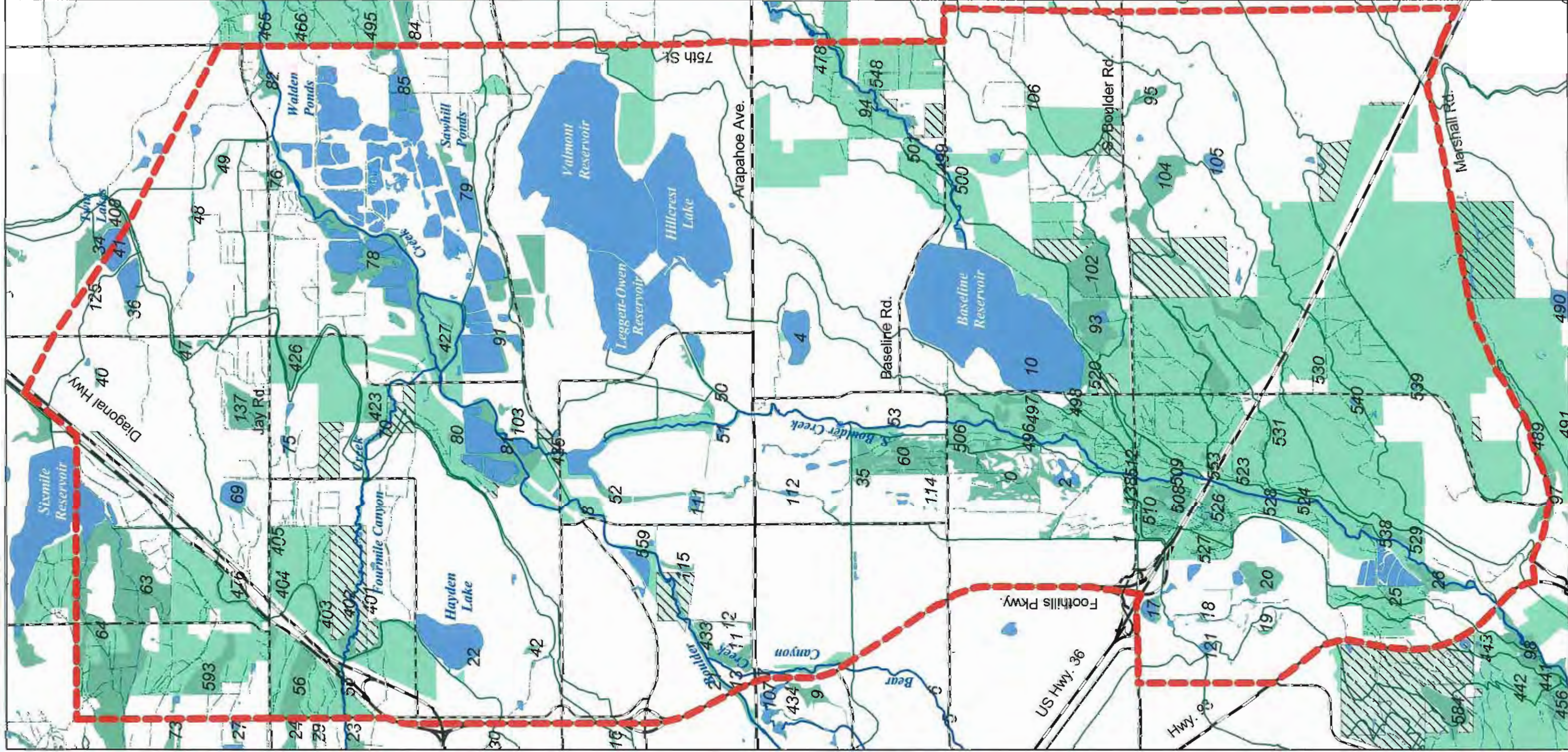
1:33000



Exotic plant mapping is a mosaic.
Not all species are mapped in all years.
Most data represents 1997 mapping.
The remainder is supplemental from
1992-5 mapping.

Figure 7.5 Mapped Extent of Exotic Plants

Figure 8.7: Wetlands



Map Key

Hydrology

- Creek
- Intermittent Creek
- Ditch
- Ditch Lateral
- Lake
- Wetland
- Wetland Numbering Example: 495

South Boulder Creek Management Area Extents

City of Boulder Open Space

- Owned In Fee
- Easement Held By Open Space
- Closed to Public

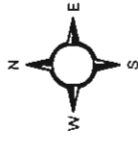
Roads

- Arterial
- Highway

Scale



1:33000



***** SPECIAL NOTE *****

This map shows the approximate locations of many wetlands in the Boulder Valley Comprehensive Planning Area (BVCPA) based upon field visits to each site. Information regarding hydrology, vegetation and soils has been recorded for each wetland. The mapping typically reflects conditions during the specific year and season when the fieldwork was conducted. Wetlands exist throughout the BVCPA that are not shown because certain areas have not been surveyed. Some wetlands shown in this mapping may no longer exist.

This mapping is NOT meant to delineate wetland boundaries for regulatory purposes. Federal, State and local regulatory agencies with jurisdiction over wetland boundaries may define or describe wetlands in a different manner than used to produce this map. There is no attempt in the design of this map to define the limits of proprietary jurisdiction of any Federal, State or local regulatory government, or to define the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, State or local agencies concerning specific agency regulation that may affect such activities. For more information regarding the City of Boulder Wetlands Protection Program contact the Planning Department at (303) 441-3270. For more information about wetlands on City of Boulder Open Space, contact the Open Space Department at 441-3440.

Figure 8.7 Wetlands

Figure 9.1

Selected Wildlife and Rare Plant Species

Map Key

Wildlife Species

- Preble's Meadow Jumping Mouse Capture Locations (*Zapus hudsonius preblei*)
- ▨ Bobolink Habitat (*Dolichonyx oryzivorus*)
- ▲ Orangespotted Sunfish (*Lepomis humilis*)
- ▼ Plains Topminnow (*Fundulus sciadicus*)

Rare Plant Species

- Ute Ladies'-Tresses (*Spiranthes diluvialis*)

South Boulder Creek Management Area Extents

- Open Space
 - Owned In Fee
 - Easement Held By Open Space
 - ▨ Closed to Public

Roads

- ▬ Arterial
- ▬ Highway

Hydrology

- ▬ Creek
- Lake

Scale

0.5 0 0.5 Miles

0.5 0 0.5 1 Kilometers

1:33000

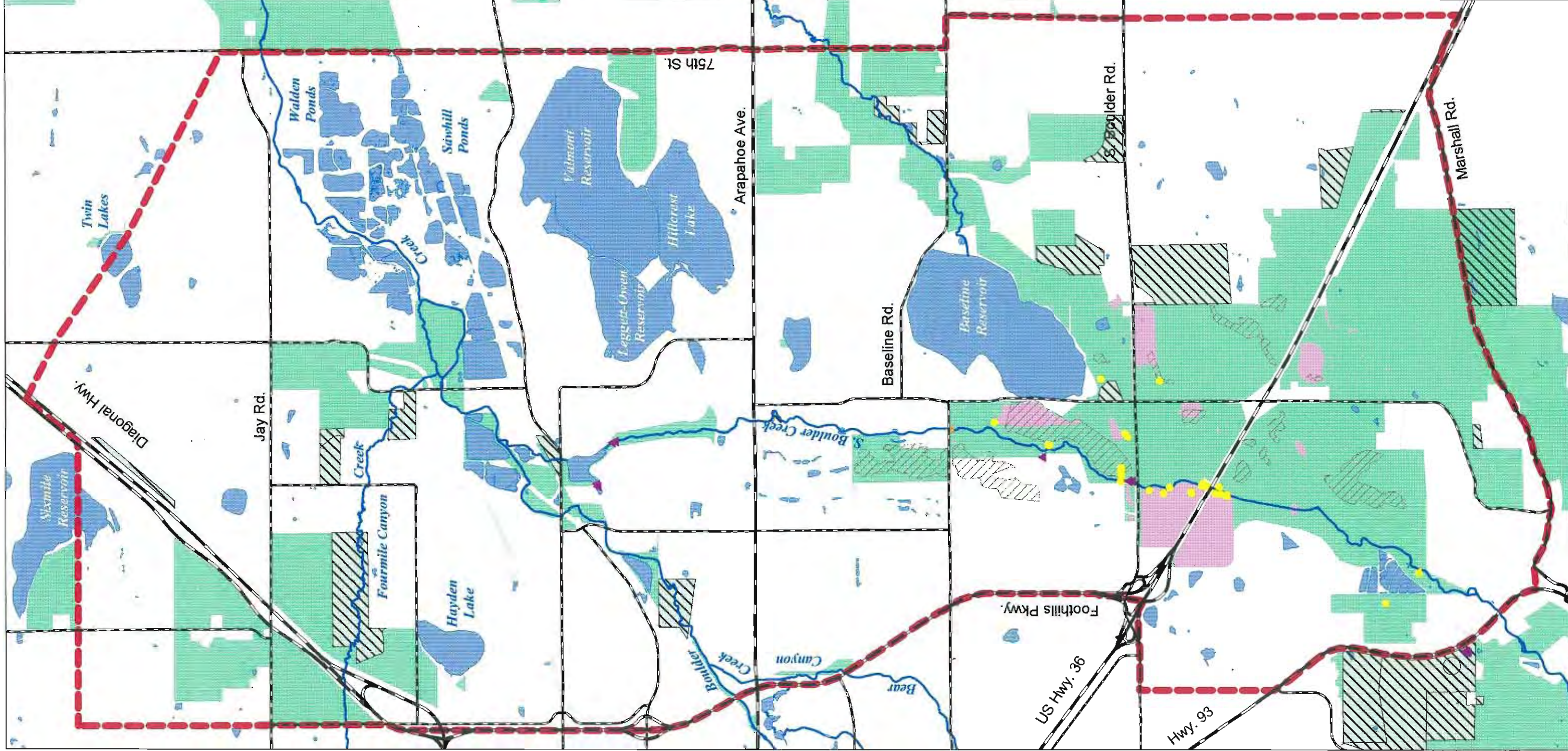
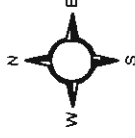


Figure 9.1 Selected Wildlife and Rare Plant Species of Special Concern









Wildlife and rare plant information provided here is for know sightings only. No information is provided regarding potential restoration areas. Not all areas have been monitored during all years. Spiranthes populations were mapped over several years.

