CITY OF LOUISVILLE
OPEN SPACE MASTER PLAN

covering the following properties:

AQUARIUS
CTC
DAUGHENBAUGH
DAVIDSON MESA
LAKE PARK
NORTH
TAMARISK
WAREMBOURG
LEON A. WURL WILDLIFE SANCTUARY
MISCELLANEOUS

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City of Louisville
Department of Land Management
and Louisville Open Space Citizens Advisory Board

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SUMMARY

In 2003, most of the remaining large parcels are either dedicated as open space or have been platted for development and only smaller pieces remain for actual purchase. Louisville has maximized its size and is completely confined by bordering cities that have expanded their own limits, so the need to purchase more land to protect buffers is nearly achieved. The completion of this open space master plan initiates a stronger focus on managing this highly valuable public land. The stewardship that is detailed in the two-volume Open Space Master Plan will protect the City's investment for the enjoyment and appreciation of future generations. The development of an Open Space Master Plan is required under provisions of the City Open Space Ordinance (No. 1329, Series 2000). The emphasis at this stage reflects the importance of preservation of surviving elements of natural history/natural landscape that occur in existing Open Space holdings.

The open space discussed in the first volume are acreages that are owned solely by Louisville. The decisions on how these acres are managed are purely directed by the City Council. In volume two (Jointly-owned Open Space Management Plan), deriving management direction is more complex, in that Louisville shares the decision making role with Boulder County and Lafayette governing boards, who also have a hand in devising the management for these lands. In many cases, the lands described in volume two were purchased for agricultural preservation and for municipal buffers.

This document incorporates information from Article 15 (Open Space) of the Louisville Home Rule Charter, the Open Space Opinion Survey of Louisville Citizens Report, both independent and staff initiated inventories as well as individual classifications for management direction developed by the Open Space Advisory Board. This collection of information is condensed into a master plan, to provide management direction that is consistent with philosophies detailed in the Open Space Charter (Article 15).

CLASSIFICATION SUMMARY CHART OF OPEN SPACE LANDS

Property	#Acres	Ownership	Open Space Classification	Management Focus
Aquarius	34.5	Louisville	PS, V	Trail, Grassland
CTC	14.58	Louisville	PS, PT, V	Habitat
Daughenbaugh	20	Louisville	V	Trail, Habitat
Davidson Mesa	246.14	Louisville	PS, PT, V	Habitat, Trail
Lake Park	17.15	Louisville	V	Trails
North	37.42	Louisville	PS, PT, V	Trail, Habitat
Tamarisk	49.5	Louisville	V	Trail, Habitat
Warembourg	90	Louisville	V	Fishing Pond, Trail
Leon A. Wurl Wildlife Sanctuary	16	Louisville	L	Trail, Habitat Improvement
Dutch Creek	26.5	Louisville	V	Trail, Habitat Improvement
Hunters Ridge	23.5	Louisville	V	Trail
Gateway	.5	Louisville	PT	Native Landscape
Hillsboro West	10.49	Louisville	V	Trail Habitat
Allenbaugh	2	Louisville	V	Buffer
Cherrywood	3	Louisville	V	Buffer
Olson Subdivision	17.35	Louisville	V	Buffer
Lastoka	138	Louisville Lafayette Boulder Cnty	L	Agricultural/ Historical
Admor	80	Louisville Boulder Cnty	PT	Agricultural
Callahan	45	Louisville Boulder Cnty	PT	Agricultural/Trail
Warembourg (96th St.)	292	Louisville Boulder Cnty	PT	Agricultural
Boulder Cnty Land Venture/Trillium	300	Louisville Boulder Cnty	PT	Agricultural
Bowes	66	Louisville Boulder Cnty	PT	Agricultural
Scriffiny	22	CE	CE	Habitat
Esmail	35	Louisville Lafayette Boulder Cnty	PT	Agricultural
Fingru	55	Louisville Lafayette Boulder Cnty	PT	Agricultural
Mayhoffer	155	Louisville Lafayette Boulder Cnty	PT	Agricultural

Open Space Classifications:

PS (Preserve) V (Visitor) CE (Conservation Easement)
PT (Protect) L (Other)

Mesa Open Space

1.0 INTRODUCTION

In 1992 a Parks Master Plan was adopted to direct future management of Louisville's parks, trails, athletic fields, and open space. Part of this process included a citizen survey to determine the greatest priorities from the residents' viewpoint. One of the top priorities that were identified was the desire to protect open space land around the city's border and trails to enable more appreciation for the surrounding countryside. At the time, there were numerous significant parcels available to purchase for open space. In 1993 a ballot question to impose a 3/8-cent sales tax for the purchase of open space was successful and Council decided it was necessary to prioritize a list of goals and parcels to consider purchasing. They formalized the Open Space Task Force to critically prioritize potential land acquisitions. In 1994, the City Council voted to bond $2,035,000 for land acquisition with the open space sales tax as the source for payment of the bonds. After two years of meeting with neighboring governments and studying the actual parcels considered for open space acquisition, the Open Space Task Force brought forward the first Open Space Master Plan, dated April 1995. Between the mid –1990's and today, many of the lands identified in this plan were purchased through intergovernmental agreements formalized between Louisville, Boulder County and Lafayette to maximize limited open space funds and increase the total land available for local public ownership.

Opinions for the manner in which open space lands should be managed are as varied as the land resource. To that effect, yet another survey of citizen opinion was conducted to best understand the resident majority impression for the general direction for this master plan. In short, the citizens' views on open space have not changed. It is nearly an even split as to residents who want to see open space preserved for wildlife habitat, versus those who wish to see more trails built to access open space. Citizens who have resided in Louisville for multiple generations desire to maintain the agricultural backdrop that has been important in Louisville's evolution as a city.

1.1 Report Organization

Louisville's Open Space Master Plan is created as a two-volume plan. Open Space lands owned completely by Louisville are covered in the first volume. Jointly-owned properties are located in the second volume which was created collaboratively between Boulder County, Lafayette and Louisville.

Volume One presents a summary of the information gathered from independently contracted "Natural Resource Rapid Assessments", the Open Space Inventory and Recommended Management Direction Report prepared by ESCO Associates in December of 2001 and through Land Management Staff reports. This plan is divided into general information that applies to all ten of the properties and then is broken down by individual property. Accompanying this plan is the corresponding property classification. Open space lands that are jointly owned through intergovernmental agreements may be located in the Jointly-Owned Open Space Management Plan (Volume Two).

2.0 RELEVANT GOALS AND POLICIES

According to Article 15 of the Louisville Home Rule Charter, Open Space shall be managed in a manner consistent with good stewardship and sound ecological principles that benefits citizens of Louisville by promoting native plants, wildlife, wildlife and plant habitat, cultural resources, agriculture and scenic vistas and appropriate passive recreation. It is intended that the differing classifications of Open Space will require different management policies to provide reasonable levels of protection consistent with the desired uses of the land.

Charter Section 15-1. Open Space Article – Purpose:

The purpose of this article is to establish management standards for City owned open space lands that:

(a) Are consistent with good stewardship and sound ecological principles;

(b) Preserve and promote native plants, native wildlife, and their habitats; and

(c) Preserve and promote cultural resources, agriculture, scenic vistas, and appropriate passive recreation activities.

3.0 MANAGEMENT GOALS AND PROTOCOL

3.1 Management Classification Descriptions

The following explains in detail how Open Space Properties are classified and the management of Open Space Lands. Please see the Open Space – Master Plan Management Classifications Map for the classification on each Open Space property. In management discussions and decisions on jointly owned properties, the City's position will be consistent with the properties' land classification.

Open Space-Preserve

1. Land under this classification is characterized by a moderate to high level of relative ecological importance with lower levels of habitat fragmentation. It is the intention that land under this classification, when possible, shall include sufficient surrounding lands, to serve as a buffer to permit the successful management of this classification of land.

2. This land shall be managed in a manner to preserve and promote the long-term viability of native flora and fauna, restoration, restoration potential and ecologically sound agricultural use. It is the intention that management of City-owned lands surrounding Open Space-Preserve lands shall, to the extent possible, not be in conflict with the management required under this section. Visitation for research purposes and formal supervised educational visitation are permitted. It is intended that there shall be no or very low levels of passive recreational visitation.

3. When there is a real conflict between human use and any area or item of ecological importance in this classification of land, preference shall be given to sustaining the area or item of ecological importance.

Open Space-Protected Land

1. Land under this classification shall be characterized by a higher to moderate level of relative ecological importance with higher levels of habitat fragmentation.
2. This land shall be managed in the same manner as Open Space-Preserve Land, except that management may permit passive recreational opportunities so long as:
    a. the passive recreational opportunities are designed to encourage resource protection, long-term ecological viability of native flora and fauna, restoration, ecologically sensitive agricultural use, research and education; and
    b. the recreational impacts can be contained to prevent spillover to Open Space-Preserve Land.
3. Visitation levels to this classification of land shall be moderate to moderately high.
4. When there is a real conflict between human use and any area or item of ecological importance in this classification of land, preference shall be given to sustaining the area or item of ecological importance.

Open Space-Visitor Land

1. Land under this classification shall be characterized by a lower level of relative ecological importance with higher levels of habitat fragmentation.
2. Open Space-Visitor Land is intended to be managed so that recreational opportunities are compatible with resource protection with minimal landscaping using native plants and limited irrigation. Moderate to high levels of visitation may be permitted on land in this classification.

Notwithstanding the foregoing, all current uses, including those contemplated in any intergovernmental or other contractual obligation of the City in existence before the enactment of the Open Space ordinance, will be allowed unless and until the City Council recommends a change and takes all necessary legal steps to implement such a change. The Open Space Advisory Board may recommend such a change to Council at anytime.

City decisions regarding Open Space identification, classification and management shall consider the best available information.

Open Space – Other Land

1. Open Space – other lands shall be managed to include construction of entryway features and trail rests, planting of trees and other buffer plantings, provided that reasonable attempts shall be made to minimize the impact of entryway features and trail rests on the land, and reasonable attempts are made to use native trees and plants.

2. High levels of visitation and use consistent with existing patterns shall be permitted on such open space – other lands.

3.2 Management Protocol

3.2.1 Open space lands (not leased for agriculture) will not be mowed on a regular basis. Certain conditions may arise where the land manager may prescribe mowing to enhance plant vigor, or in some circumstances, to decrease extreme fire danger. Buffers will be mowed between residential housing and open space to reduce fire hazard. Strips may be mowed along the side of open space trails. Urban open space parks, like Lake Park, may be exempted from this standard.

3.2.2 Maintenance vehicles are restricted to trails, unless prior approval from the Land Management Director has been obtained.

3.2.3 It is illegal for any resident to create a garden, landscape, playground or any other type of "improvement" without written consent from the Land Management Director.

3.2.4 Utility easement holders must obtain a permit with the Land Management Dept. to disturb open space during the course of maintaining a utility line. Any vegetational disturbance is the responsibility of the utility to rehabilitate to the City of Louisville's revegetation standards.

3.2.5 Unless special circumstances exist where the open space would need prairie dogs relocated to repopulate historical prairie dog colonies, Louisville open space does not allow any release of prairie dogs on its parcels.

3.2.6 The sides of newly constructed trails must be reclaimed with plant materials that are native to Boulder County plains. Native plant materials will be used to replant any disturbances to open space. The exception to this protocol will be for lands leased for agriculture and urbanized open space.

3.2.7 Louisville recognizes the importance of the prairie dog to the grassland ecosystem. In recognition of their significance and in order to provide watchable wildlife opportunities for Louisville residents, the City of Louisville will strive to maintain a minimum of three prairie dog colonies on Louisville open space.

3.2.8 In order to maintain healthy prairie dog colonies and protect other elements of a particular property, the most humane lethal control of prairie dog's may be used when relocation options have been fully considered.

4.0 LANDSCAPE SETTING AND PHYSICAL CHARACTERISTICS

4.1 Location

Louisville Open Space is located in southeastern Boulder County, Colorado, in between Coal Creek and Rock Creek. The Louisville Open Space parcels are listed below:

1) 34.5 acres referred to as the Aquarius Property;
2) 14.58 acres referred to as the CTC Property;
3) 20 acres referred to as the Daughenbaugh Property;
4) 246.14 acres referred to as the Davidson Mesa Property;
5) 17.15 acres referred to as the Lake Park Property;
6) 37.42 acres referred to as the North Property;
7) 49.5 acres referred to as the Tamarisk Property (Parcel R);

8) 90 acres referred to as the Warembourg Property;
9) 16 acres referred to as the Leon A. Wurl Wildlife Sanctuary (Harper Lake) Property;
10) 143.53 acres of Miscellaneous Open Space Property.

Together, these properties comprise approximately 668.82 acres of open space. Other descriptive locators include:

- Plains lifezone;
- Colorado Piedmont section of the Great Plains physiographic province, eight to ten miles east of the Front Range of the Southern Rocky Mountains;
- Coal Creek-Rock Creek watershed;
- In Township 1 South, Range 69 West, parcels with sections 5, 6, 7, 8, and 9. In Township 1 South, Range 70 West, parcels with sections 12 and 13.

4.2 Climate

With an average elevation of 5,370 feet, the climate of the Louisville area can be described as a high plain, continental climate, with light rainfall and low humidity. The climate is modified considerably from that expected of a typical high plains environment because of the nearby mountains. Winds are channeled from the Continental Divide down the Front Range and can be severe. Prevailing winds are generally from the west.

The average high temperature in July is 88°F, and the average low temperature in January is 14°F (Weatherbase, 2002). Annual precipitation averages 16 inches. Relative humidity is about 30-35 % in summer and about 40-50% in winter. Periods of drought are frequent, usually occurring in the fall and winter. The length of the growing season is approximately 140 days, with the average date of the first killing frost being September 28. The last killing frost occurs around May 11 (USDA, 1975).

4.3 Topography

The area lies within the plains life zone, about eight to ten miles east of the Front Range of the Southern Rocky Mountains. Generally flat lands characterize the overall topography with some gently rolling terrain trending toward either Coal Creek or Rock Creek. Elevations range from about 5,250 feet on the eastern edge of the subject lands to about 5,530 feet on the western side.

4.4 Geology

Geologically, the Louisville area in general is underlain by gently dipping Upper Cretaceous sediments that would be more extensively exposed but for widespread veneers of alluvium of both Pleistocene and Holocene age (Chase and McConaghy 1978). With regard to the bedrock underlying the alluvial veneers, the upper portion of the Laramie formation contains the coal beds that attracted much of the human activity that comprised the early (post-settlement) history of the Louisville area. Most of the Open Space system areas of highest ecological interest as identified in this and the preliminary study (ESCO 2000) are aligned with surface exposures of Fox Hills sandstone and/or adjacent areas with thin veneers of Pleistocene age alluvium. Two linear exposures of Fox Hills sandstone cross the Louisville area from southwest to northeast. The more northwesterly of these underlies the Davidson Mesa, McCaslin, and North sites, and the more southeasterly includes the Warembourg, CTC (west), and Aquarius sites. This correlation has much to do with the fact that these exposures tend to be located on slopes largely in excess with what would be reasonably cultivated by settlers and later agricultural occupants. In addition to slope steepness, shallow soils and (where coarse alluvial veneer is present) extreme rockiness also probably discouraged the plowing of these areas. The Coal Creek riparian communities are directly associated with the young alluvium laid down by the action of the creek during flood events.

The Louisville area is located in the Colorado Piedmont Section of the Great Plains (physiographic) Province (Crosby 1978). Most of the Louisville area is included in the Upland Subsection and the Rolling Upland Unit (Crosby 1978). This unit includes "broad areas of nearly flat to very gently rounded surfaces between major stream valleys. Low hills are [aligned] along some divides between drainage courses; other divides have little surface irregularity" (Crosby 1978). The landform-defining drainage in the Louisville area is the southwest-to-northeast trending Coal Creek. Uplands to the northwest of Coal Creek comprise the drainage divide with the South Boulder Creek drainage basin, and the uplands to the southeast straddle the drainage divide with Rock Creek. The environs of Coal Creek fall within the Bottomland and Terrace units of Crosby (1978). These latter units are both nearly level to very gently sloping, with Terrace areas located adjacent to and upslope from the Bottomland areas. As defined by Crosby (1978) the Bottomland areas are those subject to inundation during 100-year flood events.

4.5 Soils

Soils of the Louisville area include representatives from three soil associations as identified in the Boulder County Soil Survey (Moreland and Moreland 1975). Soils to the northwest of Coal Creek (excluding the top of Davidson Mesa) are part of the Ascalon-Nunn-Manter association that includes nearly level to moderately steep, deep soils on terraces, valley sides and uplands. Soils of the upper portions of Davidson Mesa are of the Nederland-Valmont association that includes nearly level to moderately steep, deep, very cobbly soils on hold high terraces, alluvial fans, and benches. Soils lying between Coal Creek and Rock Creek are of the Nunn-Heldt association, which includes nearly level to moderately sloping deep soils on terraces and uplands. Most of the soils in the latter association are very fine (clays, clay loams and sandy clay loams), while those northwest of Coal Creek are more often sandy loam in surface texture.

Terrace escarpment soils underlie relict grasslands at the Davidson Mesa, Warembourg, and CTC (west) sites. These soils are the very cobbly and stony offspring of coarse alluvial parent material. Ascalon-Otero complex (9 to 20 percent slopes) soils are mapped in the North and Aquarius sites. The soils present are shallower than the typical pedon descriptions in Moreland and Moreland (1975) and grade into the sandstone outcrops acknowledged in the mapping unit description. Valmont clay loam soils are typical of the older (Pleistocene) pediment surfaces, and these underlie the McCaslin and portions of the Davidson Mesa relict grasslands. Coal Creek riparian communities occur, of course, along the drainage on miscellaneous alluvium with little soil development (Soil Group Fluvents).

4.6 Significant Agricultural Land

Eastern Boulder County contains agricultural lands of national significance due to its soil resources and their production capability. These lands are considered prime farmland because of the productive soils and their associated irrigability. Many of the properties outlined in this plan contain prime soils. Even as dryland farms, the properties may be significant at both the state and local levels. Most of the significant agricultural lands are jointly owned between Louisville, Boulder County and sometimes, Lafayette and are covered in the Volume Two (Jointly-owned Open Space Management Plan).

Not only does local agriculture contribute to the local private economy, but also additionally benefits Louisville's Land Management Dept. financially. By leasing lands for agriculture much of the necessary direct management is performed by local farmers in accordance to lease agreements. Were it not for the local farmers who lease the open space lands for agriculture, the number of city employees or contractors necessary to manage the land would be a substantial toll on the Land Management Department budget.

4.7 Resource Evaluations

4.7.1 Vegetation

4.7.1.1 Historic Ecology

During Holocene time the grasslands of the Great Plains took their pre-settlement form in that warm season species radiating from northern Mexico are thought to have joined the cool-season species that had been present in North America for several million years. The drying trend in the past few thousand years, including some apparent extreme droughts, led to the zonation we observe today (albeit in very fragmented form). The grasslands of the Colorado Front Range Piedmont are part of what has come to be called "shortgrass prairie" and represent a response to predominant dryness as well as historic stress in the form of heavy grazing periods by domestic livestock associated with the arrival of European culture.

4.7.1.2 Vegetation Resource Inventories and Current Conditions

Detailed plant species inventories were undertaken on five tracts that had been identified in the preliminary study as likely to include biological resources of special note. The Davidson Mesa, McCaslin, North, Aquarius, and Coal Creek Riparian parcels were surveyed in detail and the results are the basis of the discussion below. The plant species encountered are tallied by tract in Table 1 (end of document). A total of 158 plant species were observed on the Davidson Mesa site, 95 on the McCaslin site, 114 on the North site, 125 on the Aquarius site, and 75 along the Coal Creek riparian area.