Figure 11.2


1996 Boulder County Assessor Land Use Classes


Map Key


Boulder County Assessor Land Use Classification


-  Agricultural
-  Commercial
-  Industrial
-  Natural Resources
-  Oil and Gas
-  Public Utilities
-  Residential
-  Tax Exempt

White areas are either road right of way or the data was not available.

 1993 Buildings

 South Boulder Creek Management Area Boundary


 City of Boulder Open Space

 Hydrology

 Creek

 Lake

 Roads

 Arterial Highway

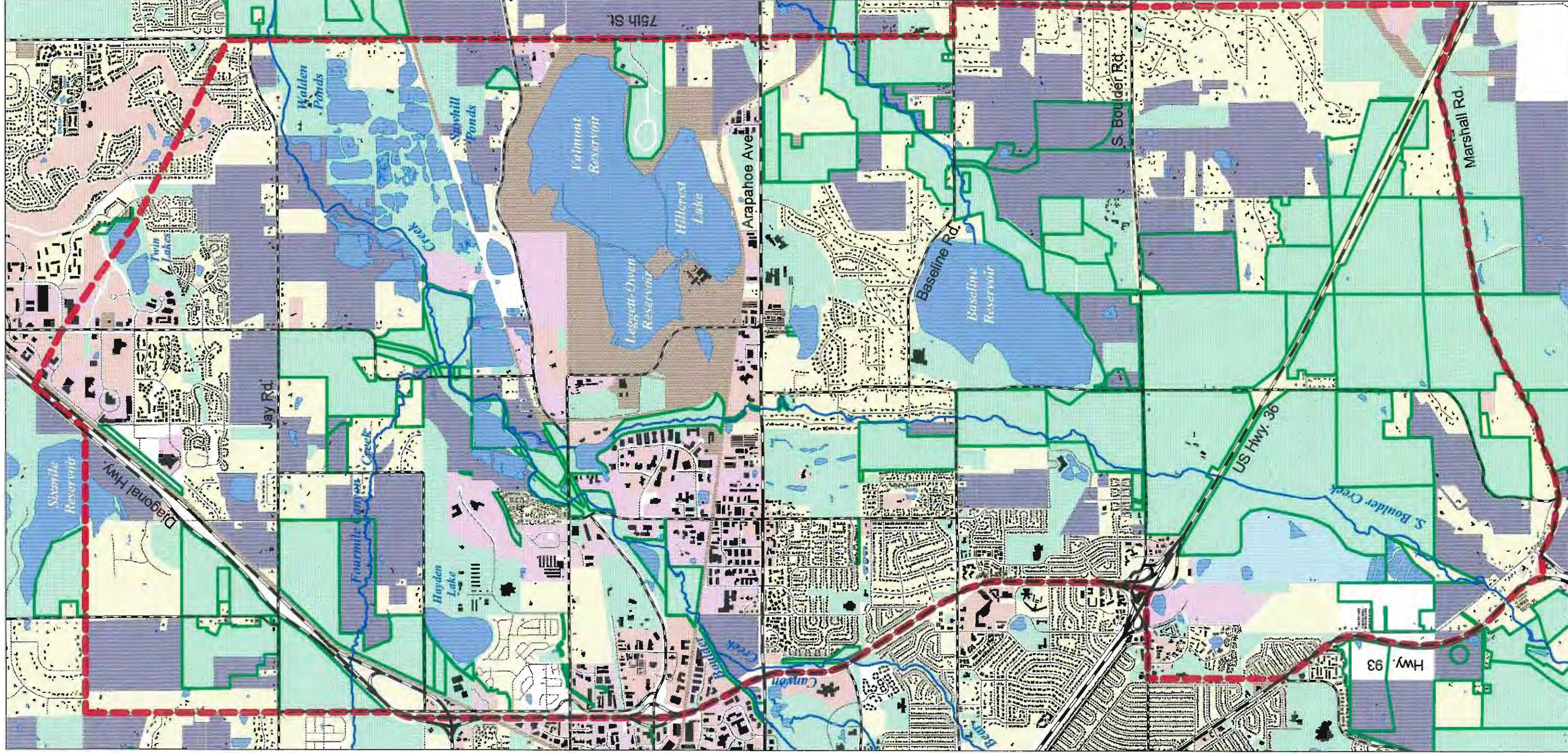
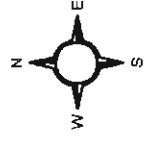
 Street

Scale

0.5 0 0.5 Miles

0.5 0 0.5 1 Kilometers

1:33000



Land use data provided by Boulder County Land Use Department. All other data is maintained in house by the City of Boulder Open Space GIS Lab.

Figure 11.2 County Land Use Classes

Figure 11.3:

Boulder County Land Use Zoning

Map Key

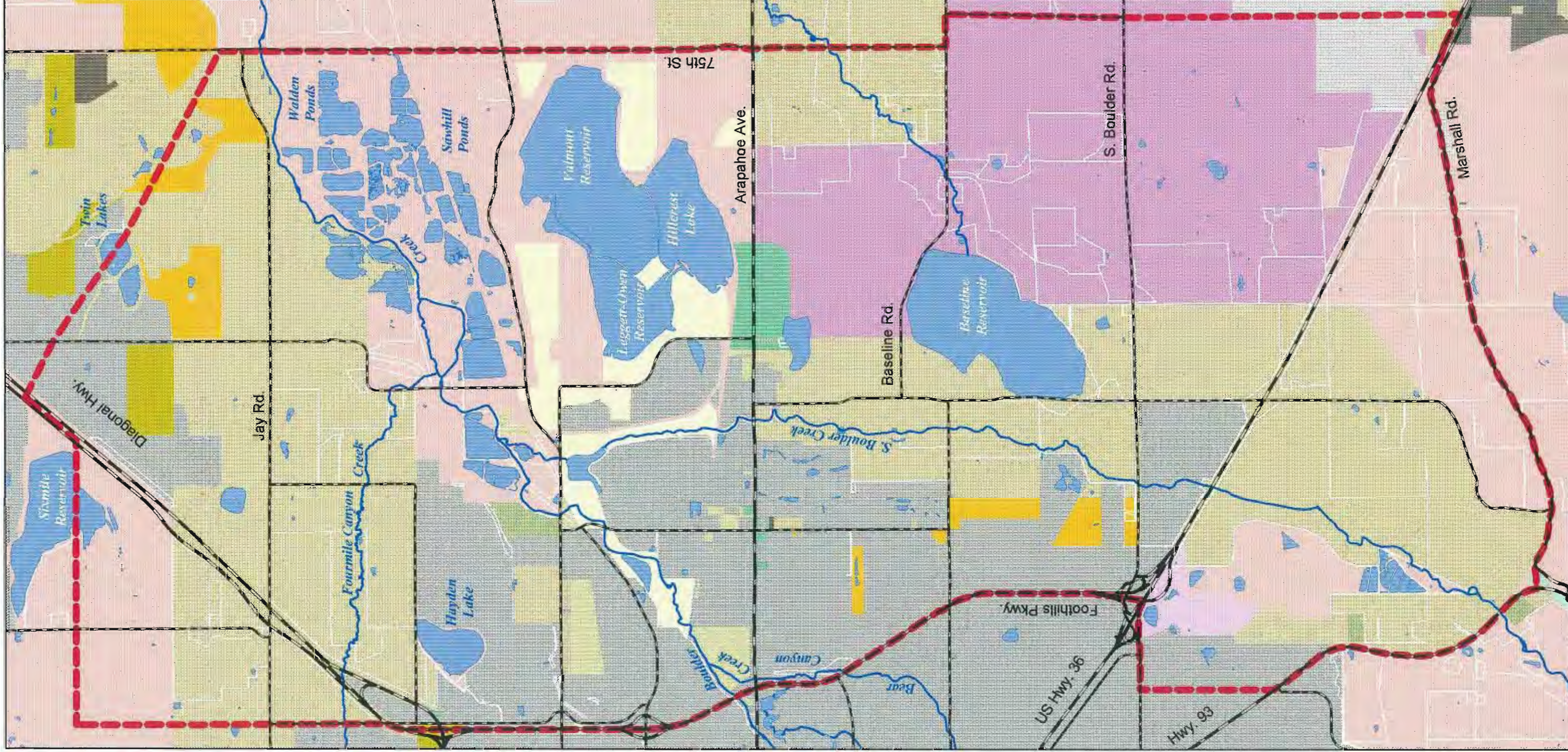
- Boulder County Land Use Zoning**
- Agriculture
 - Business
 - Commercial
 - Economic Development
 - Estate Residential
 - General Industrial
 - Light Industrial
 - Multiple-Family
 - Manufactured Home Park
 - Rural Residential
 - Suburban Residential
 - Transitional
 - Boulder City Limits
 - Louisville City Limits
 - Superior City Limits

City of Boulder Open Space is Outlined in White

South Boulder Creek Management Area Extents

Roads
Arterial
Highway

Hydrology
Creek
Lake



Scale

0.5 0 0.5 Miles

0.5 0 0.5 1 Kilometers

1:33000

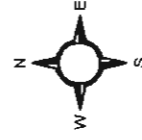


Figure 11.3 Boulder County Zoning

Land use zoning data provided by the Boulder County Land Use Department. All other data maintained in house by the City of Boulder Open Space GIS Lab.