One of the most serious and fastest growing problems in the West – especially along the Front Range – is the spread and establishment of invasive non-native plants. Noxious weed infestations have contributed to the loss of productivity and ecological functions on both public and private lands, seriously impacting native ecosystems, agriculture, and the enjoyment of natural areas. Weeds are rapidly becoming the most pressing management issue for many private and public land managers.

4.7.2 Wildlife Resources

4.7.2.1 Historic Ecology

Pre-Settlement Era

Prior to settlement, wildlife resources of the Louisville area reflected three major habitat components: the vast expanse of prairie grassland, narrow ribbons of riparian woodland and shrubland along streams, and the proximity to the Front Range foothills.

In those pre-settlement times, the prairie was the overwhelmingly prevalent habitat type in what is now Louisville. Far from being "empty land" as it is so often viewed, the pre-settlement prairie was a rich mosaic of community types, ranging from short grasses on dry sites to tall grasses on moist sites, with significant numbers of shrubs and yuccas on rocky slopes. Migratory herds of bison followed the spring flush of palatable and nutritious grasses. Other ungulates (hoofed mammals) inhabiting the prairie included the pronghorn, American elk and mule deer. Today, mule deer and elk are thought of as mountain species. Even bighorn sheep, now emblematic of our highest peaks, ventured onto the fringes of the pre-settlement prairie to feed on the lush herbs. Where ungulates go, so too go carnivores that feed upon them. Mountain lions, grizzly bears, and gray wolves were present far from the mountains prior to settlement. Their retreat to more remote terrain was a result of both the demise of their prey base and being

hunted or trapped for their fur as well as to eliminate them as threats to settlers and their livestock.

Other hallmarks of the pre-settlement prairie included colonies of prairie dogs that covered thousands of acres and supported large numbers of predators and populations of predators, and high densities of ground-nesting songbirds, small mammals, and reptiles sustained by the rich and productive grasses.

Narrow stream corridors such as Coal Creek provided important sources of water and, probably more importantly, sustained cottonwoods, willows, chokecherries, plums, and other tall woody species. These linear woodlands provided habitat for species that otherwise would find the prairie inhospitable: white-tailed deer, red foxes, fox squirrels, woodpeckers, arboreal songbirds—both resident and migratory—and amphibious or aquatic species such as frogs, toads, salamanders, and fishes. Even the small mammals and reptile communities of the riparian woodlands, shrublands, and herbaceous wetlands were distinct from their counterparts in the open grassland.

Agricultural Era

As this area began to be settled, much of the eastern Boulder County prairie was converted to agriculture to sustain the booming new culture of mining in young Louisville. Louisville was home to many families who made their livelihoods from the fertile soil and irrigation provided by an intricate network of well-engineered supply ditches. Families like the Warembourgs', the Mayhoffers', the Lastokas', and the Callahans' spent generations learning to work with and manipulate the landscape to harness its ability to provide them a living while they helped feed their community.

Habitat fragmentation began during this era, as cultivated land began to isolate areas of native habitat into smaller and smaller blocks. The widespread planting and subsequent natural colonization of trees along ditches and around irrigation lakes and stock ponds benefited some species of wildlife, but native riparian areas were often degraded over the decades by cattle and horses attracted to the streams for the water, shade, and lush grasses they provided. This era of colonization also ushered in a wide host of alien plants through deliberate introductions, as in the case of Dalmatian toadflax and inadvertent introductions such as leafy spurge.

As the first stewards of the land, many lessons were learned about the delicate balance of the mixed grass and riparian ecosystems. To support the influx of humans and their livestock, many native areas were converted to more productive, introduced pasture grasses such as smooth brome, orchard grass, and timothy. These species were more suited to being cut and baled to provide forage year round for horses, meat animals and dairy cattle. Predators, such as bears, wolves, coyotes and mountain lions, were controlled to the point where most of them no longer exist on the plains.

Suburban Development Era

While grassland habitats in eastern Boulder County were greatly decreased in both extent and quality during the agricultural era, this loss has been even greater since the spread of urbanization from nearby population centers. The high quality of life offered by Louisville's attractive surroundings made the 1980's and 1990's a time of rapid suburban expansion. Farms were purchased for development of subdivisions and retail space to support the influx of families moving here during Louisville's second phase of human settlement.

While riparian corridors themselves are mostly protected from development, loss of adjacent open terrain and the invasion of so many invasive European plant species, has rendered the corridors unsuitable for many of the riparian wildlife species. Those that use the trees and dense shrubs for cover and reproduction but hunt or forage in the grasslands are gone.

Fortunately, not all aspects of the suburban development era have had negative impacts to the natural areas surrounding and within Louisville. The seemingly sudden loss of open areas has triggered concern among citizens of Louisville and other Front Range communities—concern sufficient to lead to the approval of taxes to fund the acquisition and management of open space. However, the potential exists to preserve and enhance remaining grasslands and riparian woodlands in ways that could provide a connection to the natural history of the area and create endless opportunities for education and enjoyment.

4.7.2.2 Wildlife Resource Inventories and Current Conditions
A few grassland areas on Louisville open space continue to support some of the historic uses by prairie wildlife, especially areas that are too steep to have been plowed.

Some riparian areas on Louisville open space continue to support many of the uses that pre-dated settlement, even though they have been modified by the loss of adjacent habitat, increased human disturbance, and competition with human-tolerant urban wildlife. Other areas of open space have been so highly modified or so impacted by development that they no longer sustain significant use by non-urban species.

Few wildlife resource inventories exist within the City of Louisville files. Fortunately, there are several records that exist through the Boulder County Nature Association and even a few through Boulder County Parks and Open Space. Future direction will place more importance on evaluating habitat for target wildlife species. Habitat enhancement would include inputs such as native grass and shrub plantings, removal of invasive species, wildlife habitat area closures, and in some instances – grazing or prescribed burning to manipulate vegetational responses to favor certain species.

Probably the most volatile topic pertaining to wildlife in Boulder County is the subject of prairie dogs. There are varying opinions about how they should be managed. Land managers' greatest concern is to assure there is suitable habitat to sustain the flux of prairie dog numbers over time – without semi-permanent degradation of the native grassland resource. Louisville's open space parcels, including those jointly owned with Boulder County and Lafayette, do not total enough contiguous land to naturally sustain a typical prairie dog colony.

4.8 Cultural History

The history of the rolling hills and plains of eastern Boulder County has been largely eclipsed by the drama of the gold and silver mining camps in the mountainous western half. But in some respects it is essential to review that early phase of county history to place Louisville in perspective.

It was gold that lured the party of Captain Thomas Aikins to break off from the security of a larger group of prospectors at Fort St. Vrain and head for the mouth of Boulder Canyon in the fall of 1858. Within a few months, the party had discovered the rich placer deposits up the canyon and the camps of Gold Run and Gold Hill were born. Five months after the Aikin party's arrival, the Boulder City Town Company was organized to plan a community in the vicinity of that first encampment at the base of the mountains.

The "easy" gold of the placers had quickly played out, resulting in countless unsuccessful miners or "go-backs" heading for homes in the east with dismal stories of hardship and failure. Many turned to agricultural pursuits on the plains and realized greater profits "mining the miners" as suppliers of scarce food products. Many of the original settlers in the Louisville area fell into this latter category of miners who became farmers.

The Cheyenne and Arapaho's, who had been restricted by treaty to hunting grounds between the South Platte and the Arkansas as early as 1851, had continued to hunt the abundant game of the Boulder Valley at the time of their contact with the first wave of white prospectors. The region was naturally a favorite hunting ground for the Cheyenne and Arapaho as it had been for the Comanche and Kiowa during the 18th century before they were displaced to the south and east.

Despite an uneasy truce between the Indians and the gold seekers, in 1860 the government again responded to pressures to restrict the Cheyenne and Arapaho to reservation lands near Sand Creek, with the intention of turning their nomadic hunting lifestyle into one of settled farming. The failure of this plan and the growing fear that the Indians were conspiring to stage a massive attack upon the new settlers prompted the tragedy of the Sand Creek Massacre in 1864. Several Boulder volunteers aided Colonel Chivington in the surprise raid that crushed the tribes, which indicates the sentiment of removing the Indians permanently from the area was very strong. An unprecedented era of new white settlement reached eastern Colorado following the final Indian defeat at the Battle of Summit Springs in 1869. It is into this picture of Indian removal, with the coming of railroads, smelters, and new immigrants, that the history of Louisville takes on greater focus.

In August 1877, the Welch Mine opened in Louisville, the first of many coal mines to come. Louis Nawatny, a local landowner, platted his farmland which he named for himself and registered in February 1878.

Coal miners soon moved to the new town to work in the emerging coal industry. From the beginning, Louisville differed from most coal camp towns as it was not owned and controlled by a single mining company. Louisville is located in an area known as the Northern Coalfield, an extensive coalfield in Boulder and Weld counties. Wages in the early days of coal mining were somewhat higher in the Louisville mines and the mines were relatively safe. The economy, however, was generally depressed. Family gardens and odd jobs were the way of life as mining was seasonal and strikes often interrupted production.

From 1890 to 1928, the Acme Mine operated directly beneath the original town of Louisville. Worked on two levels, the Acme produced nearly two million tons of coal and was one of 171 coalmines in Boulder County. In all, thirty mines were located in and around Louisville. During the peak years of 1907 and 1909, there were twelve mines in operation. The use of coal declined following World War II, and the last mines near Louisville closed in 1952.

Many Europeans migrated to Louisville to work in the mines, as jobs were plentiful. Some learned the skills to become miners, while others brought skills they had used in Europe. Later, miners were recruited as strike breakers during the several union disagreements with coal companies. Although miners worked together, they lived with their own relatives and fellow countrymen in ethnically separated neighborhoods.

These ethnic neighborhoods are gone now, as are the remnant of the coal mines. Flowers grow in suburban yards with never a hint of the passageways underground or the history they represent.

At the time of the writing for this plan, few cultural history surveys have been conducted. Future management will seek assistance from the Louisville Historical Preservation Board to assist in prioritizing cultural significance of Louisville's open space parcels.

4.9 Opportunities for Passive Recreation

Louisville's citizenry has overwhelmingly supported the preservation of the remaining parcels of natural lands surrounding the community. While it is evident that recreation is not befitting all open space lands, due to the responsibility to protect wildlife habitats, plant communities, cultural resources and in many situations, continued agricultural viability, providing enough area for citizens to "enjoy the outdoors" is an important mission for open space. Opportunities for nature discovery, hiking, biking, rollerblading, "geocaching", and dog walking are provided along most of the trails that wind through Louisville and its open space lands. Lands where these activities are encouraged, will describe the recreational opportunity directly.

Trails

Trails provide recreational linkages for passive recreational activities. Passive recreational activities only include hiking, running, dog walking, biking, nature observation, photography, geo-caching, and on hard surface trails skateboarding, rollerblading and non-motorized scooters. Louisville's trails vary between soft and hard surface, but generally trails within the City Limits are concrete.

Connecting the Louisville trails is a high priority as noted in the 1992 Parks Master Plan. Generally, urban trails provide opportunities for passive recreation as well as connections between neighborhoods. As noted in the Parks Master Plan, trails connecting open space to open space should be soft surface. Louisville's trails are addressed under the Parks Master Plan. As stated in the Open Space Ordinance and Charter, the Open Space Advisory Board will review any proposed trails and make recommendations for trail prioritization and placement to City Council. Louisville's trail system has greatly improved since the Parks Master Plan was written in 1992. Between the Intergovernmental Agreement that enabled and developed the Coal Creek/Rock Creek Trail system and the City's participation in regional planning efforts for future alternative transportation tax funding, there have been significant connectivity improvements and numerous possibilities for betterment bettering the existing trail system that lie ahead.

Trail Prohibitions

To assure the safety of all trail users, some uses are prohibited by municipal ordinance. Any motorized vehicles, horseback riding, and unleashed dogs are all prohibited on Louisville trails.

Geocaching

Geocaching is a game for GPS (Global Positioning System) users, enabling them to challenge their orienteering skills. The basic idea is to have individuals and organizations set up caches all over the world and share the locations of these caches on the internet. GPS users can use the location coordinates to find the locations. There are different types of caches for this sport:

Offset Caches - With the Offset Cache the published coordinates are that of an existing historical monument, plaque, or even a benchmark that you would like to have your cache hunter visit. From this site the cache hunter must look around and find offset numbers stamped/written in or on some part of the marker site, or continue based on instructions posted to the website.

Multi-caches - The first cache gives coordinates (or partial coordinates) to the next location, or multiple caches have hints to the final cache.

Virtual caches - A cache is actually an existing landmark, such as a tombstone or statue. The player has to answer a question from the landmark and let the "cache" owner know as proof that they were there.

Guidelines for Geocaching on Louisville's open space and trails:

1. No material caches are allowed without written consent from the Land Management Director. All unauthorized caches will be removed and discarded.
2. The Land Management Dept. encourages geocaching through virtual caching or "multi-caching".
3. It is unlawful to mark on, or deface in any way, any sign or structure maintained by the City of Louisville.
4. All caching activities must be contained on open space parcels classified for "Visitor Use". No caching will be permitted to occur on properties classified as "Preserve" or "Protect".
5. Follow "Leave No Trace" principles by never leaving any materials on open space lands and by not removing any natural features.
6. All courses must follow designated trails.

Horseback Riding

Horseback riding is not permitted on any trails within the City of Louisville.

Dogs on Open Space

To protect the safety of resident wildlife, open space visitors and their pets are permitted on open space provided they are maintained on a leash at all times. The Mesa Open Space offers an exception to this regulation with a partially fenced "dog off leash" area where dogs may run off leash under voice control.

5.0 PROPERTY DESCRIPTIONS, RESOURCE EVALUATIONS, AND MANAGEMENT DIRECTION

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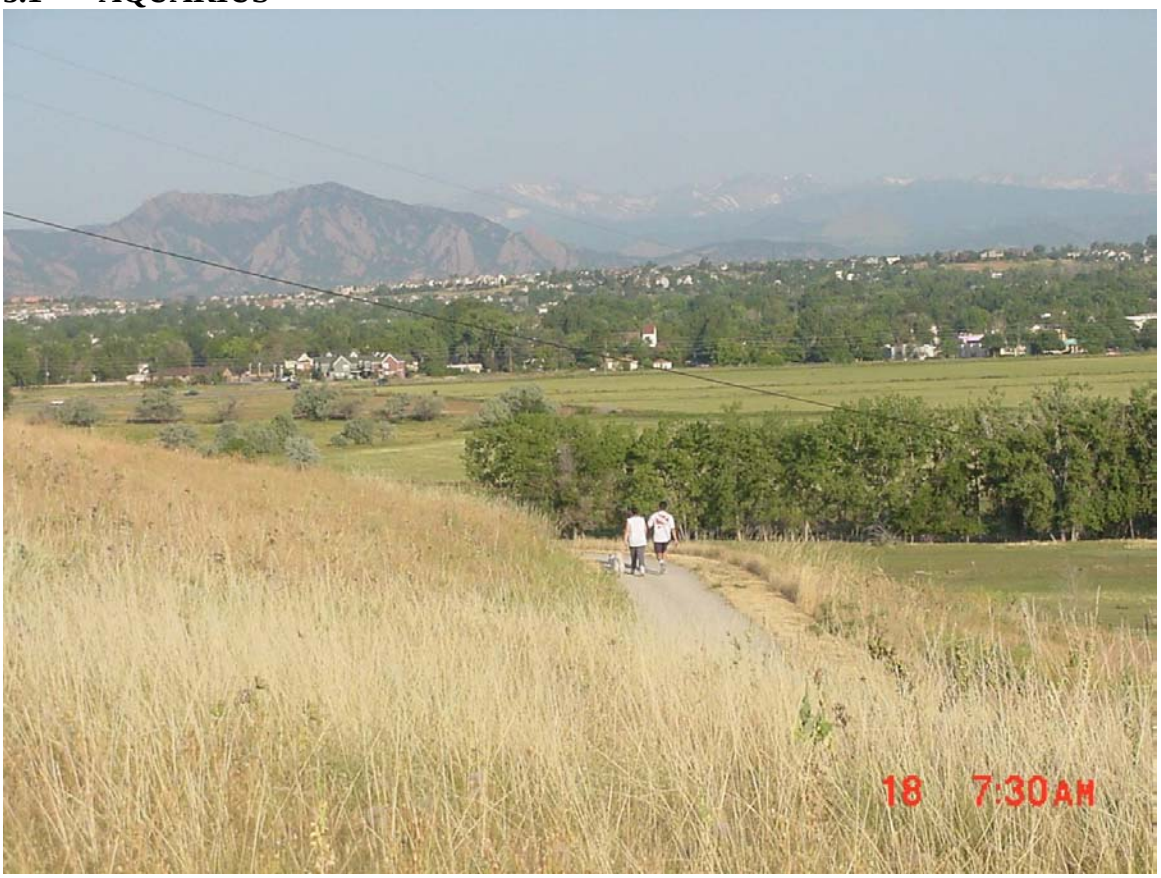
5.1 AQUARIUS



5.1 AQUARIUS

Long Range Goal – The Aquarius property is classified by 2 categories: Preserve and Visitor. Long term management will be focused to enhance the native plant community and to provide a high quality trail experience for Coal Creek trail users.

5.1.1 Acquisition History

The Aquarius property was purchased in September of 1982 from the Aquarius Development Company for $300,000. It was initially platted for development but was sold to the City of Louisville specifically for "green belt". The purchase agreement included secondary uses, specifically allowing for developed visitor use or cemetery expansion.

5.1.2 Location and Access

The Aquarius property is located south of Empire Road and north of Hwy 42. It borders the Coal Creek and Louisville Cemeteries to the southeast. Access to the property is from the developed parking lot on the north side of Hwy 42.

5.1.3 Adjacent Land Use and Ownership

The surrounding land uses and ownerships of the Aquarius Property are:

North: The Adler-Fingru Open Space is owned by Boulder County, Louisville and Lafayette and lies to the north. It is primarily managed for agricultural preservation although part of the Coal Creek trail runs through it.

South: The Colorado Tech Center lies to the south and it is zoned in the planned community zoning district.

East: The outer eastern bordering land is the Adler-Fingru Open Space, described above. The inner eastern bordering lands are the Coal Creek and Louisville Cemeteries.

West: The Mayhoffer Farm lies to the west of the Aquarius Property.

5.1.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

Other than the current Coal Creek/Rock Creek Trail Intergovernmental Agreement to designate this property as part of the trail system, there are no present encumbrances or obligations to impact the management of this land.

5.1.5 Vegetative Resources

5.1.5.1 Vegetative Communities

This interesting parcel is like a small version Davidson Mesa or Warembourg—native grassland along the north-facing slope and pasture on the level upland. Precisely because of its small size, the opportunities for significant wildlife use are less than with the larger parcels.

Its limited size notwithstanding, the proximity to Coal Creek enhances its potential for use by mule deer and avian and mammalian predators if diversity of plant cover types is maintained.

Native grasslands of two types are found on the Aquarius parcel, both of which represent the mid-grass prairies of the Great Plains. The first is representative of eastern high plains needle-and-thread grasslands that are listed by CONHI (1996) as rare and imperiled. Along with needle-and-thread are found blue grama, buffalograss, western wheatgrass, Sandberg bluegrass, Junegrass, threadleaf sedge, as well as the forbs spotted gayfeather, scarlet globemallow, common sunflower, wild buckwheat, white prairie aster, brickellia, ironplant goldenweed, wild tarragon, and puccoon. Prominent cacti present include big-root pricklypear and hen-and-chickens. Introduced grasses that have invaded include cheatgrass, Japanese brome, and feral rye.

The second grassland type is characteristic of the lower slopes and finer-textured soils and is dominated by western wheatgrass. Other species present include blue grama, sideoats grama, and Agassiz bluegrass. .

Current goals include preserving the strip of native grassland along the north-facing slope.

5.1.5.2 Rare and Imperiled Plants

This property supports plains needle-and-thread grass, a cool season plant that has been labeled as "imperiled" by the Colorado Natural Heritage Program.

5.1.5.3 Exotic Species and Noxious Weeds

Invasive species that are present on the Aquarius property include but are not limited to diffuse knapweed (*Acosta diffusa*), Scotch thistle (*Onopordum acanthium*), and chicory (*Cichorium intybus*).

5.1.6 Wildlife Resources

5.1.6.1 Mammals

The native grassland area is likely to support native mice and rabbits. Similarly, coyotes and red foxes may pass through the area while searching for prey across a larger area.

5.1.6.2 Birds

Native songbirds that frequent this area are the western meadowlark, vesper sparrow, and lark sparrow. A small raptor, the American kestrel, may be seen hunting along the north-facing slope. Larger species such as the Swainson's hawk, red-tailed hawk, and great horned owl are likely to hunt across the site occasionally, although the potential for prey is limited.

5.1.7 Cultural Resources

Cultural resources remaining on this property have not been researched or catalogued. Evidence of past ranching activity may exist.

5.1.8 Agricultural Resources

5.1.8.1 Water Rights

Since this property was never irrigated, no water rights were retained with the purchase of this property.

5.1.8.2 Soil Resources and Production Potential

The complexes of soils supporting this property are Nunn Clay Loam and the Ascalon-Otero complex. The topographical variation of this property restricted its agricultural potential to domestic livestock grazing. All ranching activities ceased to exist after the Aquarius property was platted for potential development.

5.1.8.3 Agricultural Infrastructure

There is no lingering evidence of recent agricultural use for this property.

5.1.9 Management Direction

5.1.9.1 Black-Tailed Prairie Dog

Under the Boulder County Prairie Dog Management Plan habitat guidelines, the Aquarius property is classified as a Multiple Objective Area. Management will become necessary when prairie dog numbers fall out of balance with the carrying capacity of the limited grassland.

5.1.9.2 Noxious Weeds

The Aquarius property will be mapped for presence of noxious weeds to enable more effective containment and control. Weed management activities shall include an integration of appropriate tools such as mechanical, biological, herbicidal, and cultural controls, depending upon the biology of the invading species. All herbicide applications will be in accordance to State and Federal laws governing pesticide applications.

5.1.9.3 Agricultural Resources

Since the Aquarius property lacks the proper infrastructure (fencing, water resources, etc.) or acreage for feasible agricultural program, it has been assigned a very low priority for agriculture.

5.1.9.4 Ecosystem Restoration and Enhancement

Disturbed areas will be reclaimed with native species that would normally be adapted to the site. Since it is a predominantly native site, there are no plans to disrupt what presently exists, but to enhance the grassland resource through various inputs such as prescriptive fire, grazing, herbicides, etc..

5.1.9.5 Visitor Access and Recreation

The Aquarius property offers trail head parking, a picnic shelter and access to the Coal Creek Trail from the developed lot north of Hwy 42, west of the Louisville Cemetery. Casual parking along Empire Road right-of-way was prohibited in 2003 for safety reasons.

The bulk of the Aquarius native grassland remnants are to be managed as per the constraints provided under the "Open Space – Preserve" management category. Given the limited presence of native remnant vegetation in the Open Space system, the need to preserve this small representation of the vast high plains grasslands in an urbanized matrix is sufficient justification for this classification and management direction. Although an existing trail (trail corridor classified as "visitor") divides the western wheatgrass and skirts the needle-and-thread portions, thus comprising direct fragmentation and limiting what might be regarded as buffer, the area still represents a very limited resource. The constraint on visitation inherent in this category is perhaps actually enhanced by the presence of the trail in that the well–maintained and wide pedestrian surface attracts the bulk of visitors - leaving the adjacent natural grassland mostly untraveled.

5.1.9.6 Education and Outreach

Numerous opportunities exist for interpreting the resources and views of the Aquarius property. The picnic shelter provides a shaded view to interpret the Boulder Valley watershed. Plans are underway to construct a kiosk near the picnic shelter to post regulations and interpretive material.

5.1.9.7 Emergency Services

5.1.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations.

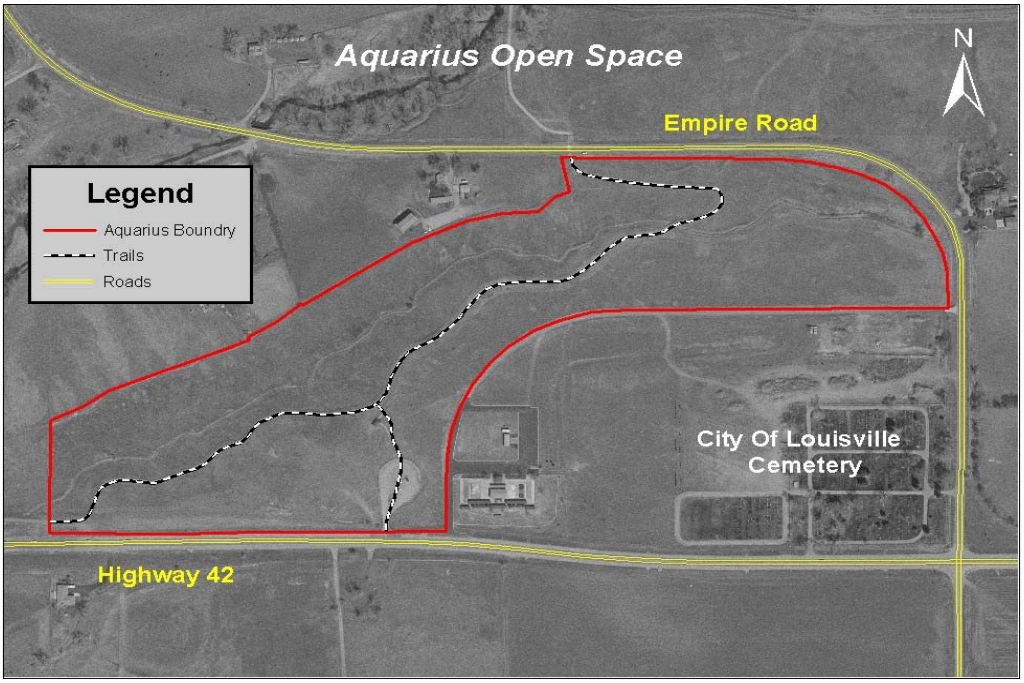
5.1.9.7.2 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

5.1.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Prairie Dog Survey----------Annual----------Staff/volunteer
Weed monitoring----------Annual/ongoing---Staff/contractor
Weed inventory----------Every 3 yrs.--------Staff/contractor
Grassland evaluation--------Every 3 yrs.--------Staff/contractor



5.2 Colorado Technical Center (CTC)

5.2 CTC

Long Range Goal – This parcel is divided into three separate classifications: Preserve, Protect and Visitor. Long term management for the CTC open space will primarily focus on wildlife habitat improvements. A future trail connection may be considered to connect the Colorado Tech Center to the Coal Creek trail system.

5.2.1 Acquisition History

The Colorado Tech Center Filing 1, purchased for $54,000 is comprised of 14.58 acres.

5.2.2 Location and Access

The CTC property is located to the north and west of the Colorado Tech Center. It borders State Highway 42 on the north, just east of the major curve in the highway.

5.2.3 Adjacent Land Use and Ownership

North: The Mayhoffer farm is located on the north side of the CTC open space, directly north of Highway 42. It continues to be managed for its agricultural value.

South: Light Industrial, Colorado Tech Center
East: Light Industrial, Colorado Tech Center
West: Private residences

5.2.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

A highway right-of-way exists through the CTC property for the placement of the 96th Street/Highway 42 Connector to be constructed in 2004. The City of Louisville agreed to construct a trail from the CTC development to the Coal Creek Trail in an effort to support and encourage cycling to work for CTC employees.

5.2.5 Vegetative Resources

5.2.5.1 Vegetative Communities

The outcrop of upper Fox Hills/lower Laramie sandstones in this area has a significant complement of native species remaining as well as an occurrence of the "turtleback" pattern of polygonal sandstone jointing. This jointing pattern is very similar (although much smaller in extent) to what has been well documented and highly valued at White Rocks, along Boulder Creek, north and east of Boulder.

Numerous shrubs occur along the slope leading to Coal Creek. These include rubber rabbitbrush (*Chrysothamnus nauseosus*), skunkbrush (*Rhus trilobata*), and wild rose (*Rosa* spp.)

5.2.5.2 Rare and Imperiled Plants

There were no notable species listed on the resource inventory conducted by ESCO Associates in 2001.

5.2.5.3 Exotic Species and Noxious Weeds

Numerous exotic species occur in this area, including but not limited to: diffuse knapweed (*Acosta diffusa*), Russian-olive (*Elaeagnus angustifolia*), Canada thistle (*Breea arvense*), chicory (*Cichorum intybus*), sulphur cinquefoil (*Potentilla recta*), bouncing Bette (*Saponaria officinalis*), Scotch thistle (*Onopordum acanthium*), and other escaped ornamental weedy species.

5.2.6 Wildlife Resources

5.2.6.1 Mammals

The suggested management of the CTC parcels parallels that for Coal Creek riparian in general. These parcels include sufficient land adjacent to the creek that the previously mentioned wildlife habitat enhancements are included.

5.2.6.2 Birds

The CTC property offers numerous riparian nesting areas for many species of birds. Dead trees in the riparian areas will not be removed, as they offer habitat benefits such as perch and hunting platforms, as well as cavities for nesting birds and insect stores for insectivorous birds.

5.2.7 Cultural Resources

As a result of a recent inventory (2002), two artifacts of Native American origin were identified. However, these finds are not significant enough to recommend the site as eligible for the National Register of Historic Places. Although previous collections and the present testing program confirmed Native American presence in the Coal Creek stretch through Louisville, only one surface artifact and one subsurface artifact were identified, and these remains do not appear to be significant. The accompanying chart indicates that numerous artifacts were discovered in 1981. It appears that a majority of the artifacts may have come from on top of the slope south of Coal Creek, which is now heavily disturbed.

Year	Activity	Result	Recommendation	Reference
1981	Original Site Recording	Identification of 77 Artifacts, 1 bison skull	Needs Data	Chambellan 1981
1990	Reevaluation For Lafayette Bypass Survey	No Artifacts observed	Needs Data. Test for Ground Disturbance	Crum 1990
1995	Inventory for Southern Water Supply Pipeline	5 test pits. No artifacts observed.	North of Highway 42: ineligible. Remainder: unevaluated	Grestle and Reiter 1995
2000	Inventory for 96th St connection	No Artifacts Observed	Test terrace deposits south of Coal Creek. Needs Data.	Barclay 2000
2002	Evaluation of 5BL239 in Proposed Right-of-Way	One surface flake located, site slightly enlarged. 18 auger probes, one artifact found.	Entire Site Recommended Not Eligible.	Broadhead 2002

(Source: RMC, Martorano)

5.2.8 Agricultural Resources

The topographic nature of this property precludes it from most practical agricultural operations. Having Coal Creek bisecting part of this property, it can be assumed that past livestock grazing probably occurred on this property.

5.2.8.1 Water Rights

Since this property was never irrigated no water rights were transferred with the dedication of this property.

5.2.8.2 Soil Resources and Production Potential

Much of this property possesses steep slopes, moving into the Coal Creek Riparian. The soils do not fall into any category that suggests it is significant agricultural land.

5.2.8.3 Agricultural Infrastructure

There is no lingering evidence of recent agricultural use for this property.

5.2.9 Management Direction

5.2.9.1 Black-Tailed Prairie Dog

Prairie dogs do not currently exist on the property. Due to mostly steep slopes, this habitat would be unlikely to benefit a prairie dog colony. However, according to the Prairie Dog Management Plan, the CTC property would be classified as a Multiple Objective Area.

5.2.9.2 Noxious Weeds

The CTC property will be mapped for presence of noxious weeds to enable more effective containment and control. Weed management activities shall include an integration of appropriate tools such as mechanical, biological, herbicidal, and cultural controls, depending upon the biology of the invading species and site being occupied. All herbicide applications will be in accordance to State and Federal laws governing pesticide applications.

Weed management within the riparian community on the Property should be consistent with an overall effort along the Coal Creek corridor, including the control of Canada thistle and removal of Russian-olive trees. Russian-olive, an invasive, non-native tree species, is capable of displacing many native trees and shrubs over time.

5.2.9.3 Agricultural Resources

There is no lingering evidence of recent agricultural use for this property.

5.2.9.4 Ecosystem Restoration and Enhancement

Disturbed areas will be reclaimed with native species that would normally be adapted to the site. Of particular interest is the construction of the 96th Street By-pass, which will impact this property. Any reclamation on this site will use native species. It is possible that flat areas of this property may serve as stock pile areas for road base or top soil. The Land Management staff will collaborate with construction engineers to encourage stock pile areas where non-native pasture grasses dominate.

5.2.9.5 Visitor Access and Recreation

The small sandstone outcrop and native grassland here should be preserved along with its context (i.e. the adjacent riparian ecosystems of Coal Creek). This property is classified for management under the provisions of Open Space-Protect, Preserve and Visitor.

A trail connection between CTC and Coal Creek Trail as part of the 96th Street/Highway 42 Connector is the preferred alignment**.**

5.2.9.6 Education and Outreach

While the Coal Creek riparian area offers numerous educational opportunities, it may be unlikely that this particular property would offer as much as other areas. There are no parking lots that are in close proximity to enable educators to capitalize on the natural features located in this riparian area.

5.2.9.7 Emergency Services

5.2.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations.

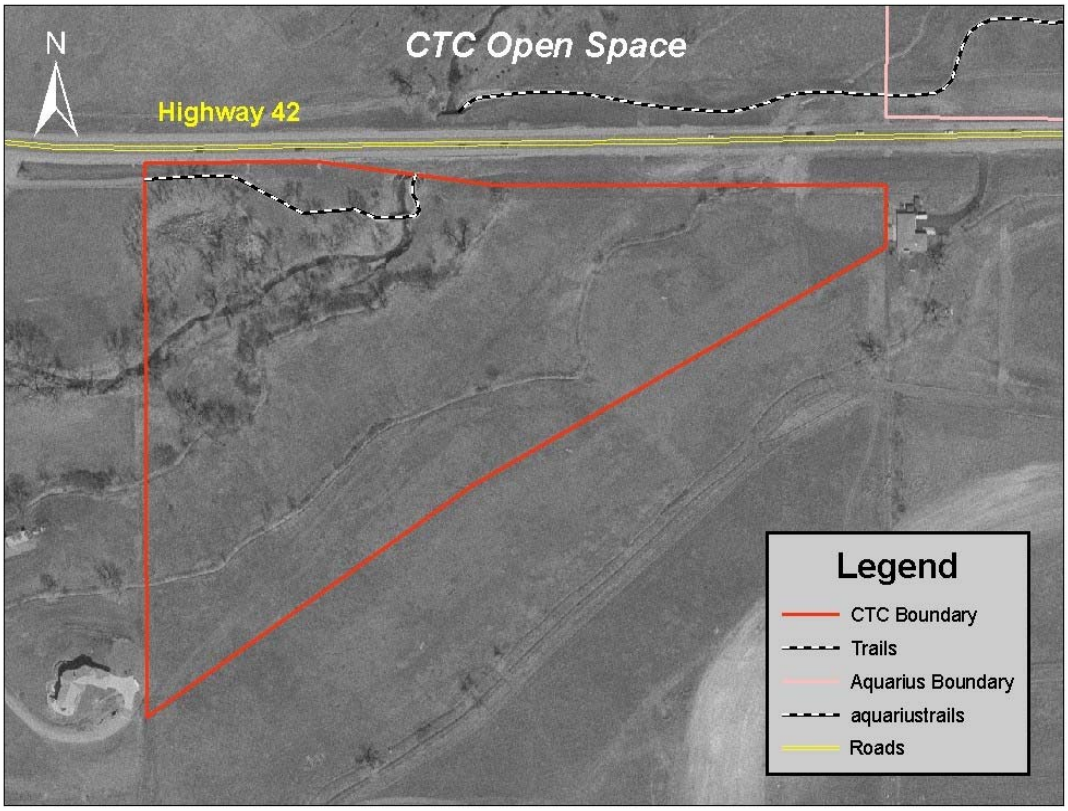
5.2.9.7.2 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

5.2.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Prairie Dog Survey----------Annual----------Staff/volunteer
Weed monitoring ----------Annual/ongoing----Staff/contractor
Weed inventory----------Every 3 yrs.--------Staff/contractor
Grassland/riparian eval.------Every 3 yrs.--------Staff/contractor



5.3 DAUGHENBAUGH

5.3 DAUGHENBAUGH

Long Term Goal – The Daughenbaugh parcel is classified as a Visitor property. Management objectives include maintaining the black-tailed prairie dog colony.

5.3.1 Acquisition History

The 20 acre Daughenbaugh property was purchased in 1997 for $575,000. This property will be preserved and will accommodate more passive recreational activities such as walking, and nature study.

5.3.2 Location and Access

The site is located off Cherry and Bella Vista.

5.3.3 Adjacent Land Use and Ownership

The Daughenbaugh parcel borders Warembourg open space and both properties are surrounded by housing developments that were created in the1970's and 1980's. The Daughenbaugh property lies east of Heritage Park.. The main public access is from Cherry Street, next to the small historical barn, which is actually a Warembourg property access point.

5.3.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

There are currently no known legal obligations

5.3.5 Vegetative Resources

5.3.5.1 Vegetative Communities

This parcel consists of an expanse of pasture largely surrounded by development. Smooth brome (*Bromopsis inermis*) is an introduced pasture species that has carried over after the abandonment of the former irrigated pastureland use. With the lack of irrigation, this grass species will be less dominant and eventually, without supplemental watering, will need to be replaced with native species that will better suit the goals of improving wildlife habitat.

5.3.5.2 Rare and Imperiled Plants

There are no known rare plant species occurrences on this property.

5.3.5.3 Exotic Species and Noxious Weeds

Numerous exotic species occur in this area, including but not limited to: diffuse knapweed (*Acosta diffusa*), Russian-olive (*Elaeagnus angustifolia*), Canada thistle (*Breea arvense*), field bindweed (*Convolvulus arvensis*), chicory (*Cichorum intybus*), sulphur cinquefoil (*Potentilla recta*), bouncing Bette (*Saponaria officinalis*), Scotch thistle (*Onopordum acanthium*), and other weedy species.

5.3.6 Wildlife Resources

5.3.6.1 Mammals

Prairie dogs are abundant on this land Coyote and red foxes are known to frequent these areas.

5.3.6.2 Birds

Species observed include the American kestrel, mourning dove, western meadowlark, black-billed magpie, American crow, American robin, common grackle, Brewer's blackbird, and house finch—all common in suburban landscapes.

5.3.7 Cultural Resources

A cultural resource inventory was not created for this property. Remnants from historical agriculture may exist.

5.3.8 Agricultural Resources

5.3.8.1 Water Rights

This property was historically irrigated for agricultural crops, but no water rights remain for irrigation purposes.

5.3.8.2 Soil Resources and Production Potential

Ascalon sandy loam is the prevailing soil for the Daughenbaugh parcel. It offers moderately high agricultural productivity when farmed.