Figure 11.4: Utilities City of Boulder

Map Key

Utilities

Water

Hydrant

Water Line

Storm

Manhole

Inlet

Storm Drain Line

Sewer

Manhole

Sewer Line - SS08-10

Sewer Line - SS10-20

Sewer Line - SS20-60

South Boulder Creek Management Area Extents

City of Boulder Open Space

Owned In Fee

Easement Held By Open Space

Closed to Public

Hydrology

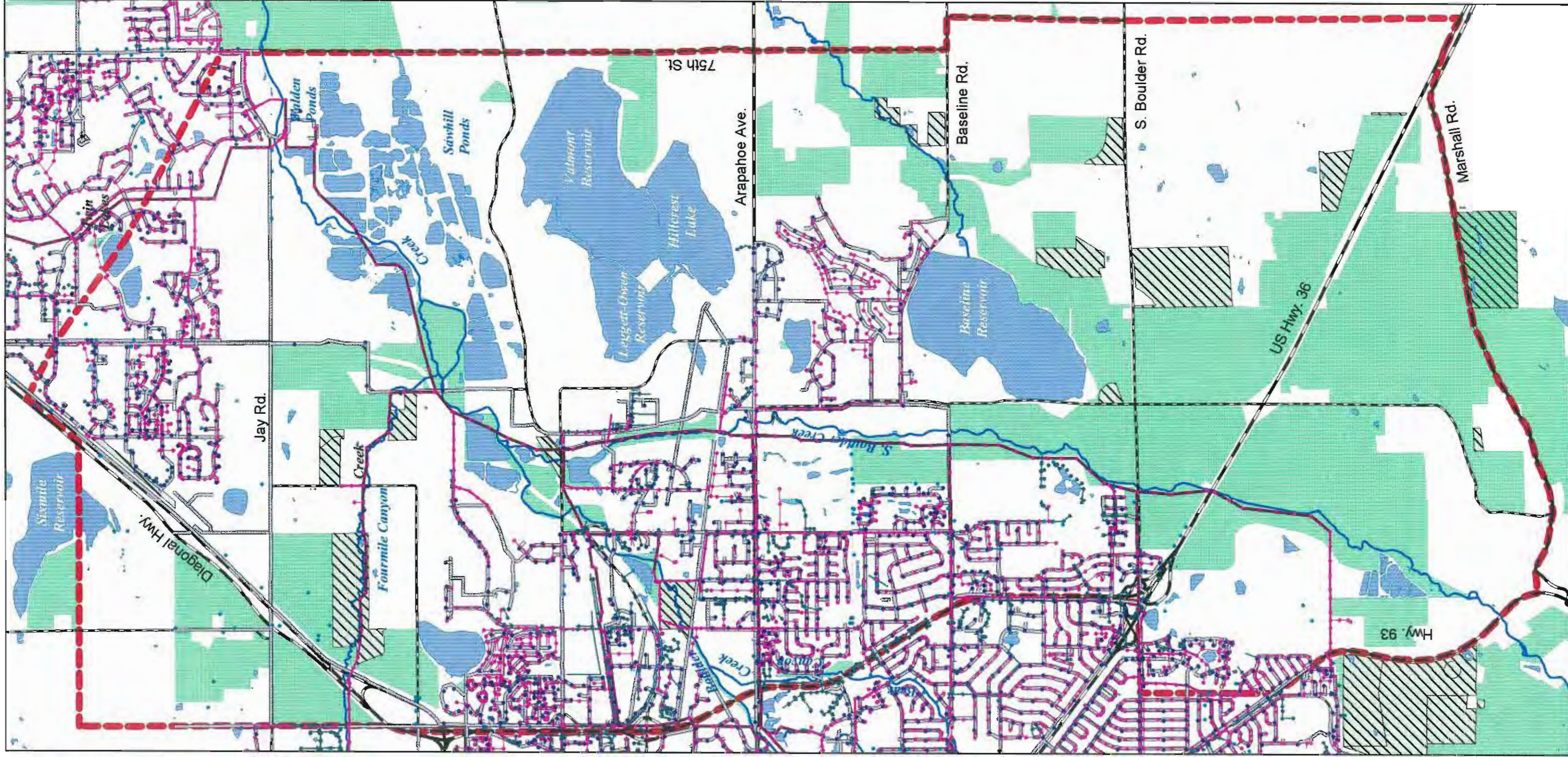
Creek

Lake

Roads

Arterial

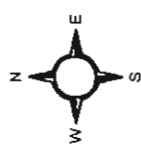
Highway



Scale



1:33000



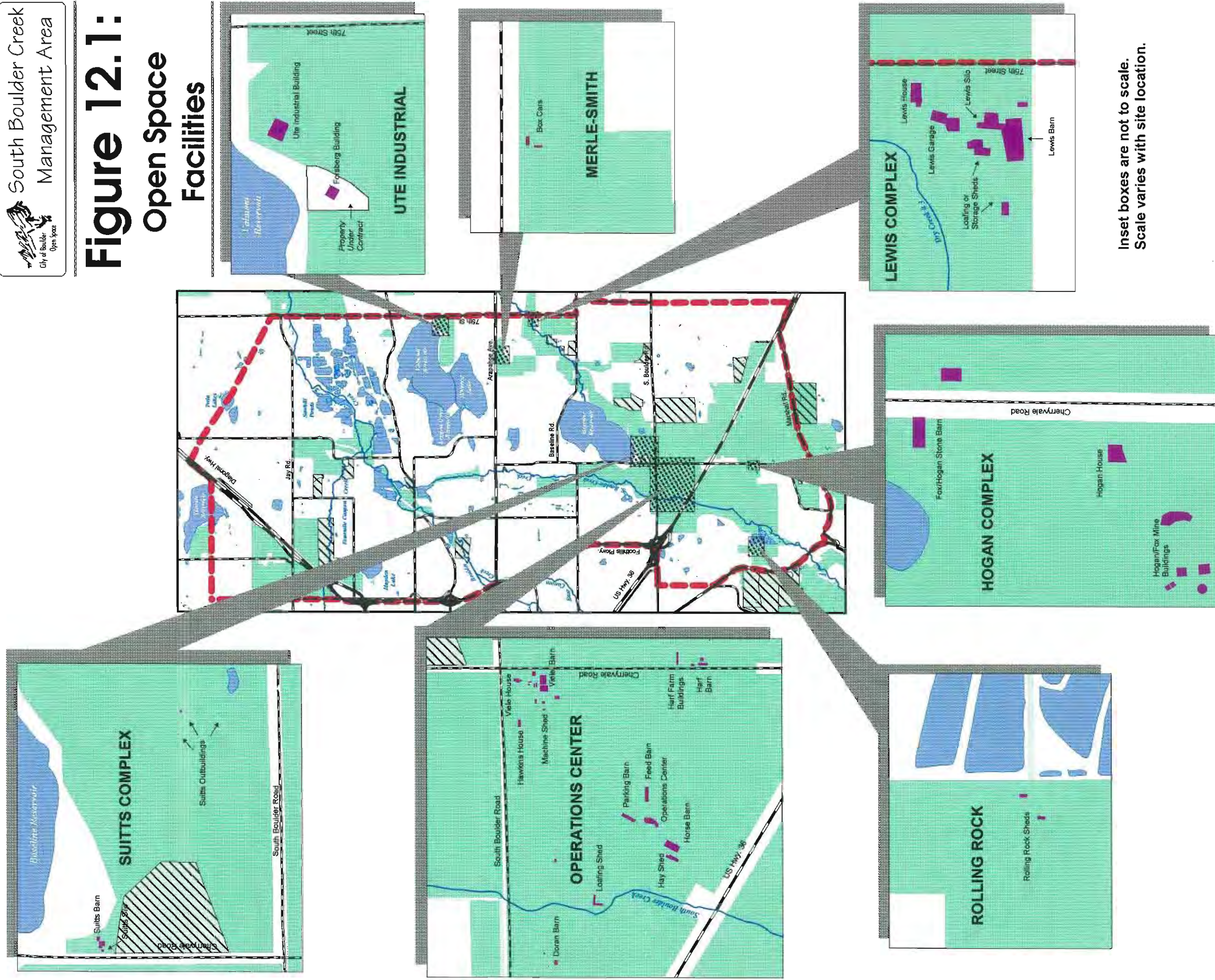
Utilities Information provided by the City of Boulder Public Works Department.