5.3.8.3 Agricultural Infrastructure

The irrigation ditches have not been in working order for many years. Their conveyance system was probably interrupted by local residential development.

5.3.9 Management Direction

The Daughenbaugh parcel is classified as Open Space – Visitor Land under the City of Louisville Open Space Management Plan. This classification denotes a property generally characterized by low relative ecological significance, relatively high levels of habitat fragmentation, and provides for passive recreation. Currently, this parcel provides for wildlife habitat and passive recreation opportunities through a recreation trail running north/south along the eastern boundary of the property into the Warembourg parcel to the north.

Recreation consists of pedestrian traffic along the established trail running north/south on the eastern side of the parcel. Wildlife habitat largely consists of non-native grassland with an irrigation ditch providing an intermittent riparian corridor across the western edge of the property and several large cottonwood trees providing habitat for a variety of birds and small mammals. In addition to occasional coyotes, fox, raccoons, skunks, and other small mammals, the property contains a colony of black-tailed prairie dogs. This property is classified as a multiple objective area for prairie dog management.

5.3.9.1 Black-Tailed Prairie Dog

5.3.9.1.1 Current Parcel Status

Prairie dogs occupy a large portion of the center and eastern edge of the Daughenbaugh parcel with at least some movement of these animals occurring between the Open Space property and the adjacent private property to the east.

5.3.9.1.2 Habitat Suitability

Although the vegetation on the property is not highly suitable for unmanaged, long-term occupancy of these prairie dogs (Appendix A), they have existed on the property for a number of years. With proper population management to keep the population from severely degrading the site, the colony may serve as a valuable, long-term watchable wildlife resource for Louisville residents. The Daughenbaugh parcel itself has relatively low ecological significance (very few associated wildlife species).

However, the shorter stature vegetation (associated with the prairie dog population) through its juxtaposition to the taller grasses found on the Warembourg parcel likely enhances the area's wildlife diversity.

5.3.9.1.3 Barriers

Natural vegetative barriers should be maintained along the eastern edge of the Daughenbaugh parcel. Vegetation along the primary trail running north out of the Daughenbaugh parcel into the Warembourg parcel should not be mowed unless it becomes necessary for weed management goals. By allowing vegetation to grow naturally and remain throughout the year, a natural visual barrier can be developed between the Daughenbaugh parcel, the Warembourg parcel, and the adjacent private property. This visual barrier may help discourage prairie dogs from dispersing away from the Daughenbaugh parcel and onto the Warembourg parcel and adjacent private agricultural property. In addition, allowing taller vegetation to remain throughout the year may also help to increase the available wildlife habitat.

5.3.9.1.4 Population Management

Because the Daughenbaugh parcel is a small and isolated parcel of land within an urban environment, natural predation is unlikely to regulate prairie dog numbers. Likewise, habitat fragmentation, urbanization, and incompatible land use around the Daughenbaugh parcel precludes prairie dogs from successfully expanding outward as numbers increase beyond vegetative and social carrying capacities. As a result, the population will likely expand beyond an ecologically balanced density and will require active management.

- Recommended Population Parameters

To ensure a maximum level of animal health, conservation of vegetative and soil resources, public health and safety, and minimal tendency to disperse, prairie dogs on the Daughenbaugh parcel should be maintained within a 10-acre area in the core of the property and as close to a density of 10 adult prairie dogs per acre (evenly distributed) as possible. This density and overall population size of 100 animals (as of September/October of each year) should ensure adequate genetic diversity and enough numbers to sufficiently withstand the area's low-level year-round predation while still ensuring adequate forage, much reduced neighboring landowner conflicts, and minimal impacts to soil resources.

A prairie-dog free zone or "buffer" around the 10-acre area should be maintained at least 100 feet from the north and east property lines and at least 75 feet from the west and south property lines. This buffer will help minimize the likelihood that prairie dogs will breach vegetative barriers and encroach onto neighboring private properties. In the event that prairie dogs encroach into the buffer area, the animals should be removed.

- Annual Population Estimates

Annual population estimates will allow Open Space managers to evaluate the need for population control activities on a yearly basis. Estimates will be made by qualified wildlife biologists (internal or external to Louisville) experienced in urban prairie dog population surveys. Surveys should be conducted each fall (September/October). If population removal is necessary either to maintain the

buffer or to thin the core population, control activities should be conducted that same fall in order to reduce resource damage until the next growing season.

- Removal Activities

See Appendix A for acceptable removal activities except in cases where prairie dogs have established within the buffer area, relocation of these animals back to the core area is acceptable if:

a. The core population is less than 100 animals at the time of relocation; and
b. Abandoned pre-existing holes are available which are at least 50 yards away from the nearest coterie.

- Reclamation Considerations

Exotic and native weeds have largely replaced traditional short-grass prairie in most areas due to the long term presence of a high-density prairie dog colony on the Daughenbaugh parcel. Therefore, it may be desirable to reclaim these areas to native habitat.

5.3.9.2 Noxious Weeds

The main form of vegetation on this property seems to be predominately field bindweed (*Convolvulus arvensis*). This is a result from many years of high prairie dog densities. Since field bindweed is the main source for cover and there is no ability to establish more desirable vegetation, due to high prairie dog density (continuous grazing), the bindweed offers limited soil cover to minimize wind erosion. While this is not the most desirable ecological situation, in this circumstance the field bindweed is better than bare ground.

Due to the extreme disturbance on this property, staff must carefully monitor this property for new invaders and eradicate them as soon as they are identified. Weed management activities shall include an integration of appropriate tools such as mechanical, biological, herbicidal, and cultural controls, depending upon the biology of the invading species and site being occupied. All herbicide applications will be in accordance to State and Federal laws governing pesticide applications.

5.3.9.3 Agricultural Resources

The neighboring landowner leases their land for livestock grazing. It is important to work together to prevent prairie dog migration to their irrigated lands.

5.3.9.4 Ecosystem Restoration and Enhancement

Replace smooth brome with native mixed grass prairie species to improve habitat quality for songbirds, small mammals, and reptiles. A full restoration of this property is a strong possibility, although to invest the resources in such an undertaking while prairie dogs continue to dominate the site would be imprudent. Install raptor perches near the Daughenbaugh prairie dog town to encourage perching, and feeding sites for raptors.

5.3.9.5 Visitor Access and Recreation

Because the Daughenbaugh parcel is designated as a Multiple Objective Area and Open Space – Visitor Land, passive recreation opportunities will be maintained. To ensure the highest level of visitor satisfaction and wildlife conservation, recreational opportunities are permitted only along the Warembourg trail on the eastern edge of the parcel. Dogs and other pets must be kept on a leash. Public rest benches and /or wildlife interpretive stops along this trail for visitor recreation and education opportunities are encouraged. Interpretive signage would allow Louisville to provide accurate, scientific information concerning the prairie dog colony and/or other wildlife to help inform visitors about urban wildlife and its management, as well as the facts concerning human health and safety when living near prairie dogs.

5.3.9.6 Education and Outreach

Numerous opportunities exist for families to observe the prairie dogs and coyotes, foxes and hawks that hunt them. Signs may be erected to educate users of this open space about the significance of the prairie dog in the grassland ecosytem.

5.3.9.7 Emergency Services

5.3.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations. It will be necessary to monitor fishing and other recreational activities at the "Fishing is Fun" pond.

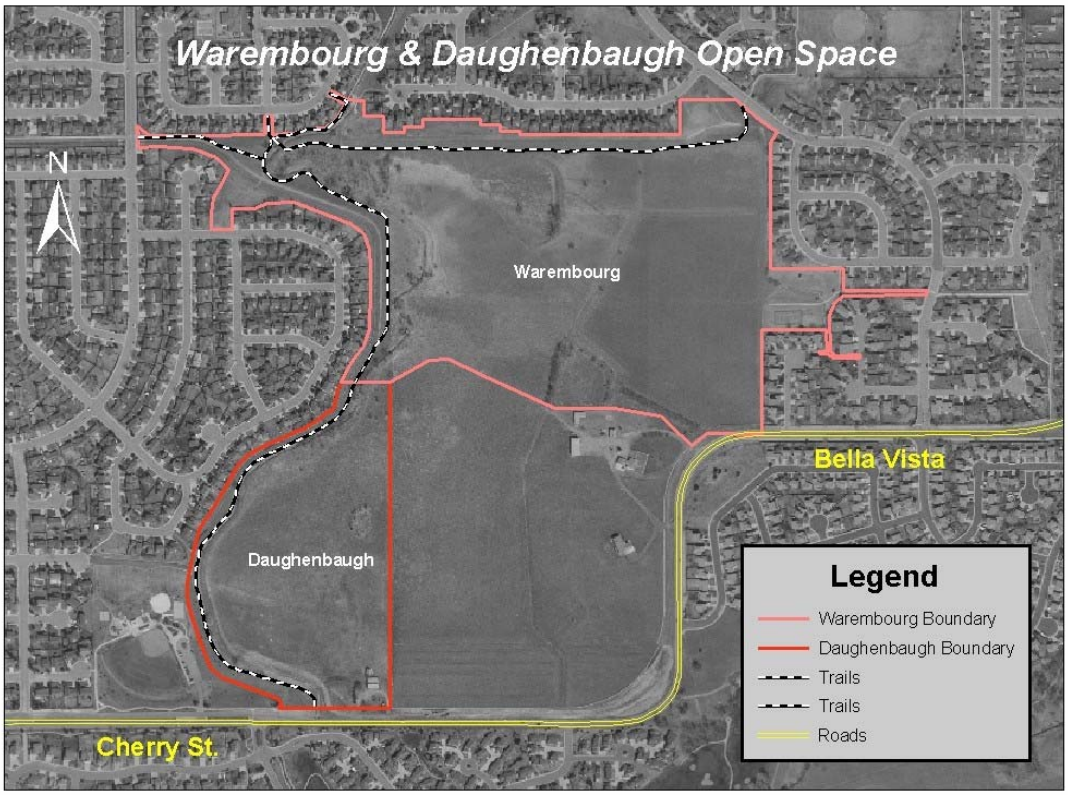
5.3.9.7.2 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

5.3.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Prairie Dog Survey----------Annual----------Staff/volunteer
Weed monitoring----------Annual----------Staff
Weed inventory----------Every 3 yrs.----------Staff/contractor
Grassland evaluation--------Every 3 yrs.----------Staff/contractor
Reclamation process--------Monthly during growing season----------Staff


Warembourg & Daughenbaugh Open Space
N
Warembourg
Daughenbaugh
Bella Vista
Cherry St.
Legend
Warembourg Boundary
Daughenbaugh Boundary
Trails
Trails
Roads

5.4 DAVIDSON MESA

5.4 DAVIDSON MESA

Long Term Goal: The Davidson Mesa Open Space is classified by 3 categories: Preserve, Protect and Visitor. Management will be directed to enhancing the mixed grass prairie resource and to implement a suitable loop trail for the enjoyment of Louisville residents.

5.4.1 Acquisition History

The Davidson Mesa Open Space, 246.14 acres, was purchased for $369,000.

5.4.2 Location and Access

The Davidson Mesa open space is bordered by the City of Boulder "Paragon Estates" on the north and west boundaries. A Louisville subdivision, "The Enclave" lies along a portion of the southeast side and McCaslin Blvd. borders a short frontage on the north east side. A parking lot and trail head exist at this location. Omeda and other private agricultural or light industrial entities border the southeastern boundary.

5.4.3 Adjacent Land Use and Ownership

See above.

5.4.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

A powerline easement through the property exists with Xcel Energy. No other easements, leases or obligations exist.

5.4.5 Vegetative Resources

5.4.5.1 Vegetative Communities

The Davidson Mesa tract varies from relatively recently planted areas with primarily domesticated grasses (in the southern portion) to intact native grassland with substantial diversity of native grasses, forbs, and subshrubs. Four plant communities are present in the Davidson Mesa parcel: 1) Native Grassland – Nearly Intact, 2) Native Grassland – Modified, 3) Intermediate Wheatgrass, and 4) Smooth Brome/Crested Wheatgrass.

The native grassland is located on the northwest-facing slopes above Davidson Ditch in the northern portion of the parcel. Native grass and grass-like species present include needle-and-thread, hairy grama, blue grama, Junegrass, sunsedge, Canada bluegrass, Agassiz bluegrass, little bluestem, big bluestem, and purple threeawn. Non-native grasses that have invaded include occasional individuals of Kentucky bluegrass, crested wheatgrass, Japanese brome, and cheatgrass. Native forbs present include Colorado greenthread, threadleaf groundsel, narrowleaf scurfpea, rigid sunflower, whiplash fleabane, winged buckwheat, fringed sage, wavyleaf thistle, hairy goldenaster, wild tarragon, spotted gayfeather, white prairieaster, purple prairieclover, locoweed, Porter aster, goldenrod, western ragweed, low sunflower, Short's milkvetch, scarlet paintbrush, bushy wildbuckwheat, bastard toadflax, plains coreopsis, Nuttall's evolvulus, false boneset, Louisiana sage, pussytoes, catchfly, and ground cherry. Non-native forbs present include occasional salsify and littlepod falseflax. Cacti present include bigroot pricklypear and hen-and-chickens. Prickly rose a native shrub is locally abundant, and the ubiquitous yucca is scattered in this area also.

Additional disturbance resulted from peripheral gravel mining operations where fill material from the development of Harper Lake was disposed. Big bluestem, little bluestem, sideoats grama, blue grama, buffalograss, junegrass, and western wheatgrass are all consistently present. Below the intact grassland remnant, slopes flatten and effects of agricultural modification predominate with varying mixtures of crested wheatgrass, Canada bluegrass, Kentucky bluegrass, white prairie aster, common mullein, and yucca. A short distance further downslope, the large Davidson ditch passes. Leakage from the ditch supports wetlands in the extreme northwest corner of the tract. Baltic rush, tall fescue, Canada thistle, and broadleaf cattail dominate these wetlands. In the drier portions of the area below the ditch, local plant dominance is held by prickly lettuce, wild licorice, Indian hemp, swamp pepperweed, prickly poppy, and horsetail.

The area mapped as intermediate wheatgrass is the result of a relatively recent effort(s) to revegetate areas disturbed by gravel mining as well as areas elevated by the disposal of spoil from the enlargement of Harper Reservoir. This unit is the most extensive on the Davidson Mesa parcel. Nearly all the measurable cover in this vegetation type is provided by intermediate wheatgrass (ESCO 2001). Yellow sweetclover, field bindweed, and Kentucky bluegrass are locally important parts of the vegetation cover in this type.

The areas mapped as smooth brome/crested wheatgrass are remnants of either past revegetation efforts or agricultural actions to establish pasture with these domestic forage species. Species diversity in this type, as in the preceding, is relatively low, with the occasional presence of opportunistic annual or biennial species.

5.4.5.2 Rare and Imperiled Plants

This property abundantly supports plains needle-and-thread grass, a cool season plant that has been labeled as “imperiled” by the Colorado Natural Heritage Program.

5.4.5.3 Exotic Species and Noxious Weeds

Exotic broadleaf weed species include diffuse knapweed, Dalmatian toadflax, field bindweed, and Scotch thistle. Both of the introduced winter annual species (cheatgrass and Japanese brome) that so extensively afflict disturbed western North American plant communities are present in abundance.

5.4.6 Wildlife Resources

5.4.6.1 Mammals

Historically, this area was likely important as a movement corridor for ungulates and other species. Today, the barrier of US 36 and adjacent development decrease this potential value. Nonetheless, the area of native grasses is an important remnant and large enough to support a variety of mammal species, including coyotes, prairie dogs and other grassland rodents. A wetland area along a ditch at the northern edge of this parcel adds to its ecological diversity and supports use by species such as coyotes, fox, raccoons, striped skunks, and likely a variety of small rodents. Drier areas along the west and southern portions of the parcel provide habitat for coyotes, prairie dogs and other grassland rodent species.

5.4.6.2 Birds

Songbirds reported in the Davidson Mesa grasslands included the Western Kingbird, Western Meadowlark, Loggerhead Shrike, Vesper Sparrow, Grasshopper Sparrow, Lark Sparrow, and the common Black-Billed Magpie. Along the wetland area, other bird species reported on the property include the Red-Winged Blackbird, Song Sparrow, and Common Yellowthroat. The Davidson Mesa property also provides habitat for a variety of birds of prey to include Red-Tailed Hawks, Swainson's Hawks, Ferruginous Hawks, Bald and Golden Eagles, American Kestrels, and occasionally Prairie Falcons.

5.4.7 Cultural Resources

A cultural resource inventory has not been conducted for the Mesa Open Space.

5.4.8 Agricultural Resources

5.4.8.1 Water Rights

Water rights were not acquired with this property.

5.4.8.2 Soil Resources and Production Potential

It is important to realize that the soils on this site were dramatically changed when the Harper Lake excavation tailings were spread over this site. The 1975 Boulder County Soil Survey (Moreland and Moreland 1975) indicates excavation tailings that were spread over the southern half of the Davidson Mesa consisted largely of clay and sandy loam soils (from Nunn and Valmont soil series). Predominant "native" soils across the southern portion of the Davidson Mesa Open Space is Valmont cobbly clay loam (VcC) with areas across the northern portion of the property classified as Terrace escarpments (Te) and Nunn clay loam (NcC). The overall soil structure of Davidson Mesa is high in cobble and stone. That is why there were two gravel pits historically located on the southwestern and northeastern portions of the Davidson Mesa. Specifically the Davidson Mesa soil classifications are:

- Open Space – Preserve Land include VcC and Te;
- Open Space – Protected Land include VcC and NuC; and
- Open Space – Visitor Land include VcC and small amounts of Te.

VcC soils are typically deep soils with high amounts of cobble and gravel. In VcC soils, the first 24 inches (A and B horizons) are approximately 50 percent cobble and gravel and the following 24 – 60 inches (C horizon) are approximately 70 percent cobble and gravel. Historic native vegetation on these soils consisted primarily of mid- and tall-grass species.

There are typically shallow soils with an extremely high amount of rock and gravel. Often, only a very limited amount of water is available to vegetation due to the shallow, extremely rocky nature of these soils. Historic native vegetation was typically mid- and tall- grass species with some shortgrass species possible.

NuC soils are typically deep soils often with low to moderate amounts of cobble or gravel. However, on Davidson Mesa, because this soil abuts Te soils, it may have scattered cobble and gravel on the surface and possibly in the A and B horizons. Historic native vegetation on these soils was typically short- and mid- grass species.

5.4.8.3 Agricultural Infrastructure

Other than the irrigation ditch that flows on the south side of the property, no obvious agricultural remnants exist on this property.

5.4.9 Management Direction

Because of its size, history, and use by Louisville and Boulder County residents, different areas of the Davidson Mesa Property are classified as:

- Open Space – Preserve Land (Preserve Land);
- Open Space – Protected Land (Protected Land); and
- Open Space – Visitor Land (Visitor Land).

Because of these multiple differing classifications, management of the Davidson Mesa is complex. Davidson Mesa provides for a variety of vegetative communities and wildlife habitat while at the same time providing for large numbers of passive recreationists each year. The Davidson Mesa is home to a variety of wildlife species including black-tailed prairie dogs and coyotes, as well as songbirds and assorted raptors that use the property year-round. Future management of the Davidson Mesa Open Space must balance native vegetation and wildlife conservation objectives with continued passive recreational opportunities.

Open Space – Preserve Land

Preserve Land is located in the east central portion of Davidson Mesa Open Space. It is a preserve due to the unique native vegetative community within this zone. This vegetation community is greatly influenced by the soil structure upon which the vegetation is found. Very little to no passive recreation is allowed in the Preserve Area.