City of Boulder Open Space GIS Lab, Sean Metrick, 11/24/97 (bocutils.apr). Copyright 1997 City of Boulder

Figure 11.4 Utilities, City of Boulder

Figure 12.1:

Open Space Facilities



**Inset boxes are not to scale.
Scale varies with site location.**

Map Key

- Open Space Facility
- City of Boulder Open Space**
 - Owned In Fee
 - Easement Held By Open Space
 - Closed to Public

- South Boulder Creek Management Area Boundary
- Roads**
 - Highway
 - Arterial
- Hydrology**
 - Creek
 - Lake

Scale

Applies to Overview Only

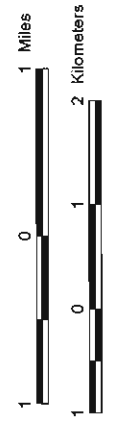
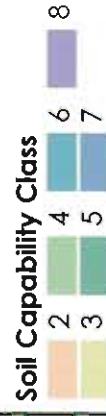


Figure 12.1 Open Space Facilities

City of Boulder Open Space GIS Lab, Sean Melnick, 8/29/97 (abcfacility.opn). Copyright 1997 City of Boulder

Figure 13.4: Agricultural Soil Capability

Map Key



Class 2 - Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class 3 - Soils have severe limitations that reduce the choice of plants, require special conservation practices or both.

Class 4 - Soils have very severe limitations that restrict the choice of plants, require very careful management or both.

Class 5 - Soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland or wildlife.

Class 6 - Soils have severe limitations that make them generally unsuitable to cultivation and limit their use largely to pasture of range, woodland or wildlife food and cover.


Class 7 - soils have very severe limitations that make them unsuitable to cultivation and that restrict their use largely to grazing, woodland or wildlife.

Class 8 - Soils and landforms have limitations that preclude their use for commercial crop production and restrict their use to recreation, wildlife, water supply or to esthetic purposes.

White Areas Are Unclassified.

*Soil capability based upon soil type and irrigation only. Analysis of slope and aspect are not included. Soil capability reflects 1995 irrigation patterns.

South Boulder Creek Management Area Extents

 City of Boulder Open Space

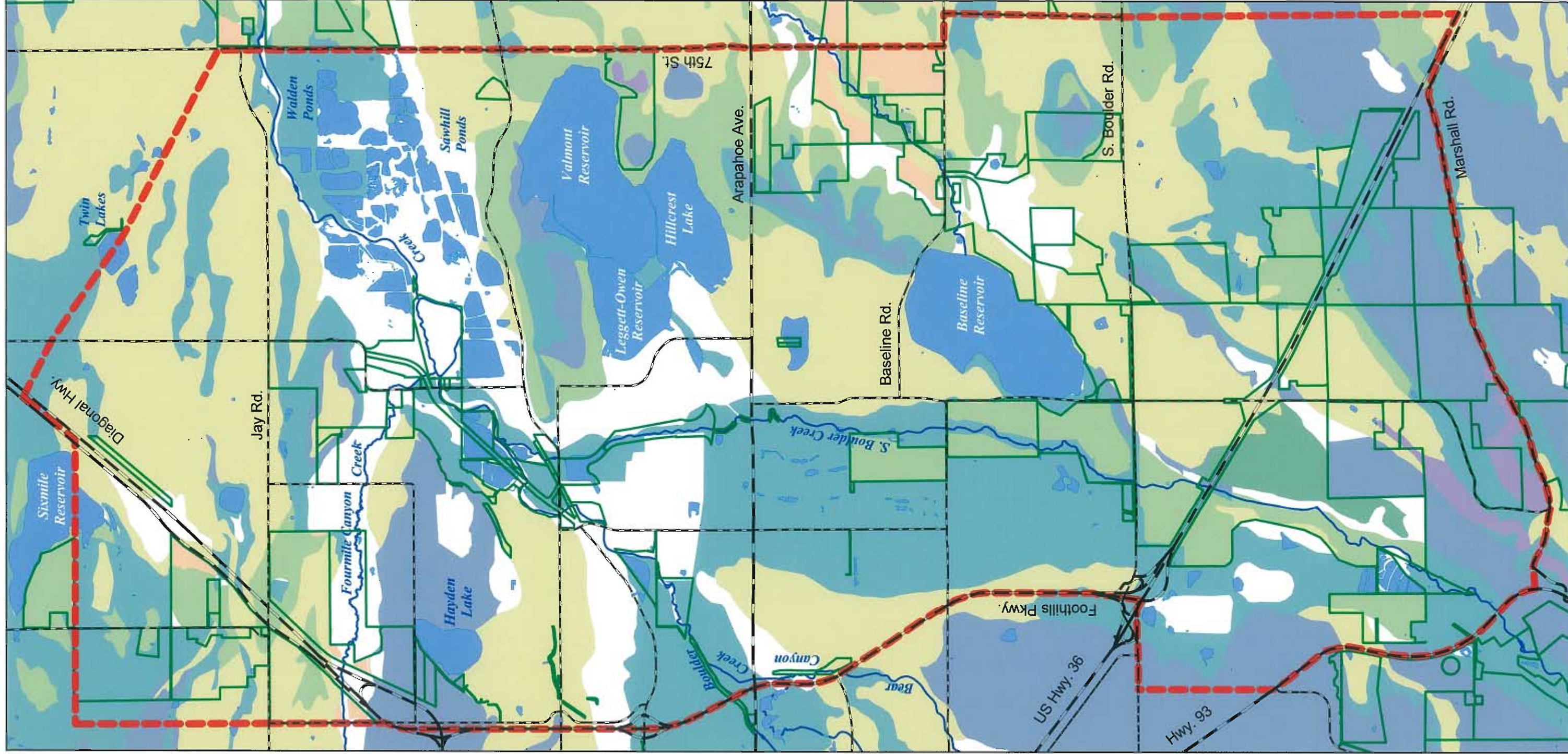
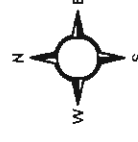
 Hydrology
 Creek
 Lake

 Roads
 Arterial
 Highway

Scale



1:33000



Soil data digitized by the City of Boulder Open Space GIS Lab with data provided by the USDA Soil Conservation Service in cooperation with the Colorado Agricultural Experiment Station. All other data is maintained in house by the City of Boulder Open Space GIS Lab.

Figure 13.4: Agricultural Soil Capability

Figure 13.5: Agricultural Leases

Map Key

Leased Areas by Name

- BBGR Lease
- BCLM Lease
- BFAC Lease
- Ditzel Lease Area
- Eccher Lease
- HB Lease
- MB Lease
- NH Lease
- Not Leased
- VV Lease
- Marshall Lease
- Not Available For Lease
- Owned In Fee
- Easement Held By Open Space

 South Boulder Creek Management Area Extents

 City of Boulder Open Space Closed to Public

Roads

-  Arterial
-  Highway

Hydrology

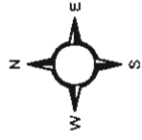
-  Lake
-  Creek

Scale

0.5 0 0.5 Miles

0.5 0 0.5 1 Kilometers

1:33000



City of Boulder Open Space GIS Lab, Sean Mielnick,
8/29/97 (ab)lease.apr. Copyright 1997 City of Boulder