Open Space – Protected Land

Protected Land is located on either side of the Preserve Land and runs from the northern property line to the south and west to the northwestern edge of the Davidson Mesa OpenSpace. This land is protected not only for its own ecological significance and/oruniqueness, but also for its ability to provide a valuable buffer around PreserveLands. Protected Lands can also provide passive recreation opportunities so long as those activities do not adversely impact the Protected Land or the adjacent Preserve Land.

Open Space – Visitor Land

Visitor Land is located along the southern edge of the eastern portion and the southern three-fourths of the western portion of Davidson Mesa. Visitor Land has a lower level of ecological significance than either Preserve Land or Protected Land, and provides for the majority of passive recreation opportunities on the parcel. Under this classification, recreation is managed so that it does not adversely impact wildlife and wildlife habitat.

5.4.9.1 Wildlife Management

5.4.9.1.1 Black-Tailed Prairie Dog

5.4.9.1.1.1 Current Parcel Status

Prairie dogs currently reside in the central, western, and south-central portions of the property. These sites include portions of areas classified as Preserve Land,

Protected Land, and Visitor Land. Prairie dog populations occur in these areas from both past relocation efforts and natural immigration from City of Boulder Open Space, which borders Davidson Mesa to the west. Currently, prairie dogs reside on native grassland areas as well as the introduced intermediate wheatgrass area on the southern half of the parcel.

Davidson Mesa is classified as a Multiple Objective Area for prairie dog management. However, because of soil structure attributes and vegetative characteristics, prairie dog management across Davidson Mesa will be "classification specific," i.e. prairie dogs will be managed differently in Preserve Land versus Protected Land versus Visitor Land.

5.4.9.1.1.2 Habitat Suitability

Open Space – Preserve Land

Although sparse prairie dog populations have, and may currently exist in this area, management practices within the Preserve Land should not encourage the conservation or promotion of continued prairie dog occupation. While the Preserve Land may be moderately suitable for prairie dogs vegetatively, soil structure precludes this area from being suitable for prairie dog conservation. Because soils are extremely rocky and hold little water for existing vegetation, continued high levels of herbivory by prairie dogs may stress the vegetation to the point of extreme degradation. This is especially true during, and after, periods of prolonged drought. These conditions currently exist in distinct patches of the native (labeled on the map as "Protect").

Open Space – Protected Land

While some of the vegetation present within the Protected Land is suitable for prairie dogs, soil structure and proximity to adjacent private properties precludes this area from being suitable for prairie dog conservation. However, because at least two prairie dog colonies currently exist in this area and are at least somewhat ecologically significant (some other wildlife species are associated with the colony), future management should be based on proximity to Preserve Land and likelihood of the population to persist over time. Therefore, prairie dog management within the Protected Land should be split between the eastern portion and the western portion of this zone.

Within the eastern portion of the Protected Land, management practices should not encourage the conservation or promotion of continued prairie dog occupation because of their potential impact to the Preserve Land. In addition, disturbance from the installation of artificial nest chambers during the prairie dog relocation efforts in the mid 1990's likely facilitated the establishment of common mullein and other non-palatable tall weeds. Overall, because of these tall weeds, excessively rocky soils, limited vegetation, and the stresses of recent drought, prairie dogs within this area appear to be doing poorly and many areas have been abandoned. Between the fall of 2000 and the summer of 2003, adult retention appears to have decreased as has overall reproduction and juvenile recruitment. Continued presence of prairie dogs in this zone may continue to decrease overall range condition and may facilitate the need for reclamation in the future.

The existing prairie dog population within the western portion of the Protected Land is on unsuitable soils, yet they do provide watchable wildlife opportunities for visitors to the Mesa. Therefore, management practices should be tolerant of existing and future natural prairie dog populations in this area, however, they should not encourage them. Prairie dogs are acceptable in this area barring any excessive damage to soil, vegetation, other wildlife resources, and/or neighboring landowner conflicts. Excessive damage can be defined as, but is not limited to, impoverished range condition, decreased wildlife diversity within the primary area occupied by prairie dogs, or any other affect on natural resources or ecological processes in the area deemed to be negative or undesirable.

Open Space – Visitor Land

Prairie dogs are primarily found within the western portion of the classified Visitor Land. Populations within this zone are due to natural immigration from City of Boulder Open Space that boarders to the west and two relocation efforts conducted in the summer of 2001. While soil structure on the western half of Davidson Mesa is suitable, vegetative composition is not. However, because of the potentially high ecological significance of prairie dogs within this zone, conservation of prairie dogs may be acceptable. In addition, the ESCO (2003) found that in areas previously occupied and currently occupied by prairie dogs, higher percentages of forbs, native perennial grasses, and introduced annual grasses exist in contrast to areas that were previously and currently unoccupied by prairie dogs. Increases in plant species diversity, increases in vegetative heterogeneity across this area, and the increased amount of "edge" that prairie dogs have created between occupied and unoccupied areas in this zone all serve to increase potential wildlife habitat value for the western portion of the Davidson Mesa.

5.4.9.1.1.3 Barriers

No new barriers are recommended at this time. It is highly recommended that the silt fence barrier from the 2001 relocations in the Visitor Land be removed. The silt fence barrier, however, should be maintained along the private property fenceline.

5.4.9.1.1.4 Population Management

Open Space – Preserve Land

Prairie dogs within this area should be completely removed in accordance with Appendix A. In addition to the removal of prairie dogs, any foreign material left from previous relocation efforts (i.e. PVC pipe, black Corex pipe, clear plastic hose, etc…) should be immediately removed. In the event that prairie dogs encroach into this area, the animals should be promptly removed.

Open Space – Protected Land

Prairie dogs within the eastern portion should be completely removed in accordance with Appendix A. In addition to the removal of prairie dogs, any foreign material left from the previous relocation efforts (i.e. PVC pipe, black Corex pipe, clear plastic hose, etc…) should be immediately removed. In the event that prairie dogs encroach into this area, the animals should be promptly removed.

Within the western portion, annual monitoring of prairie dogs is recommended to ensure the earliest identification of any excessive damage within prairie dog areas or emerging neighboring landowner conflicts. In the event that either condition is identified, excessive or damaging prairie dogs should be promptly removed as outlined in Appendix A.

- Recommended Population Parameters for Protected Land

To ensure the maximum level of animal health, conservation of vegetative and soil resources, public health and safety, and minimal tendency to disperse, prairie dogs on the western portion of Protected Land should be maintained at the numbers and current acreage and extent as of fall 2003. Population control should be employed to maintain a population as close to a density of 15 adult prairie dogs per acre (evenly distributed) as possible. This density and resulting population size should be large enough to sufficiently withstand the area's year-round predation while still ensuring adequate forage, minimal impacts to soil resources, habitat for other associated species, and minimal impacts to neighboring properties. Immigration of prairie dogs from the neighboring City of Boulder Open Space will likely ensure adequate genetic mixing and diversity for a healthy sustainable population.

- Annual Population Estimates for Protected Land

Annual population estimates will allow Open Space managers to evaluate the need for population control activities on a yearly basis. Estimates will be made by qualified wildlife biologists (internal or external to Louisville) experienced in urban prairie dog population surveys. Surveys should be conducted each fall (September/October). If population removal is necessary to thin the core population or remove dispersers, control activities should be conducted that same fall in order to reduce resource damage until the next growing season.

- Removal Activities for Protected Land

See Appendix B for acceptable removal activities.

Open Space – Visitor Land

Within the western half of the Visitor Land, management practices should allow existing natural prairie dog populations. Prairie dogs within this zone are desirable barring any excessive damage to soil, vegetation, other wildlife resources, and/or neighboring landowner conflicts. Excessive damage can be defined as, but is not limited to, decreased range condition, decreased wildlife diversity within the primary area occupied by prairie dogs, or any other effect on natural resources or ecological processes in the area deemed to be negative or undesirable. While management of this area should allow continued prairie dog presence, the relocation of additional prairie dogs should be prohibited. Current prairie dog numbers within this zone are at acceptable levels to ensure adequate room for future expansion and movement of the animals across the landscape while at the same time providing for a highly desirable mosaic of tall grass and short grass vegetative communities.

- Recommended Population Parameters for Visitor Land

To ensure the maximum level of animal health, conservation of vegetative and soil resources, public health and safety, and minimal tendency to disperse, prairie dogs on the Visitor Land of the Davidson Mesa should be maintained within a 30-acre area in the core of the 2001 relocation area and as close to a density of 15 adult prairie dogs per acre (evenly distributed) as possible. This density and overall population size of 450 animals (as of September/October of each year) should ensure enough numbers to sufficiently withstand the area's year-round predation while still ensuring adequate forage, minimal impacts to soil resources, and habitat for other associated species. Immigration of prairie dogs from the neighboring City of Boulder Open Space will likely ensure adequate genetic mixing and diversity for a healthy sustaining population.

- Annual Population Estimates for Visitor Land

Annual population estimates will allow Open Space managers to evaluate the need for population control activities on a yearly basis. Estimates will be made by qualified wildlife biologists (internal or external to Louisville) experienced in urban prairie dog population surveys. Surveys should be conducted each fall (September/October). If population removal is necessary to thin the core population or remove dispersers, control activities should be conducted that same fall in order to reduce resource damage until the next growing season.

- Removal Activities for Protected Land

See Appendix B for acceptable removal activities.

5.4.9.1.2 Other Wildlife

Wildlife species such as songbirds, hawks, eagles, coyotes, and others found on the Davidson Mesa Property provide valuable watchable wildlife viewing opportunities for area visitors. Management activities within all classification areas should work to increase viewing opportunities and valuable habitat for wildlife. To that end, several habitat improvement structures may help increase these resources for area visitors.

- Predator Cover Areas

As an aid in prairie dog population management and to increase visitor viewing opportunities on predators such as coyotes, Predator Cover Areas (PCAs) may be beneficial. Coyotes are present throughout the year on the Davidson Mesa and can be seen actively hunting prairie dog colonies throughout the day. Coyotes are often most successful at capturing prairie dogs when prairie dogs are in close proximity to tall grass, shrubs, or other "cover" areas that offer them the ability to hide in ambush. By creating several PCAs within and adjacent to prairie dog areas, it may be possible to increase the opportunity for coyotes to successfully capture prairie dogs and for visitors to view coyotes at these locations. Visually pleasing and effective PCAs may be constructed from large tree stumps and roots. Brush piles constructed of large woody material may also be effective and visually pleasing if constructed properly.

- Raptor Perches

Increased raptor use on the property may also help control prairie dog numbers and density, as well as increasing wildlife viewing opportunities. Through the introduction of properly designed and placed raptor perches, it may be possible to increase raptor use and natural predation on prairie dogs by allowing raptors to hunt these animals more efficiently and successfully, especially during nesting seasons and in winter. Raptor perches, however, should not necessarily consist of raptor "poles." Raptors that are adapted to, and successful at, capturing prairie dogs often hunt these rodents from the ground or from low lying perches only a few feet off the ground. Traditional raptor "poles," while offering resting and roosting areas for raptors, often extend 10+ feet in height and often do not provide raptors with suitable hunting platforms. Therefore, in an effort to provide both viewing opportunities for visitors and effective hunting platforms for raptors, raptor perches should be no more than six feet in height. PCAs constructed with a vertical component can provide for both terrestrial and avian predator use and eliminate the need for separate resources for raptors and coyotes.

- Small Animal Brush Piles

PCAs constructed with a vertical AND subnivean component can provide for terrestrial and avian predator use as well as provide valuable habitat resources for a variety of wildlife species. Used alone, or in conjunction with a PCA and/or raptor perch, Small Animal Brush Piles (BPs) can provide resting and hiding cover for small mammals such as raccoons, skunks, rabbits, weasels, and various rodents as well as provide nesting and foraging habitat for a variety of birds such as house wrens, warblers, and sparrows. BPs can be constructed of small woody debris collected from City clean up activities and/or power line maintenance projects.

5.4.9.2 Noxious Weeds

While many weed infestations have undergone herbicide applications over the past few years, it is very important to have a detailed inventory of noxious weeds for a property of this size. Diffuse knapweed and Dalmatian toadflax pose the greatest threats to the survival of the remnant mixed grass prairie on this site. Weed management activities shall include an integration of appropriate tools such as mechanical, biological, herbicidal, and cultural controls, depending upon the biology of the invading species and site being occupied. All herbicide applications will be in accordance to State and Federal laws governing pesticide applications.

5.4.9.3 Agricultural Resources

There is no lingering evidence of recent agricultural use for this property.

5.4.9.4 Ecosystem Restoration and Enhancement

Disturbed areas will be reclaimed with native species that would normally be adapted to the site. Future management may entail replacing the introduced grassland species with the native species found on other areas of the Mesa. While this would demand a lot of resources to reclaim this to a more natural state, it would improve the wildlife habitat considerably. Unrestricted vehicle access has plagued the Omeda boundary to this property. Land Management Staff is working to remedy this situation through land acquisition, leasing, and/or fencing solutions.

5.4.9.5 Visitor Access and Recreation

5.4.9.5.1 Loop Trail

In an effort to maximize recreational opportunities within the Visitor Land while providing for valuable wildlife habitat and wildlife viewing opportunities, a loop trail will be developed on the Davidson Mesa Property. This loop trail should generally follow along the outer boundary of the western half of the property and along the southern edge of the eastern half. By creating the loop trail in this manner, Open Space managers will be able to preserve and protect sensitive areas on the eastern half of the property while providing for wildlife-friendly, observation/viewing recreation opportunities on the western half.

When constructing the western portion of the loop trail, it may be advisable to build the trail along the western and northwestern edges of the property between the existing prairie dog colony and private property. By doing so, it may be possible to create a recreational disturbance that encourages prairie dogs to move away from adjacent private lands. Running the trail along the outer edge of the property also allows for the maximum distance possible for the trail system.

Users of this trail should be required to stay on the trail when utilizing the area. All pets must be kept on a leash while using the loop trail. Social trails crisscrossing the property will be closed and reclaimed. This will not only help to reduce resource damage on the Open Space but also provide for wildlife and wildlife habitat conservation and more wildlife viewing opportunities. High levels of recreation traffic through the interior of the property and through prairie dog colonies decrease the opportunity for wildlife to utilize these areas and decrease the opportunity for predators to forage. Refer to the following aerial photograph, delineating the recommended trail system for the Davidson Mesa.

5.4.9.5.2 Interpretive Signs and Rest Benches

To maximize visitor enjoyment and educational opportunities, interpretive signs or kiosks should be developed at the trailhead(s). These signs could inform visitors of the local geography of the region, area wildlife, and other valuable information concerning the conservation and management of the Davidson Mesa Open Space. Smaller, site specific interpretive signs or posts could be constructed along the loop trail to inform and educate visitors on locally specific points of interest (i.e. prairie dog overlook, the importance of a Predator Cover Area or Small Animal Brush Pile, etc…).

Along the loop trail, rest benches may also be valuable in providing stopping points for visitors who wish to rest along the trail or sit and enjoy wildlife viewing opportunities. Benches should be installed in several areas along the loop trail to ensure maximum enjoyment by visitors and to prevent crowding.

5.4.9.6 Education and Outreach

Many opportunities for nature study exist on the Mesa property. A parking lot exists on the northeast side of the property, where school groups can originate. Signs may be erected to educate the users of the open space about the significance of the prairie grassland ecosystem and the wildlife it supports including the prairie dog.

5.4.9.7 Emergency Services

5.4.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations. One problem that presently exists is dog owners who do not retain control of their dogs after exiting the "dog-off-leash" area. Past attempts at interpretive signage to explain the regulations has yielded limited success.

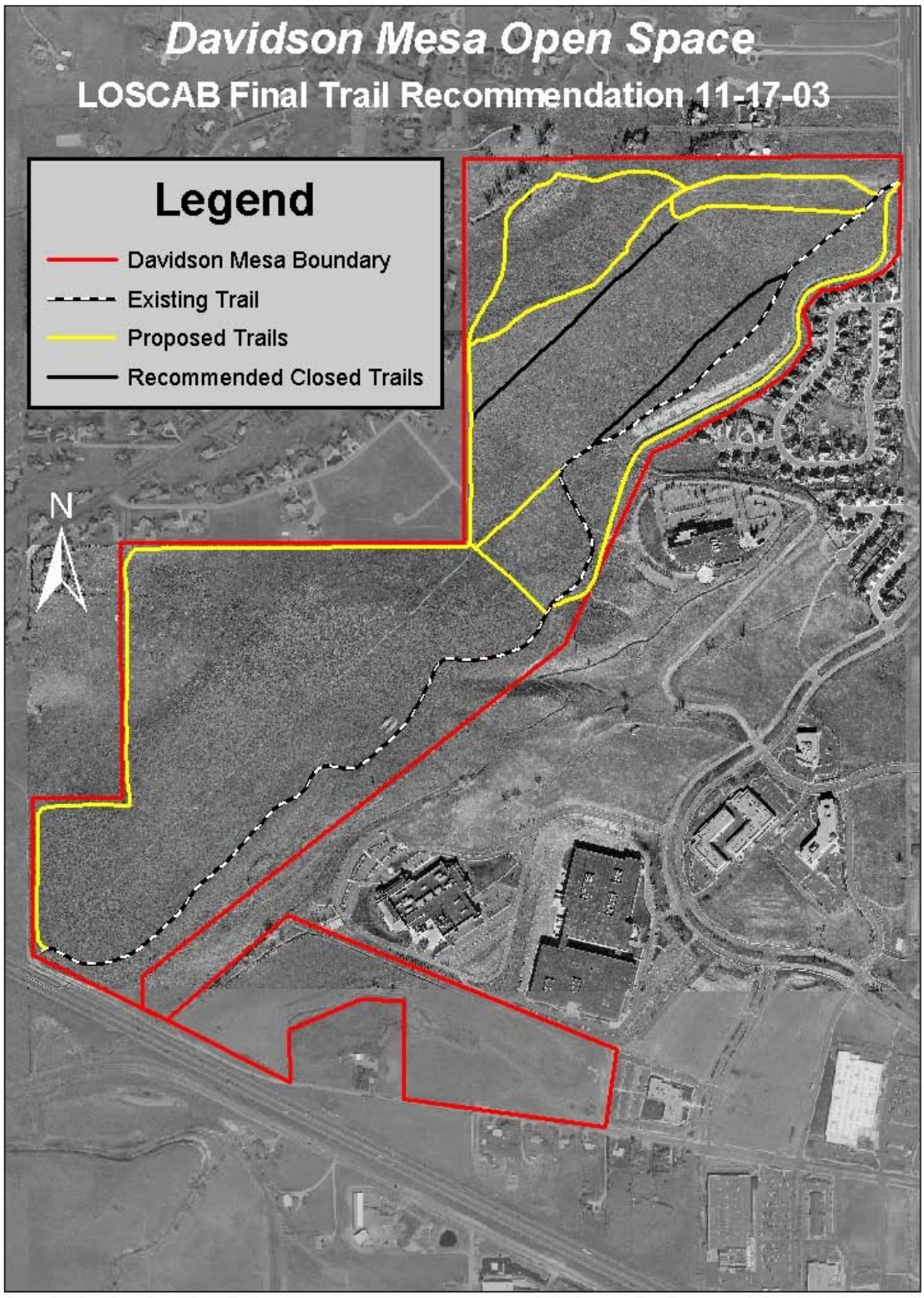
5.4.9.7.2 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

5.4.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Prairie Dog Survey----------Annual----------Contractor
Weed monitoring----------Annual----------Staff
Weed inventory----------Every 3 yrs.--------Staff/contractor
Weed Management----------Bi-annually, as needed---Staff/contractor
Grassland evaluation--------Every 3 yrs.--------Staff/contractor
Trail education rules and restoration compliance------Every 3 yrs.-------Staff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Legend
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Existing Trail
Proposed Trails
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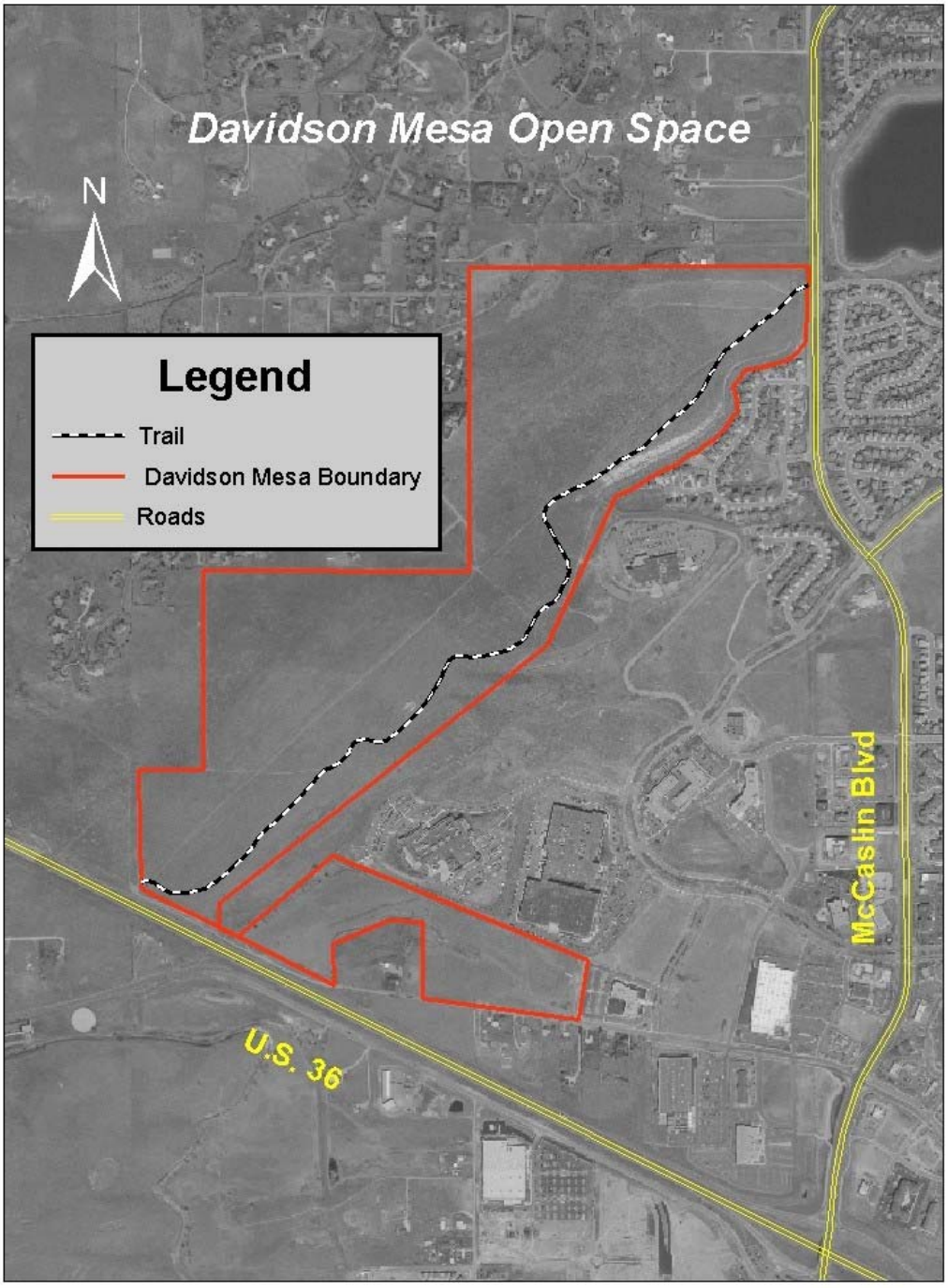
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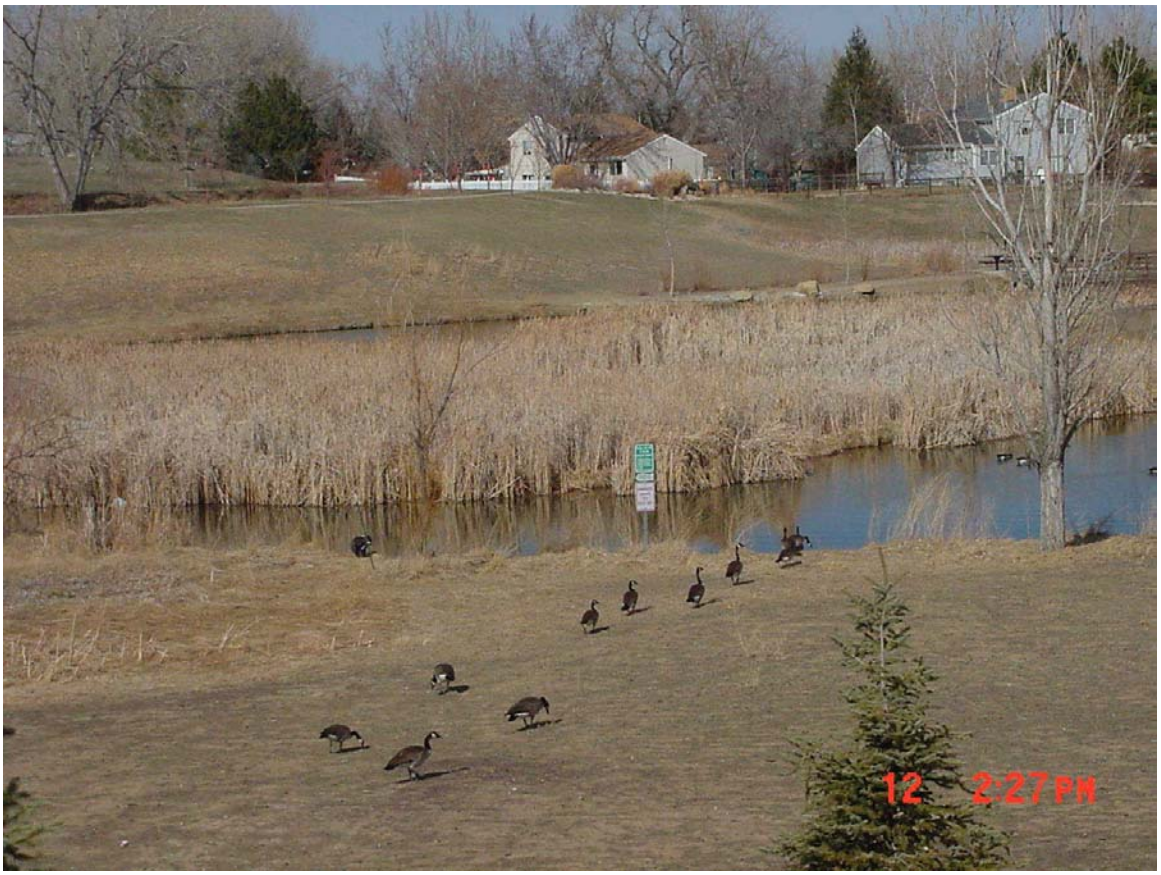


5.5 LAKE PARK

Long Term Goal: Lake Park is classified as "Visitor" since it serves the community more as an urban park than an open space parcel. The long range goal for Lake Park is to continue it's current management and explore future potential benefits of reclassifying it as a park.

5.5.1 Acquisition History

Lake Park, consisting of 17.15 acres was purchased for $66,000. This is a nature area. Lake intended for kids and handicapped with ADA-accessible dock. There is a connective trail to Cottonwood Park and Harper Lake. The Tamarisk Property (also known as Parcel R) comprises 49.5 acres, and purchased for $134,000.

5.5.2 Location and Access

Lake Park is a very accessible open space "park." It borders South Boulder Road from the north; Via Appia from the west; Lafayette Street cuts through a slender piece of it from the south; Griffith Street residents border this property from the east.

5.5.3 Adjacent Land Use and Ownership

Lake Park is surrounded by residential housing.

5.5.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

There are no known legally binding conditions for Lake Park.

5.5.5 Vegetative Resources

5.5.5.1 Vegetative Communities

Lake Park is considered to be more like an urban landscaped park than a native open space habitat. Most of it is Kentucky bluegrass (*Poa pratensis*) and cultivated tree varieties. It would be difficult to manage this area as a native landscape.

5.5.5.2 Rare and Imperiled Plant

There were no notable species listed on the resource inventory conducted by ESCO Associates in 2001.

5.5.5.3 Exotic Species and Noxious Weeds

Canada thistle is one of the more prominent weeds that plague this area. Weed management activities shall include an integration of appropriate tools such as mechanical, biological, herbicidal, and cultural controls, depending upon the biology of the invading species and site being occupied. All herbicide applications will be in accordance to State and Federal laws governing pesticide applications.

5.5.6 Wildlife Resources

5.5.6.1 Mammals

The Lake Park property is home to generalist mammal species such as raccoons, red foxes, and skunks. An occasional coyote may be seen.

5.5.6.2 Birds

Generalist songbirds commonly use the wetland area, as do non-migratory Canada geese.

5.5.7 Cultural Resources

5.5.8 Agricultural Resources

5.5.8.1 Water Rights

Since this property was never irrigated, no water rights were retained with the purchase of this property.

5.5.8.2 Soil Resources and Production Potential

The soils present on this site are Ascalon sandy loams.

5.5.8.3 Agricultural Infrastructure

There is no lingering evidence of recent agricultural use for this property.

5.5.9 Management Direction

5.5.9.1 Black-Tailed Prairie Dog

Given the strongly urbanized nature of Lake Park, it is unlikely for prairie dogs to colonize in this area. This property is classified no prairie dog for purposes of prairie dog management.

5.5.9.2 Noxious Weeds

Weed management activities shall include an integration of appropriate tools such as mechanical, biological, herbicidal, and cultural controls, depending upon the biology of the invading species and site being occupied. All herbicide applications will be in accordance to State and Federal laws governing pesticide applications.

5.5.9.3 Agricultural Resources

Past agricultural uses were abandoned when the City of Louisville acquired this parcel.

5.5.9.4 Ecosystem Restoration and Enhancement

It may become appropriate to improve the surrounding lake for waterfowl. The Kentucky bluegrass and other introduced landscape species that were intentionally planted on this site make it incompatible with normal “open space” values. This urban –like park will probably remain in its current condition.

5.5.9.5 Visitor Access and Recreation

This is a very popular park-type open space parcel and receives quite a bit of use from neighboring residents, as well as trail users passing by. Biking, running, in-line skating, and walking are all popular activities to do on the paved trails of this area. A crusher fines trail provides access from Harper Lake on the west, to Lake Park on the east. There are also paved and non-paved trail spurs running from adjacent neighborhoods that connect to the main trail.

The fishing pond offers an ADA Accessible dock.

5.5.9.6 Education and Outreach

Given the excellent trail access on both parcels, there are many educational opportunities for residents and school groups. Plant identification, bird watching, and even some predators like coyotes and red foxes can be seen. Lake Park will be managed under the provisions of Open Space- (Other) Land.

5.5.9.7 Emergency Services

5.5.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations.

5.5.9.7.2 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

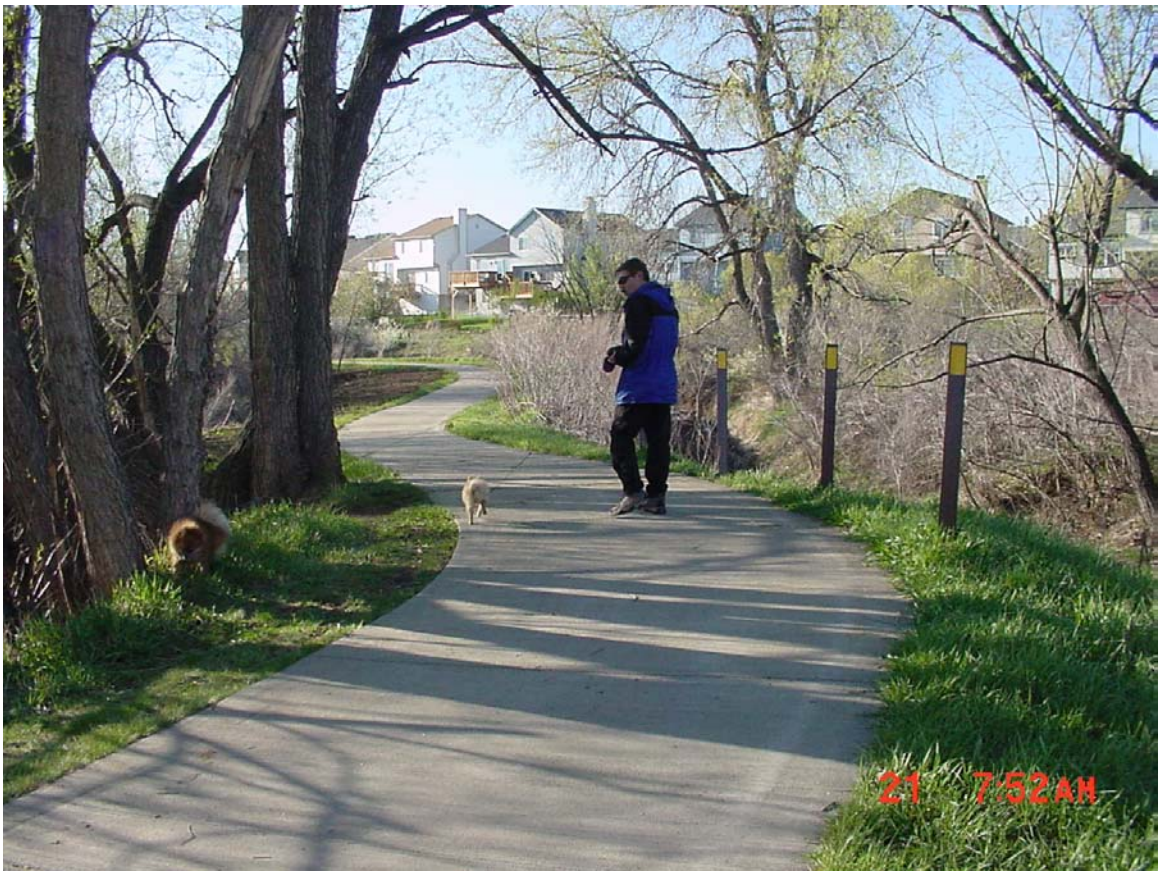
5.5.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Weed monitoring----------Annual----------Staff
Lake habitat evaluation------Annual----------Staff


N
South Boulder Road
Garfield Ave.
Via Appia
Lake Open Space
Lafayette St.
Legend
Lake Boundary
Trails
Roads

5.6 NORTH



5.6 NORTH

Long Term Goal: The North parcel is classified as Preserve, Protect and Visitor. It offers numerous habitat benefits for local wildlife species, and several concrete trails for passive recreation.

5.6.1 Acquisition History

The North Open Space totals 37.42 acres.

5.6.2 Location and Access

Much of the North Open Space, which is adjacent to the Water Treatment Plant, is not accessible to the public.

5.6.3 Adjacent Land Use and Ownership

The adjacent land use to the North Open Space is primarily residential housing. The Keith Hellart Park, to the east is an adjoining City park.

5.6.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

There are two buried municipal (Louisville and Lafayette) water lines that cross the North property. Additionally, the Davidson and Goodhue Ditch Companies have legal easements through the North parcel.

5.6.5 Vegetative Resources

5.6.5.1 Vegetative Communities

These adjacent open space parcels are interesting because they are relatively large and provide a combination of pastures, hayfields, mature trees, shrub thickets, wetlands, and native grassland. The most natural habitat is along a north-facing hillside on the southern edge of the North site, immediately south of a ditch. Native cool season grasses present include Junegrass, western wheatgrass, Agassiz bluegrass, and Canada bluegrass. Native warm season grasses present include sideoats grama, blue grama, and switchgrass.

5.6.5.2 Rare and Imperiled Plants

There were no notable species listed on the resource inventory conducted by Esco Associates in 2001.

5.6.5.3 Exotic Species and Noxious Weeds

Diffuse knapweed (*Acosta diffusa*) is the most troublesome of the noxious weeds for the North property. Other species such as Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), field bindweed (*Convolvulus arvensis*), Russian-olive (*Eleaegnus angustifolia*), and bouncing Bette (*Saponaria officinalis*) occur on this property.

5.6.6 Wildlife Resources

5.6.6.1 Mammals

Despite the proximity of residential development, larger predators such as the coyote, red fox, red-tailed hawk, and great horned would almost certainly use this habitat if sufficient prey were present. Mule deer are known residents on this property. They use the dense trees for cover. Fox squirrels are common in forested areas.

5.6.6.2 Birds

The abundance of trees and shrubs provides cover and nesting sites for birds that then feed in the open habitats. Species observed include the American kestrel, northern flicker, western kingbird, western meadowlark, Bullock's oriole, and lark sparrow, as well as common suburban species such as the American robin, blue jay, house finch, and American and lesser goldfinches.

5.6.7 Cultural Resources

5.6.8 Agricultural Resources

Like similar topographic settings at Davidson Mesa, Warembourg, and Aquarius, the north-facing slope has escaped cultivation and appears to have been moderately grazed by livestock.

5.6.8.1 Water Rights

While no water rights are attached to this parcel, two prominent irrigation ditches (the Davidson and the Goodhue) run through the north side of the North property.

5.6.8.2 Soil Resources and Production Potential

Loam. Given the steep slopes of this property, these soils demonstrate low agricultural productivity.

5.6.8.3 Agricultural Infrastructure

Past agricultural uses were abandoned when the City of Louisville acquired this parcel.

5.6.9 Management Direction

5.6.9.1 Black-Tailed Prairie Dog

Under the Boulder County Prairie Dog Management Plan habitat guidelines, the North property does not meet the minimum acreage requirements to be considered for Habitat Conservation Area. It is classified as a No Prairie Dog area for the purpose of prairie dog management. It is unlikely that prairie dogs would find this property as suitable habitat, since their ability to spot predators would be impaired.

5.6.9.2 Noxious Weeds

Weed management activities shall include an integration of appropriate tools such as mechanical, biological, herbicidal, and cultural controls, depending upon the biology of the invading species and site being occupied. All herbicide applications will be in accordance to State and Federal laws governing pesticide applications.

5.6.9.3 Agricultural Resources

Due to the surrounding urban area and its small size, it is unlikely that the North property would be suitable for continued agricultural production.

5.6.9.4 Ecosystem Restoration and Enhancement

Disturbed areas will be reclaimed with native species that would normally be adapted to the site. Since it is a predominantly native site, there are no plans to disrupt what is already there, but to enhance the grassland resource through various inputs such as reseeding, mowing, herbicides, etc.

5.6.9.5 Visitor Access and Recreation

It is recommended that the North parcel will be managed under constraints of the Open Space—Preserve category. The remaining, under modified portions of North are suggested as Open Space-Visitor Land. A paved trail runs through the North property and connects to Keith Helart Park to the east.

5.6.9.6 Education and Outreach

The North open space offers moderate opportunity for interpretation. The picnic shelter at Keith Helart Park could provide an outdoor classroom setting and gathering place for school groups.

5.6.9.7 Emergency Services

5.6.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations. Problems have occurred in the past when juveniles have cut down trees on this property to build illegal structures. Additional problems include neighboring residents who use open space for garden space.