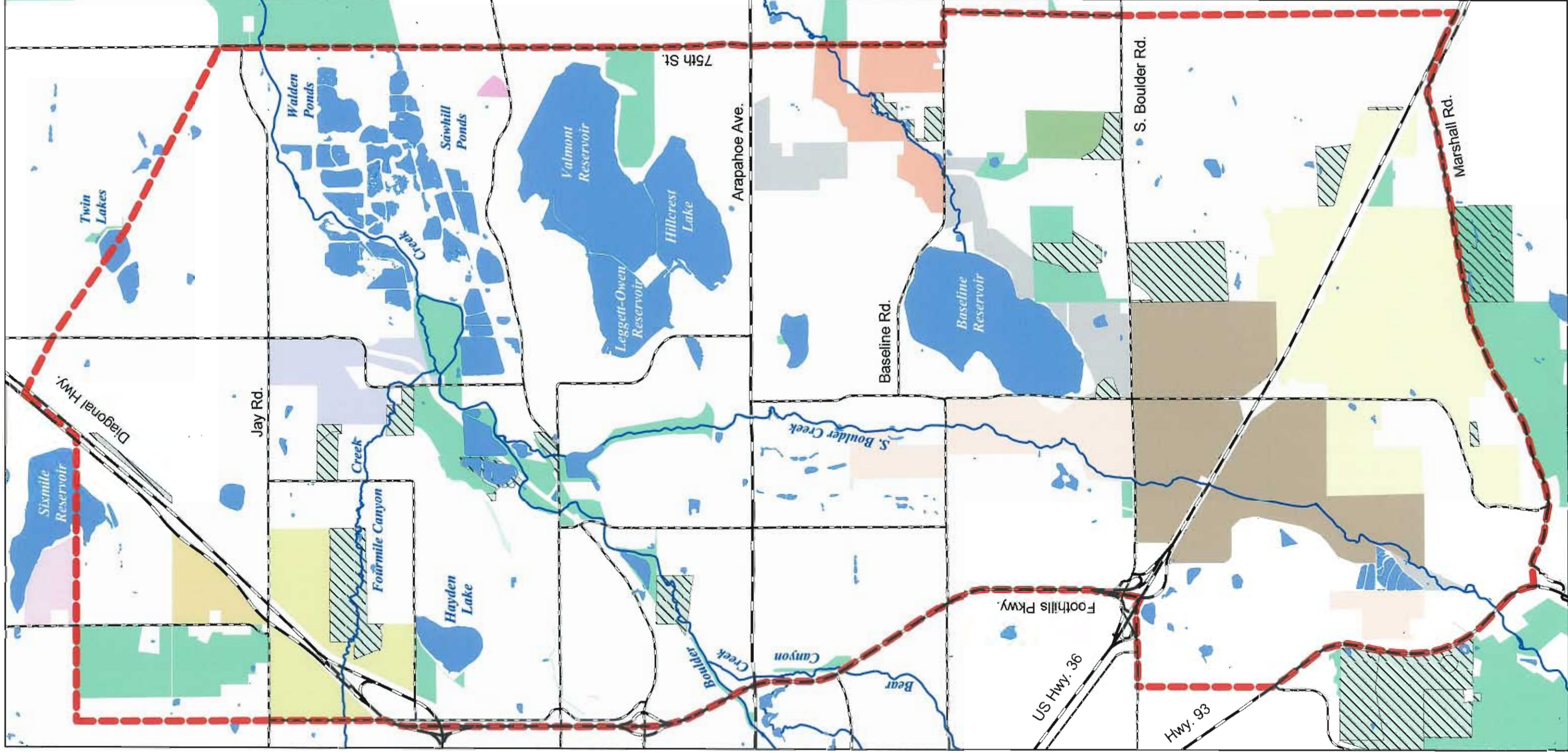


Figure 13.5 Agricultural Leases

Figure 13.6: Fence Information

Map Key

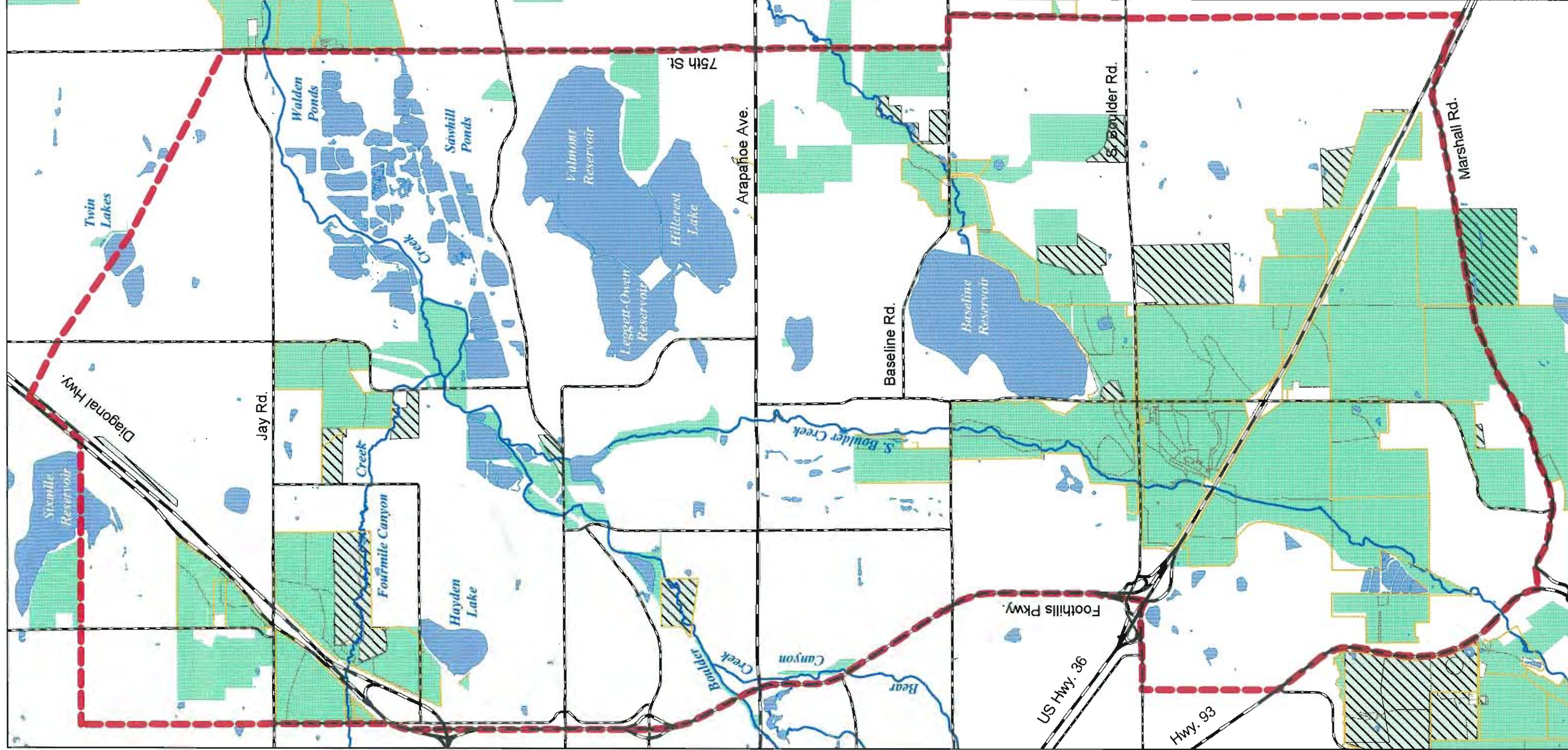
Fence Information
 Exterior
 Interior


**South Boulder Creek
 Management Area Extents**

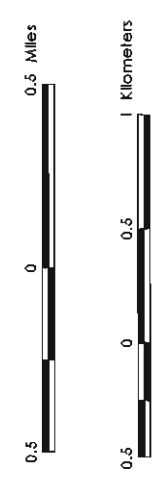
City of Boulder Open Space
 Owned In Fee
 Easement Held By Open Space
 Closed to Public

Roads
 Arterial
 Highway

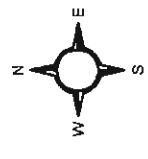
Hydrology
 Lake
 Creek



Scale



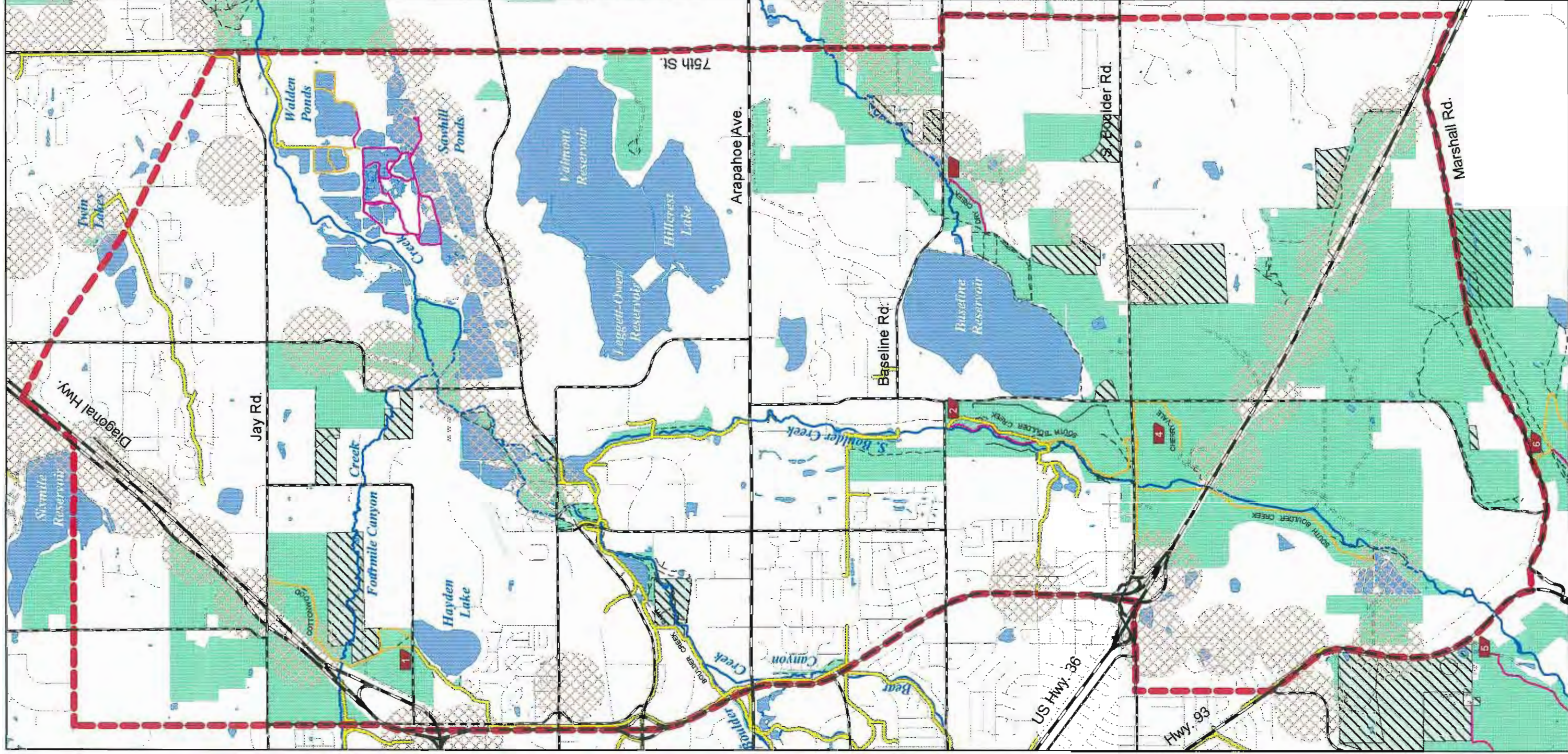
1:33000



City of Boulder Open Space GIS Lab, Sean Metrick,
 8/29/97 (bdoe:apr). Copyright 1997 City of Boulder