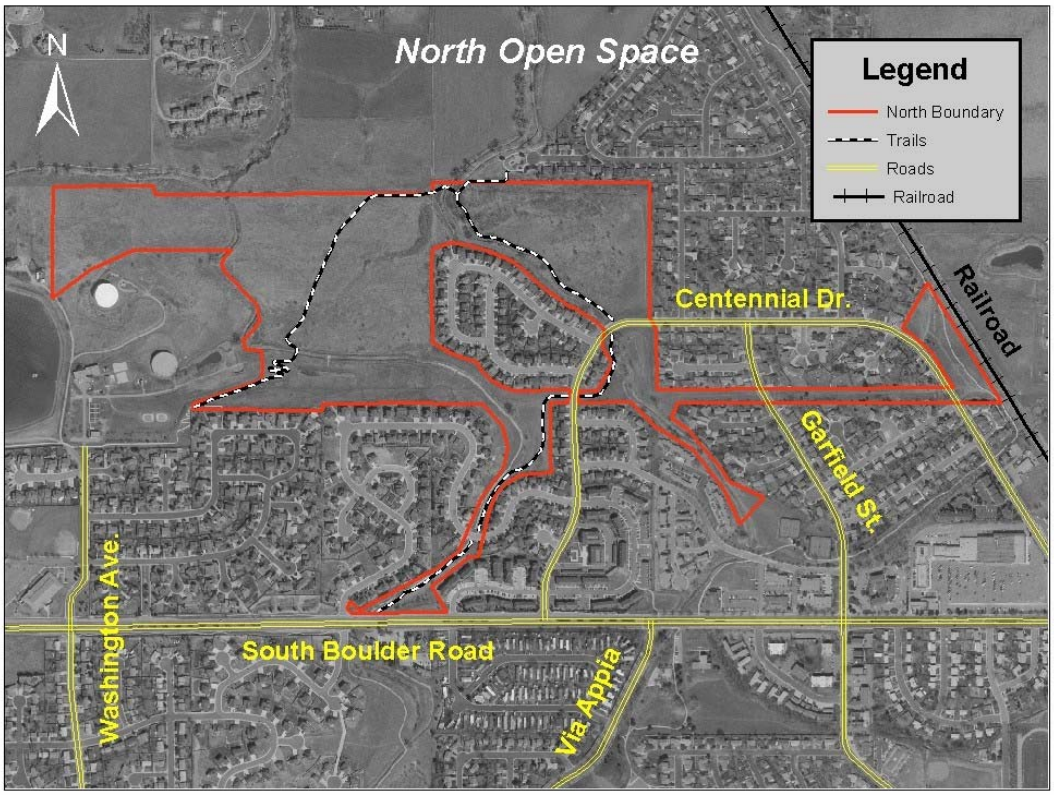
5.6.9.7.2 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

5.6.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Prairie Dog Survey----------Annual----------Staff/volunteer
Weed monitoring----------Annual----------Staff
Weed inventory----------Every 3 yrs.--------Staff/contractor
Grassland evaluation--------Every 3 yrs.--------Staff/contractor


N
North Open Space
Legend
North Boundary
Trails
Roads
Railroad
Centennial Dr.
Railroad
Garfield St.
Washington Ave.
South Boulder Road
Via Appia

5.7 TAMARISK

5.7 TAMARISK

Long Term Goal: The Tamarisk parcel is classified as "Visitor" since it is surrounded by development and offers a critical trail link between several city trails. The two major emphases for Tamarisk will be to improve the upland and wetland habitats and to maintain the enjoyable trail experience.

5.7.1 Acquisition History

The Tamarisk Property (also known as Parcel R) comprises 49.5 acres, and purchased for $134,000.

5.7.2 Location and Access

The Tamarisk parcel also connects to the Harper Lake area and Lake Park. The property is located at Tamarisk and Kennedy Avenue. There is a path that provides access through the open space. There is a wetland area located at this site.

5.7.3 Adjacent Land Use and Ownership

In general, exterior cedar 6-foot high privacy fencing separates the Property from surrounding residences. Most of the fencing is well maintained by surrounding homeowners. In the early 1980's the City of Louisville carried out a major drainage control project along much of the property's length. These improvements added surface and subsurface drainage infrastructure that is maintained by the City Public Works Department and Urban Drainage.

5.7.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

There are no legally binding agreements for this property.

5.7.5 Vegetative Resources

5.7.5.1 Vegetative Communities

Most of the grassland community for the Tamarisk property is comprised of introduced pasture grasses that were planted when the surrounding lands were developed. The most ecologically significant vegetational resource on this area is the wetlands. These areas support native plains cottonwood and peachleaf and coyote willow with understories of predominately cattails with Baltic rush and other grass-like species.

5.7.5.2 Rare and Imperiled Plants

There is no mention of any rare species in the ESCO report.

5.7.5.3 Exotic Species and Noxious Weeds

The small patch of leafy spurge (*Tithymalus esula*) is the most serious weed issue that must be addressed. Additionally, the most extensive weed problem is the hoary cress (*Cardaria draba*) Canada thistle (*Cirsium arvense*) and diffuse knapweed (*Acosta diffusa*) are also troublesome for this property.

5.7.6 Wildlife Resources

5.7.6.1 Mammals
Tracks of raccoons indicate use by this common omnivore. Red foxes, mule deer, and other wildlife may move along the ditch corridors, particularly the wetland corridor. Coyotes are known to boldly enter residential yards to prey on cats and small dogs.

5.7.6.2 Birds
These areas have relatively little wildlife value except for willow shrubs and other wetland plants along ditches. The Tamarisk parcel also connects to the Harper Lake area. Species observed include song sparrows, red-winged blackbirds, and common yellowthroats in wetlands. Most of the current use is by common suburban songbirds.

5.7.7 Cultural Resources

5.7.8 Agricultural Resources

5.7.8.1 Water Rights
Since this property was never irrigated, no water rights were retained with the purchase of this property.

5.7.8.2 Soil Resources and Production Potential
The soil complexes on this land include Ascalon sandy loam, Ascalon-Otero Complex, and Valmont clay loam.

5.7.8.3 Agricultural Infrastructure
There is no lingering evidence of recent agricultural use for this property.

5.7.9 Management Direction

5.7.9.1 Black-Tailed Prairie Dog
Under the Boulder County Prairie Dog Management Plan habitat guidelines, the Tamarisk property does not meet the minimum acreage requirements to be considered for Habitat Conservation Area. It is classified as no prairie dog area for the purposes of prairie dog management.

5.7.9.2 Noxious Weeds
There are numerous noxious weed species that are invading this property, namely diffuse knapweed, Scotch thistle and field bindweed, among others. The abandoned pasture grasses are building up a significant amount of litter and thatch, which ultimately compromises their vigor and ability to resist invasion by exotic weeds. It may become necessary to periodically mow or hay certain portions of this property to invigorate the root system so that it can better resist weeds. Future plans may entail complete rehabilitation of these grasses to a native grasses. Until that time arrives, the existing pasture resource needs to be managed. Other weed management inputs, besides the mechanical and cultural control mentioned would be herbicides and biological controls.

5.7.9.3 Agricultural Resources
Since the Tamarisk property is surrounded by residential housing, and is such a small acreage, it is unsuitable for agricultural productivity.

5.7.9.4 Ecosystem Restoration and Enhancement

Where possible, plant riparian shrub thickets such as chokecherries, plums, and hawthorns adjacent to the ditches to support native songbirds preserve the existing wetland through the Tamarisk parcel. Disturbed areas will be reclaimed with native species that would normally be adapted to the site. In the areas where introduced pasture grasses are dominant, it may be appropriate to convert these areas to native grassland to improve the wildlife habitat value.

Preserve the existing wetland through the parcel. Keep the ditches as natural-appearing as possible in terms of willows, cattails, or other vegetation that may attract wildlife.

The Urban Drainage District staff has been removing weedy Russian-olive trees.

5.7.9.5 Visitor Access and Recreation

Public access is permitted on the Property via a crusher fines trail that runs the full length of the parcel. The trail and trail spurs leading from surrounding neighborhoods allow for biking, hiking, nature study, and jogging. Dogs are required to be on a leash at all times. Horses are not currently allowed on the trail surface or on open space property. Public access has been restricted in the wetland areas. It is suggested that the management under the provisions of Open Space-Visitor Land is appropriate.

The management of Tamarisk and Lake Park parcels will be managed under provisions of Open Space-Visitor Land.

5.7.9.6 Education and Outreach

While the Tamarisk parcel offers many different observable natural features, it may be a difficult property to include in interpretive programs due to the lack of sufficient parking. The closest parking for this property is at the Leon Wurl Wildlife Habitat Area.

5.7.9.7 Emergency Services

5.7.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations.

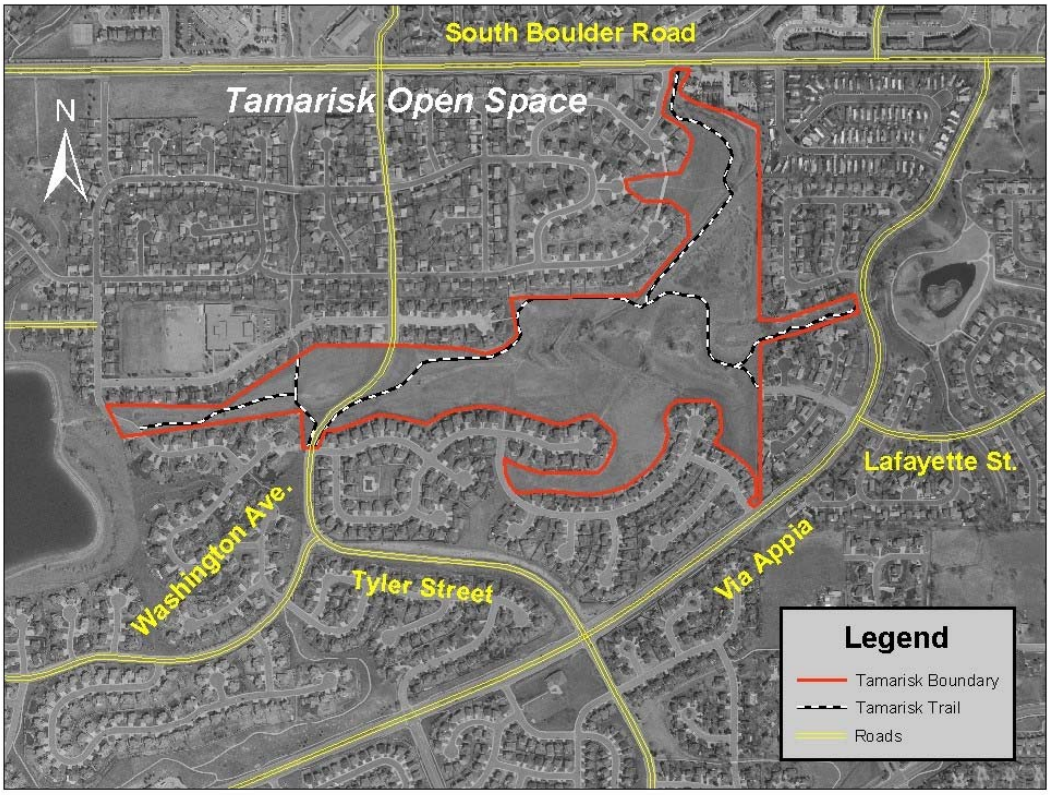
5.7.9.7.2 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

5.7.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Prairie Dog Survey----------Annual----------Staff/volunteer
Weed monitoring----------Annual----------Staff
Weed inventory----------Every 3 yrs.--------Staff/contractor
Grassland evaluation--------Every 3 yrs.--------Staff/contractor



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5.8 WAREMBOURG

5.8 WAREMBOURG

Long Term Goal: The Warembourg parcel is classified as Visitor land. The trail and Klubert Warembourg Fishing Pond are the primary focus of management for this area.

5.8.1 Acquisition History

The 90 acre Warembourg property was purchased in 1994 for $2,000,000. Fifty acres were purchased in fee by the City of Louisville and the remaining 40 acres are preserved through a conservation easement.

5.8.2 Location and Access

Additional access is provided on the trail that enters the property at several points along Hoover Ave.

5.8.3 Adjacent Land Use and Ownership

The Warembourg parcel is bordered on the south by private property and on the west, north, and east by private residential subdivisions.

5.8.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

40 acres of conversation easement has been preserved on the existing Warembourg Farm.

5.8.5 Vegetative Resources

5.8.5.1 Vegetative Communities

This parcel consist of an expanse of pasture largely surrounded by development. Smooth brome (*Bromopsis inermis*) is an introduced pasture species which has carried over after the abandonment of the former irrigated pasture land use. With the lack of irrigation, this grass species will be less dominant and eventually without supplemental watering will need to be replaced with native species that will better suit the goals of improving wildlife habitat.

5.8.5.2 Rare and Imperiled Plants

There were no notable species listed on the resource inventory conducted by Esco Associates in 2001.

5.8.5.3Exotic Species and Noxious Weeds

Numerous exotic species occur in this area, including but not limited to: diffuse knapweed (*Acosta diffusa*), Russian-olive (*Elaeagnus angustifolia*), Canada thistle (*Breea arvense*), field bindweed (*Convolvulus arvensis*), chicory (*Cichorum intybus*), sulphur cinquefoil (*Potentilla recta*), bouncing Bette (*Saponaria officinalis*), Scotch thistle (*Onopordum acanthium*), and other weedy species.

5.8.6 Wildlife Resources

5.8.6.1 Mammals

The most common predator in this area is the coyote. Nocturnal predators such as the great horned owl and red fox could occasionally use the site, but the prey base is undoubtedly sparse.

5.8.6.2 Birds

Species observed include the American kestrel, mourning dove, western meadowlark, black-billed magpie, American crow, American robin, common grackle, Brewer's blackbird, and house finch—all common in suburban landscapes.

5.8.7 Cultural Resources

There is no evidence of remaining cultural resources on this property. This property continues to be irrigatable if the need or desire arises to flood irrigate the pasture grasses.

5.8.8 Agricultural Resources

5.8.8.1 Water Rights

Water rights that were retained with the property during the sale were forwarded over to the City of Louisville for domestic water use.

5.8.8.2 Soil Resources and Production Potential

The soils on this property consist of complexes of Ascalon sandy loam.

5.8.8.3 Agricultural Infrastructure

Past agricultural uses were abandoned when the City of Louisville acquired this parcel. The Warembourg (Wecker) family continues to lease their remaining fee acres under conservation easement for agricultural production.

5.8.9 Management Direction

The Warembourg parcel is classified as Open Space – Visitor Land under the City of Louisville Open Space Master Plan and as a Multiple Objective Area under the Boulder County Prairie Dog Element (Boulder County Staff 2002). This classification denotes a property generally characterized by low relative ecological significance, relatively high levels of habitat fragmentation, and provides for passive recreation. Currently, this property provides for wildlife habitat and recreation opportunities. Recreation consists of pedestrian traffic along the established trail running north from the Daughenbaugh parcel as well as fishing activities at the Fishing is Fun pond. Wildlife habitat largely consists of the pond and associated habitat as well as non-native grassland habitat. The pond may provide some habitat resources for waterfowl, assorted wading birds, and various other avian species. The grassland area may provide for various birds as well as assorted small mammals such as mice, fox, raccoons, skunks, and coyotes.

5.8.9.1 Black-Tailed Prairie Dog

5.8.9.1.1 Current Parcel Status

The Warembourg parcel currently lies adjacent to two prairie dog colonies; however, there are no prairie dogs on this parcel. One colony is on the private property to the south and the other colony is in the central portion of the adjacent Daughenbaugh parcel. Prairie dogs from both colonies are within dispersal distance of the Warembourg parcel. This parcel should be managed as a No Prairie Dog Area (Boulder County Grassland Management Plan – Prairie Dog Element 2002). Introduction of prairie dogs, whether natural or artificial, is not recommended for this site because of poor habitat suitability.

5.8.9.1.2 Habitat Suitability

Based on the habitat suitability guidelines set forth in Appendix A, an analysis of the vegetation on the Warembourg parcel shows that it is not suitable prairie dog habitat. The predominance of smooth brome and numerous exotics and noxious weeds do not meet the total suitable vegetative cover requirement for suitable and sustainable prairie dog habitat. This habitat type, however, since it is 50 acres in size and is immediately adjacent to other open space and agricultural parcels, can be valuable for numerous other species of wildlife. It can be excellent habitat for ground nesting birds, thermal and hiding cover for animals such as songbirds and small mammals, and good hunting ground for foxes, coyotes, and raptors. This habitat would be altered and many of these mid- and tall-grass wildlife species potentially lost in that area if prairie dogs become established on this property. Furthermore, because the adjacent Daughenbaugh parcel has an active prairie dog colony, keeping the Warembourg parcel as a mid-grass habitat area would be very beneficial in maintaining the density and diversity of wildlife species across the area. Therefore, prairie dogs should not be an active component of the Warembourg parcel.

5.8.9.1.3 Barriers

Natural vegetative barriers should be maintained along the southern and southwestern edges of the Warembourg parcel. If prairie dogs are present on the Daughenbaugh parcel and/or the private land to the south, the vegetation along the primary trail should not be mowed. By allowing vegetation to grow naturally and remain throughout the year, this natural visual barrier should help discourage prairie dogs from dispersing onto the Warembourg parcel. In addition, allowing taller vegetation to remain throughout the year should also help to increase the available wildlife habitat.

If it is deemed appropriate to hay the Warembourg parcel or begins any habitat restoration, a vegetation buffer at least 50 feet wide should be maintained between the Warembourg parcel and any adjacent prairie dog colony(s). Ideally, tall, dense vegetation should be maintained along the southern and southwestern edges of the parcel. If a vegetative buffer is not possible for any reason, however, an artificial barrier will be erected. Research into costs and efficacy should be done when necessary to determine the most appropriate and cost-effective construction.

5.8.9.1.4 Population Management

In the event that prairie dogs successfully disperse and establish on the Warembourg parcel, the animals will be removed promptly and humanely. Acceptable removal activities are described in Appendix A except in cases where ≤10 prairie dogs have dispersed specifically from the Daughenbaugh parcel, relocation of these animals back to the core area of the Daughenbaugh parcel is acceptable if:

a. The core population is less than 100 animals at the time of relocation; and
b. Abandoned pre-existing holes are available which are at least 50 yards away from the nearest coterie.

5.8.9.2 Noxious Weeds

There are numerous noxious weed species that are invading this property, namely diffuse knapweed, Scotch thistle and field bindweed, among others. The abandoned pasture grasses are building up a significant amount of litter and thatch, which ultimately compromises their vigor and ability to resist invasion by exotic weeds. It may become necessary to periodically mow or hay certain portions of this property to invigorate the root system so that it can better resist weeds. Future plans may entail complete rehabilitation of these grasses to a native grasses. Until that time arrives, the existing pasture resource needs to be managed. Other weed management inputs, besides the mechanical and cultural control mentioned would be herbicides and biological controls.

5.8.9.3 Agricultural Resources

Consideration may be taken to temporarily lease portions of the Warembourg property for hay production. Not only would this help minimize the fire hazard on the property, but it would also improve the vigor of the existing grasses so they can better compete against invading weeds.

5.8.9.4 Ecosystem Restoration and Enhancement

This parcel is one to be seriously considered for prairie restoration with native vegetation.

5.8.9.5 Visitor Access and Recreation

Management will proceed under provisions of Open Space-Visitor Land. The Warembourg parcel offers two small parking lots for the "Fishing is Fun" pond. One parking lot is dedicated for use by disabled citizens and the second lot, near the Daughenbaugh parcel is for general use.

5.8.9.6 Education and Outreach

The "Fishing is Fun" pond was developed to make angling more accessible to all Louisville citizens. A great educational opportunity exists to teach children how to fish and to allow them to fish independently, since the pond is close to many neighborhoods and is close to many bike paths.