Figure 13.6 Fence Information

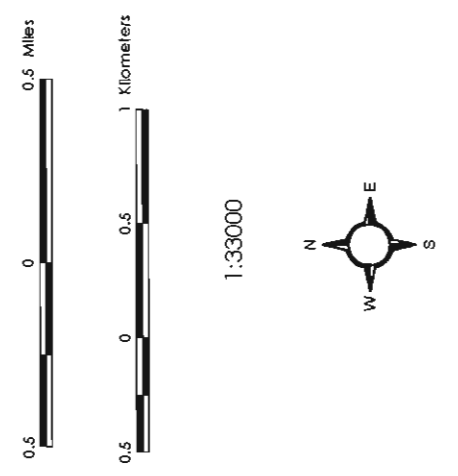
Figure 14.1: Trails and Access Points



Map Key

- Designated Trails**
 Designated Equestrian Single Track
 Designated Hiking
 Designated Multi-Use
 Paved Trails
- Undesignated Trails**
 Undesignated Single Track
 Undesignated Two Track
- Boulder Valley Comprehensive Plan, Boulder County Comprehensive Plan Conceptual Trail Corridors**
 See figure 14.2 for an overview of the conceptual trail corridors in relation to the planning area.
- Trailhead**
 1 Cottonwood
 2 Bobolink
 3 Dry Creek
 4 Cherryvale
 5 S. Boulder Creek West
 6 Marshall Mesa
- South Boulder Creek Management Area Extents**
- City of Boulder Open Space**
 Owned In Fee
 Easement Held By Open Space
 Closed to Public
- Roads**
 Street
 Arterial
 Highway
- Hydrology**
 Lake
 Creek

Scale


















City of Boulder Open Space GIS Lab, Sean Merrick, 8/29/97 (ebctrails.apr). Copyright 1997 City of Boulder

Figure 14.1 Trails and Access Points

Figure 14.3: Dog Regulations

Map Key

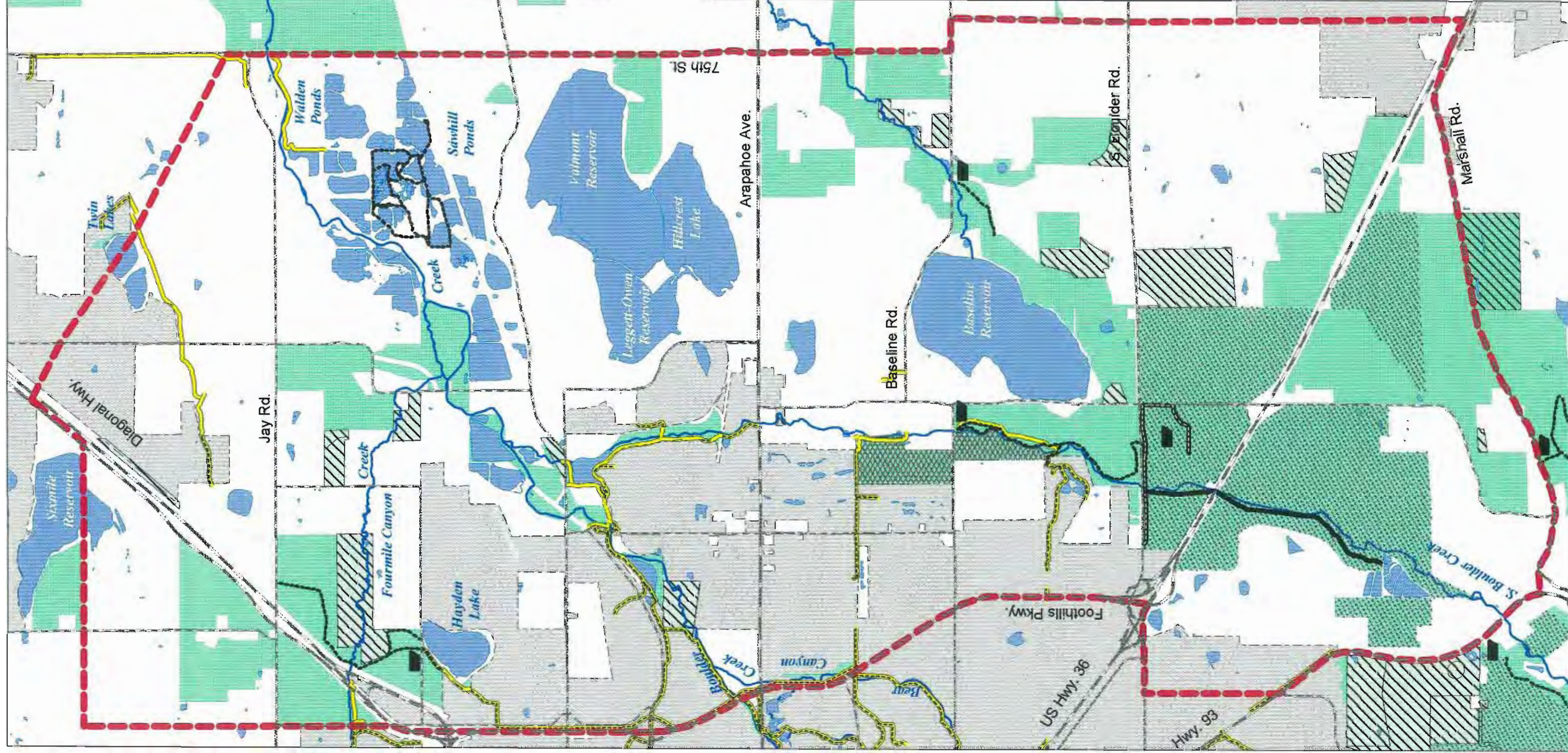
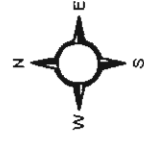
- Dog Regulations**
-  No Dogs
 -  Seasonal Leash Restrictions Voice and Sight
 -  Greenways Trail, Voice and Sight
 -  Greenways Trail, Leash Restriction
 -  City Manager Dog Prohibition Area
 -  Areas with seasonal restrictions
- Trailhead**
-  Trailhead
- South Boulder Creek Management Area Extents**
-  South Boulder Creek Management Area Extents
- City of Boulder Open Space**
-  Owned in Fee
 -  Easement Held By Open Space
 -  Closed to Public
- City Limits**
-  City Limits
- Roads**
-  Arterial Highway
- Hydrology**
-  Creek
 -  Lake

Scale

0.5 0 0.5 Miles

0.5 0 0.5 1 Kilometers

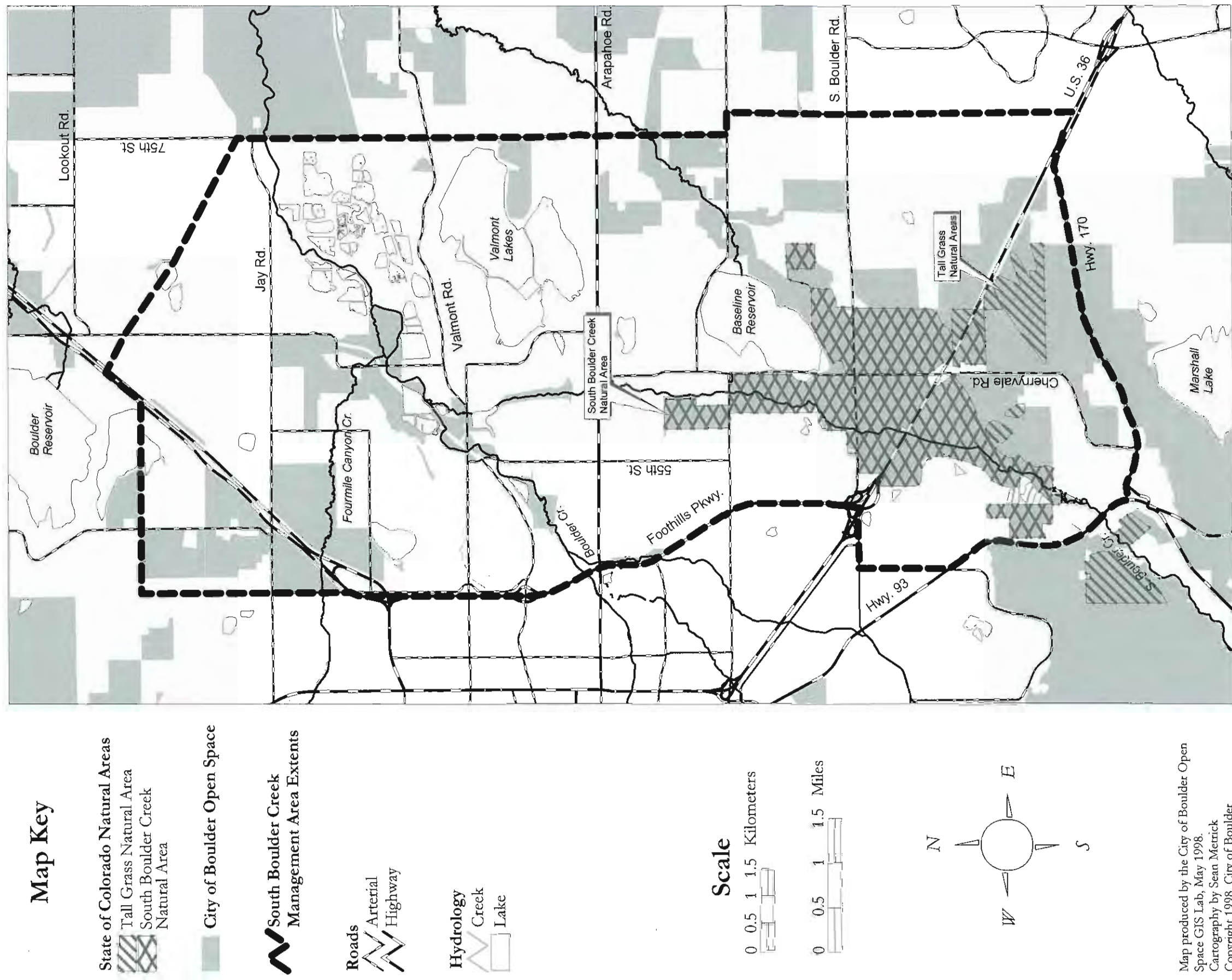
1:33000



City of Boulder Open Spaces GIS Lab, Sean Merrick, 8/29/97 (sbodog.apr).
 Copyright 1997 City of Boulder.

Figure 14.3 Dog Regulations

**Figure 1.3: Natural Areas
South Boulder Creek Management Area**



Map Key

State of Colorado Natural Areas

Tall Grass Natural Area

South Boulder Creek Natural Area

City of Boulder Open Space

South Boulder Creek Management Area Extents

Roads

Arterial
Highway

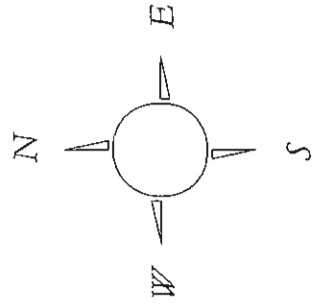
Hydrology

Creek
Lake

Scale

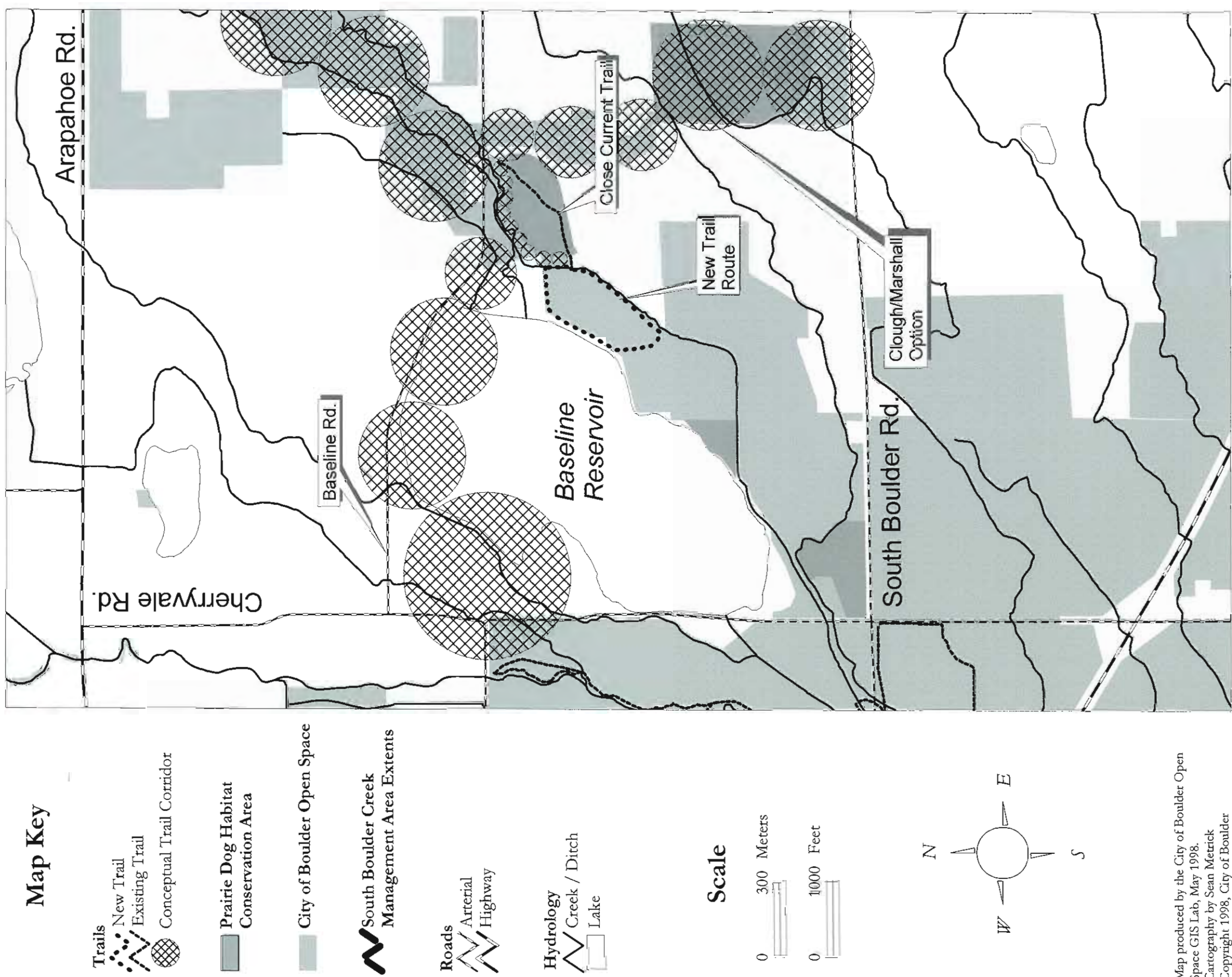
0 0.5 1 1.5 Kilometers

0 0.5 1 1.5 Miles



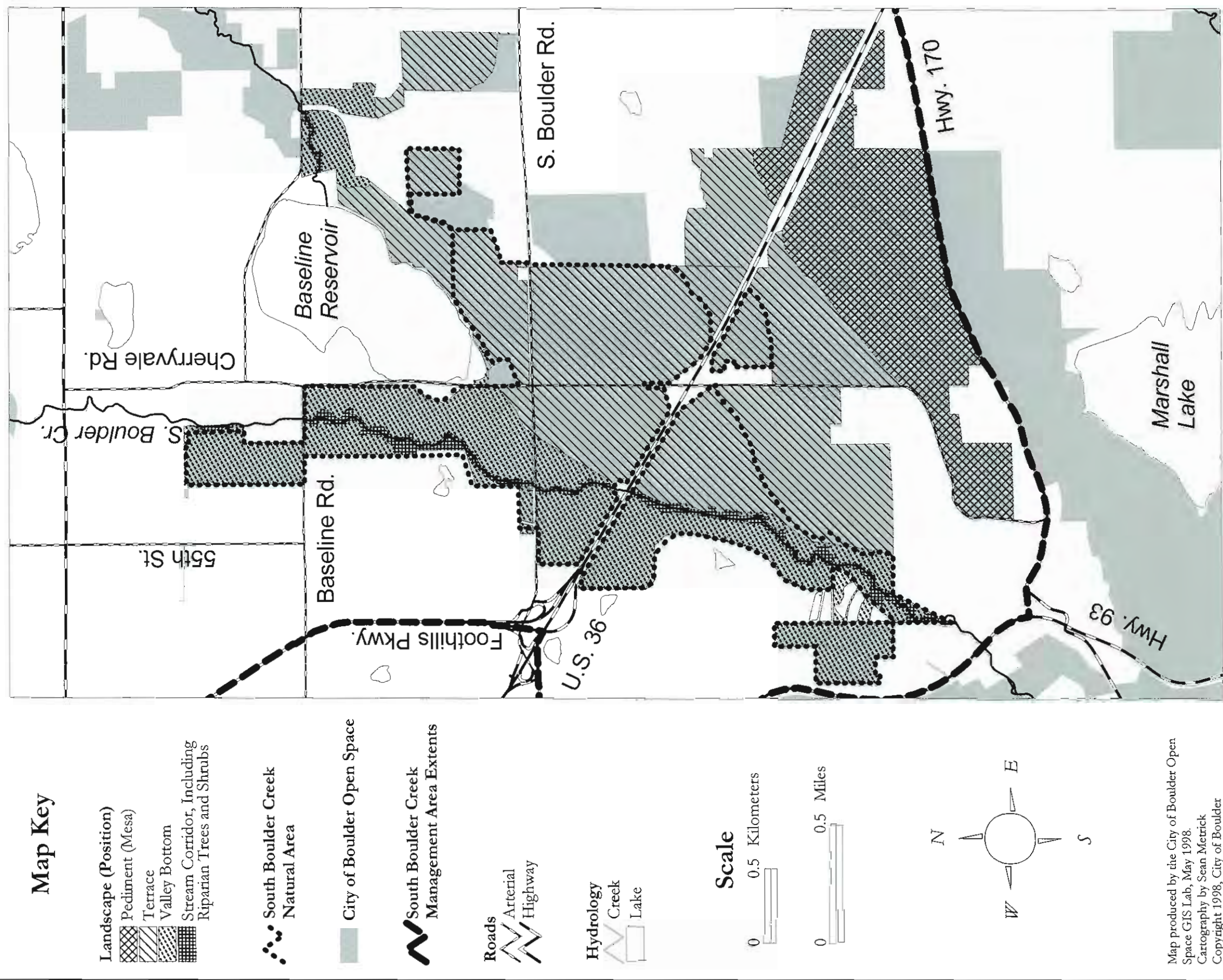
Map produced by the City of Boulder Open Space GIS Lab, May 1998.
Cartography by Sean Metrick
Copyright 1998, City of Boulder

**Figure 10.3: Dry Creek Options
South Boulder Creek Management Area**

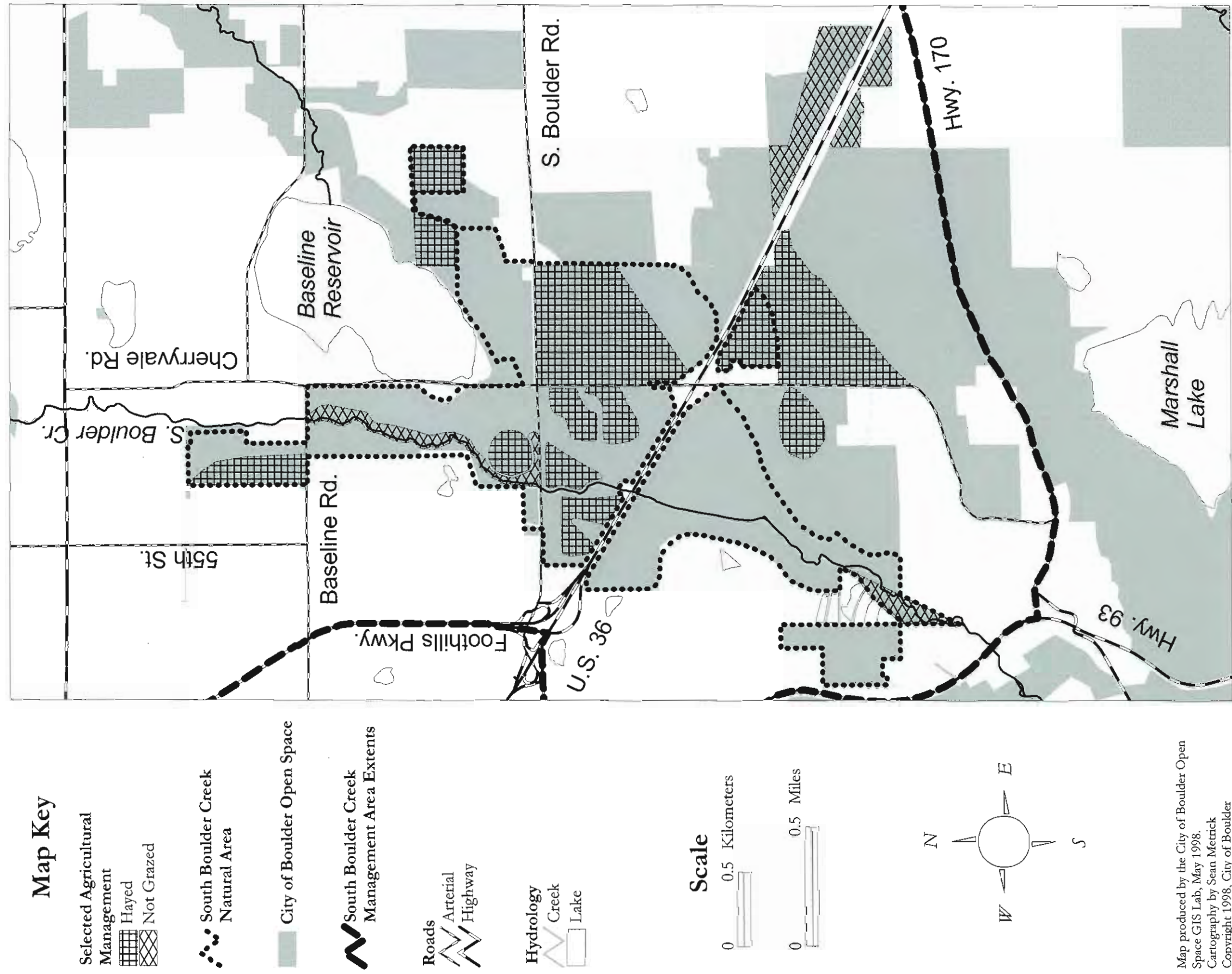


Map produced by the City of Boulder Open Space GIS Lab, May 1998.
Cartography by Sean Metrick
Copyright 1998, City of Boulder

Appendix 3.1, Figure 1: Landscape and Vegetation of the South Boulder Creek Natural Area and Adjoining Open Space



Appendix 3.1, Figure 2:
**Selected Agricultural Management of the South Boulder Creek
 Natural Area and Adjoining Open Space**



Map produced by the City of Boulder Open Space GIS Lab, May 1998.
 Cartography by Sean Metrick
 Copyright 1998, City of Boulder



Figure 13.2: Open Space Land Use

Map Key

City of Boulder Open Space Land Use

-  pasture
-  cropland
-  range

Non-Agricultural Lands

-  Owned In Fee
-  Easement Held By Open Space

City of Boulder Open Space Closed to Public

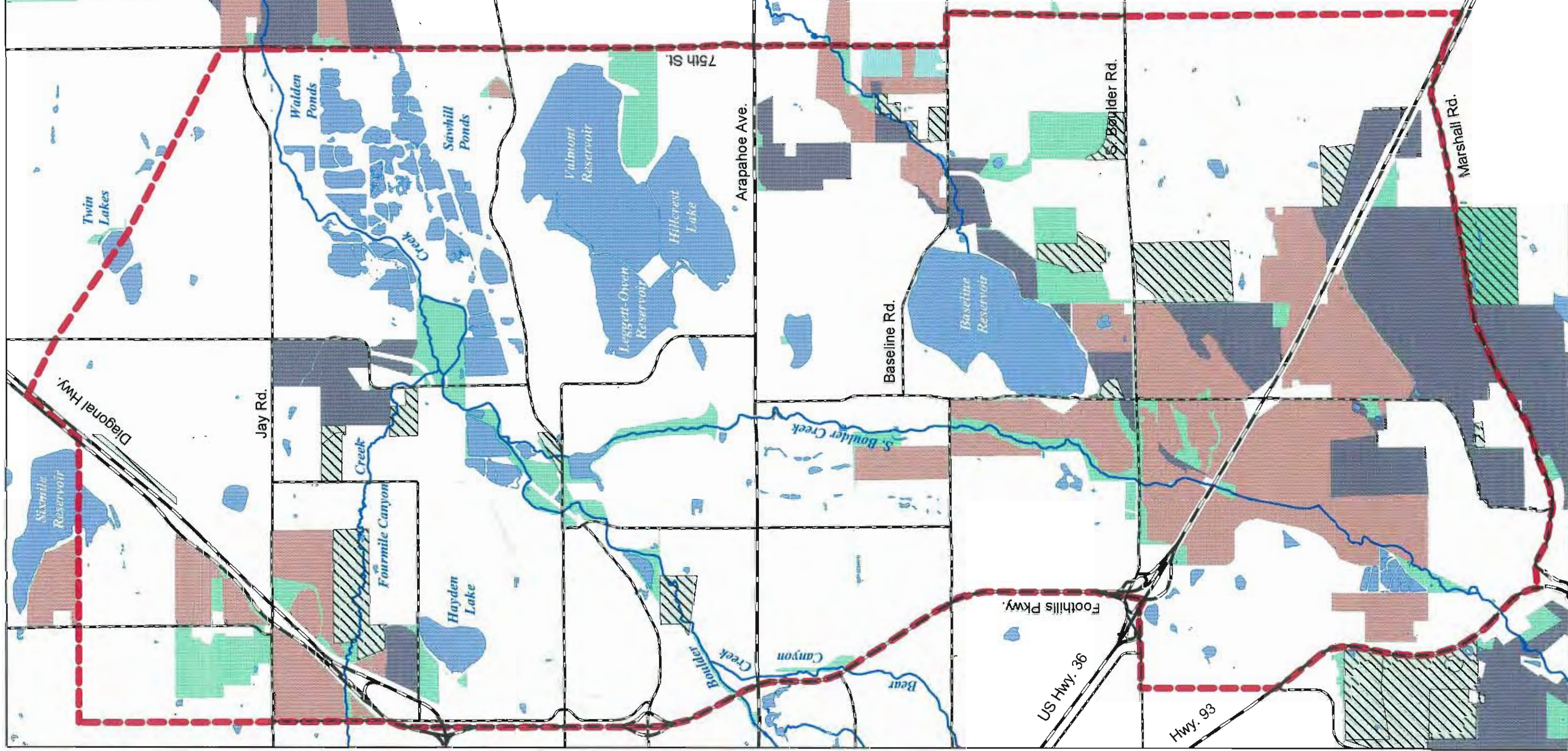
South Boulder Creek Management Area Extents

Roads

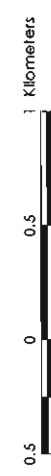
-  Arterial Highway
-  Highway

Hydrology

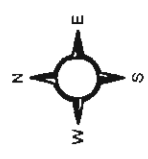
-  Lake
-  Creek



Scale



1:33000



City of Boulder Open Space GIS Lab, Sean Merhick, 8/29/97 (abclandusa.apr). Copyright 1997 City of Boulder

Figure 13.2 Open Space Land Use