5.8.9.7 Emergency Services

5.8.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations.

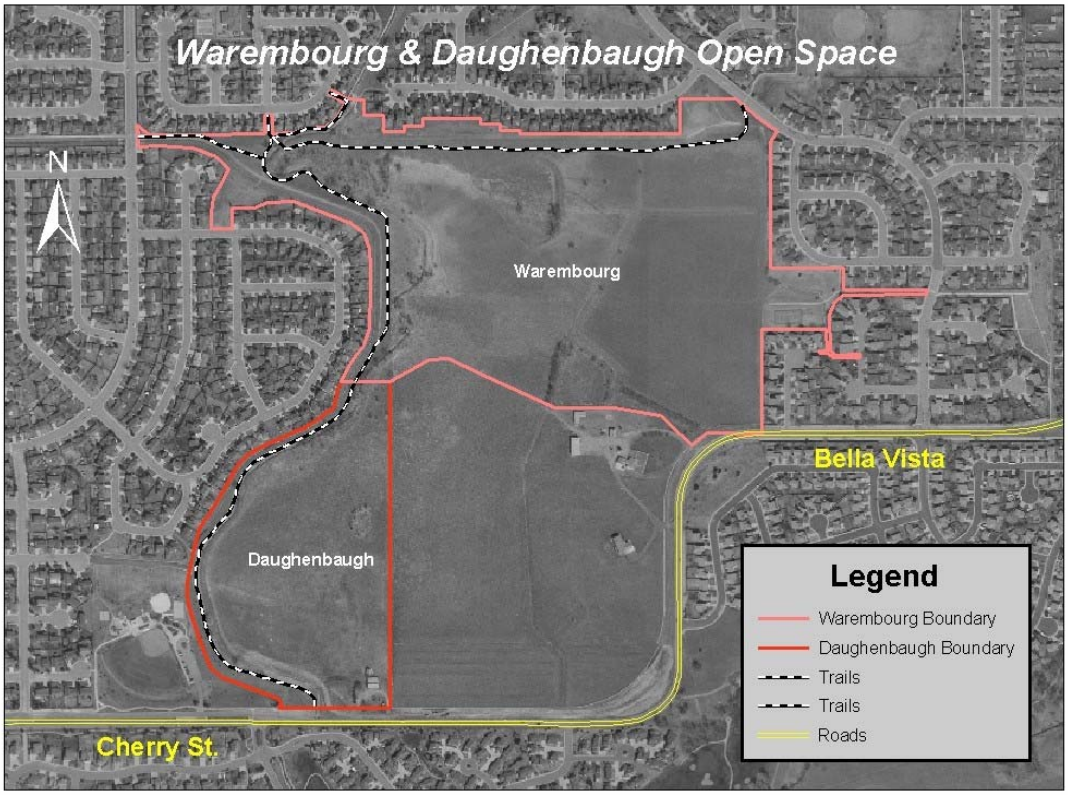
5.8.9.8 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

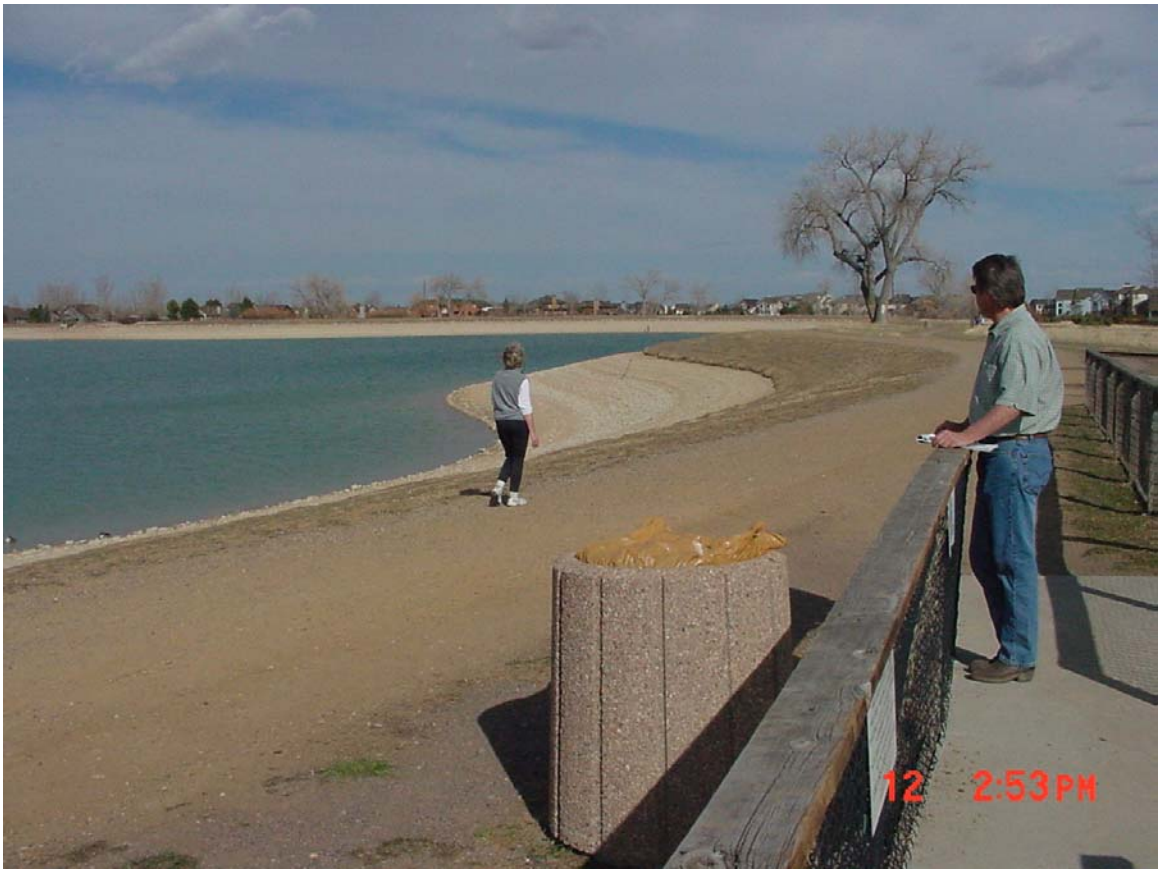
5.8.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Prairie Dog Survey----------Annual----------Staff/volunteer
Weed monitoring----------Annual----------Staff
Weed inventory----------Every 3 yrs.--------Staff/contractor
Grassland evaluation--------Every 3 yrs.--------Staff/contractor



5.9 LEON A. WURL WILDLIFE SANCTUARY



5.9 LEON A. WURL WILDLIFE SANCTUARY

Long Term Goal: The Leon A. Wurl Wildlife Habitat area is classified as "Other" since the primary function of Harper Lake is for municipal water storage. The goal for the surrounding habitat area is to improve the vegetational composition through native shrub and grass plantings.

5.9.1 Acquisition History

The 16 acre plot was dedicated to the City in 1979 and a Resolution No. 22 Series 1979 established the property as The Leon Wurl Wildlife Sanctuary. The sanctuary is named after City Administrator, Leon Wurl, who came to Louisville in 1973. The 16 acre plot was part of the Centennial Valley Mall annexation in 1978 and was intended to serve as a buffer zone near the mall.

5.9.2 Location and Access

The Leon Wurl Wildlife Habitat Area is located east of McCaslin Blvd. and north of Washington Ave. It is accessible from the parking lot from Washington Ave., as well as from the adjacent open space, the Mesa and Tamarisk properties.

5.9.3 Adjacent Land Use and Ownership

Residential subdivisions lie to the north and south of the Leon Wurl Wildlife Habitat Area.

5.9.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

There are no leases or encumbrances on this property, other than the primary use dedicated to municipal water.

5.9.5 Vegetative Resources

5.9.5.1 Vegetative Communities

This parcel consists of an expanse of pasture largely surrounded by development. Smooth brome (*Bromopsis inermis*) is an introduced pasture species that has carried over after the abandonment of the former irrigated pasture land use. With the lack of irrigation, this grass species will be less dominant and eventually without supplemental watering will need to be replaced with native species that will better suit the goals of improving wildlife habitat.

5.9.5.2 Rare and Imperiled Plants

There were no notable species listed on the resource inventory conducted by Esco Associates in 2001.

5.9.5.3 Exotic Species and Noxious Weeds

Numerous exotic species occur in this area, including but not limited to: diffuse knapweed (*Acosta diffusa*), Russian-olive (*Elaeagnus angustifolia*), Canada thistle (*Breea arvense*), field bindweed (*Convolvulus arvensis*), Scotch thistle (*Onopordum acanthium*), and other weedy species.

5.9.6 Wildlife Resources

5.9.6.1 Mammals

This open space provides a natural habitat for native wildlife and for the observation of wildlife.

5.9.6.2 Birds

Harper Lake is a water containment facility and not intended to provide habitat for waterfowl. Canada geese and several duck species use the lake but it does not offer the full requirements for nesting or feeding.

5.9.7 Cultural Resources

The Leon Wurl Wildlife Habitat Area has not been evaluated for cultural resources. Since extensive earthwork was done to create the reservoir, it is unlikely that there are any noteworthy artifacts present on this site. However, it is possible that some buried items may have been exposed during the excavation process.

5.9.8 Agricultural Resources

5.9.8.1 Water Rights

The primary function of the Leon Wurl Wildlife Preserve/Harper Lake property is for domestic water storage for the City of Louisville.

5.9.8.2 Soil Resources and Production Potential

Since this site underwent major excavation to create Harper Lake, it is difficult to catalogue the resulting surface soils with any accuracy.

5.9.8.3 Agricultural Infrastructure

Past agricultural uses were abandoned when the City of Louisville acquired this parcel.

5.9.9 Management Direction

5.9.9.1 Black-Tailed Prairie Dog

Prairie dog colonies cannot be tolerated in any area near the Harper Lake Dam as mandated by the Colorado State Engineer. This property is, therefore, classified as a no prairie dog area for the purposes of prairie dog management.

5.9.9.2 Noxious Weeds

Diffuse knapweed is the most prevalent problem weed on this sight and must be managed, according to the State Weed Law. Hand pulling, mowing and biological controls have been the main tools used, but occasional spot herbicide treatment may be necessary.

5.9.9.3 Agricultural Resources

Past agricultural uses were abandoned when the City of Louisville acquired this parcel. It is not suitable for continued agriculture due to its proximity to the domestic water source, the surrounding residential housing, and its small size.

5.9.9.4 Ecosystem Restoration and Enhancement

One goal is to enhance the cover and vegetational variety on this wildlife habitat preserve to encourage inhabitation and travel through this area by a greater number and variety of wildlife species. Weed management and systematic rehabilitation to a native shrubland is the most desired outcome for this land. The Land Management Dept must include the Public Works Dept. with any changes to this area to insure that no improvements would jeopardize water quality or the dam/reservoir integrity on that site.

5.9.9.5 Visitor Access and Recreation

There is a trail head parking lot off of McCaslin Blvd, on Washington Ave. The trail connects to the Tamarisk property to the east and the Mesa Open Space to the west. Limited boating is allowed (by permit only, through the Land Management Dept.). Boats must be human powered with limited contact with the water (canoes, open-air kayaks, paddle boats). Nothing inflatable allowed. Most passive recreation is permitted in this area, so long as municipal water quality in Harper Lake is not diminished.

5.9.9.6 Education and Outreach

The parking lot and trail connection to other more noteworthy open space makes it a suitable site to begin a nature walk in Louisville.

5.9.9.7 Emergency Services

5.9.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations.

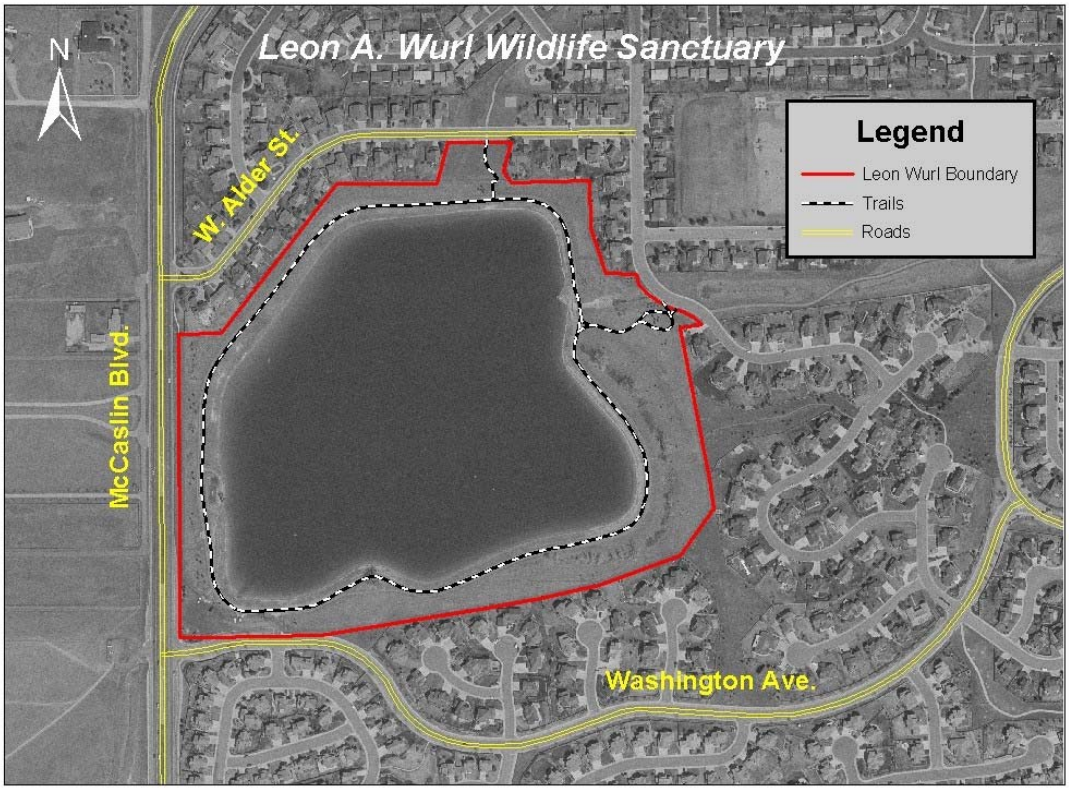
5.9.9.7.2 Fire Protection

Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

5.9.10 Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the Property:

Prairie Dog Survey----------Annual----------Staff/volunteer
Weed monitoring----------Annual----------Staff
Weed inventory----------Every 3 yrs.--------Staff/contractor
Grassland evaluation--------Every 3 yrs.--------Staff/contractor


Leon A. Wurl Wildlife Sanctuary
N
W. Alder St.
McCaslin Blvd.
Washington Ave.
Legend
Leon Wurl Boundary
Trails
Roads

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5.10 MISCELLANEOUS OPEN SPACE PROPERTY

Most significant parcels: (Parcels that comprise distances along the Coal Creek Corridor include and Dutch Creek), Hunters Ridge, Gateway, Hillsboro West, Allenbaugh, Cherrywood, Olson Subdivision, Damyanovich

5.10.1 Acquisition History

There are numerous smaller parcels within Louisville's open space system. Many of these smaller parcels provide important trail linkages throughout the City. The Coal Creek Trail is the most well-known trail system to benefit from these smaller open space purchases/dedications. Some parcels were combined to fit within a single category because their individual acreages are so small that they don't provide the significant wildlife habitat/plant community, recreational, or agricultural benefit that the larger parcels demonstrate. Many of these parcels were deed to the City of Louisville through the PUD process as "open space dedications". Their most significant contribution may be the "openness" they add to the larger housing developments. They provide open areas for trail connections and buffers between subdivisions. The Xcel Energy high line corridor is included in this category.

5.10.2 Location and Access

See open space map for smaller parcels.

5.10.3 Adjacent Land Use and Ownership

These parcels are usually part of a larger housing development with hundreds of neighbors.

5.10.4 Current Leases, Easements, Encumbrances, and Rights-of-Way

Xcel Energy owns the high power line corridor and has been granted maintenance responsibility and trail rights to the City of Louisville.

5.10.5 Vegetative Resources

5.10.5.1 Vegetative Communities

Most of the plant communities are dominated by introduced dryland pasture species such as crested wheatgrass, smooth brome, or intermediate wheatgrass. In many cases, these small open space parcels were highly disturbed by earth moving equipment when the developments were "sculpted" for construction and developers replanted them with the easiest grass mix that would grow or Kentucky Bluegrass. Typically, these areas are low maintenance, other than the weeds that invade.

5.10.5.2 Rare and Imperiled Plants

There were no notable species of concern listed in the Esco report.

5.10.5.3 Exotic Species and Noxious Weeds

Unfortunately, noxious weeds plague many of these parcels. These species include diffuse knapweed, Scotch thistle, musk thistle, field bindweed, Canada thistle and chicory.

5.10.6 Wildlife Resources

5.10.6.1 Mammals

There are a few urban-adapted species such as skunks, raccoons, coyotes, and red foxes that can be seen. Often these parcels are too small and limited even for the prairie dogs.

5.10.6.2 Birds

Please refer to bird list at end of this document.

5.10.7 Cultural Resources

5.10.8 Agricultural Resources

5.10.8.1 Water Rights

Water rights do not accompany any of these parcels. There may be a few small parcels that are irrigatable through the City's water system.

5.10.8.2 Soil Resources and Production Potential

There is minimal potential for agricultural production – due to the small size. Often the topsoil is absent from these parcels if they were scraped during subdivision construction.

5.10.8.3 Agricultural Infrastructure

There may be scattered signs of historic agriculture on some properties.

5.10.9 Management Direction

5.10.9.1 Black-Tailed Prairie Dog

Because the parcels in this category are exceptionally small, the sustainability of prairie dogs for a long period of time is unlikely. It is unlikely that prairie dogs exist on these parcels. If colonization occurred, it is likely the neighboring private lands would eventually object, since their yard landscape would be a probably food source. These properties will be managed as no prairie dog areas for the purposes of prairie dog management.

5.10.9.2 Noxious Weeds

Noxious weeds will be inventoried and prioritized, based on their threat to other open space areas and neighboring private lands. Integrated tools such as mechanical, biological, herbicidal and cultural controls will be employed. Any herbicides applied will be used in accordance with all State and Federal regulations for pesticide application.

5.10.9.3 Agricultural Resources

None of these properties has any notable agricultural value.

5.10.9.4 Ecosystem Restoration and Enhancement

Many of these areas will never support wildlife like the larger properties have potential to do. Some of these will be reclaimed to native grasses as resources allow while others will "maintain" on their existing introduced pasture grasses. The Open Space Advisory Board will help to prioritize these small parcels for their restoration potential.

The Coal Creek Corridor was noted by Esco Associates and the Louisville Open Space Advisory Board as a primary focus for future native habitat enhancement. This long term goal can be achieved in small or large increments, depending upon budget constraints.

5.10.9.5 Visitor Access and Recreation

Most of the properties in this category fall under the Open Space-Visitor category, since they are generally close to subdivisions and there are few plant communities that deserve special protection by any of the more restrictive classifications. Nearly all of the parcels listed under this miscellaneous category are valued as spacial buffers between residential subdivisions and/or trail corridors.

5.10.9.6 Education and Outreach

There are few significant opportunities for nature study, compared to the larger land holdings that support a great diversity of native plants and animals.

5.10.9.7 Emergency Services

5.10.9.7.1 Law Enforcement

Primary law enforcement responsibility for the Property rests with the City of Louisville Police Dept., as the Property is located within the Louisville city limits. Police and code enforcement officers will enforce regulations.

5.10.9.7.2 Fire Protection

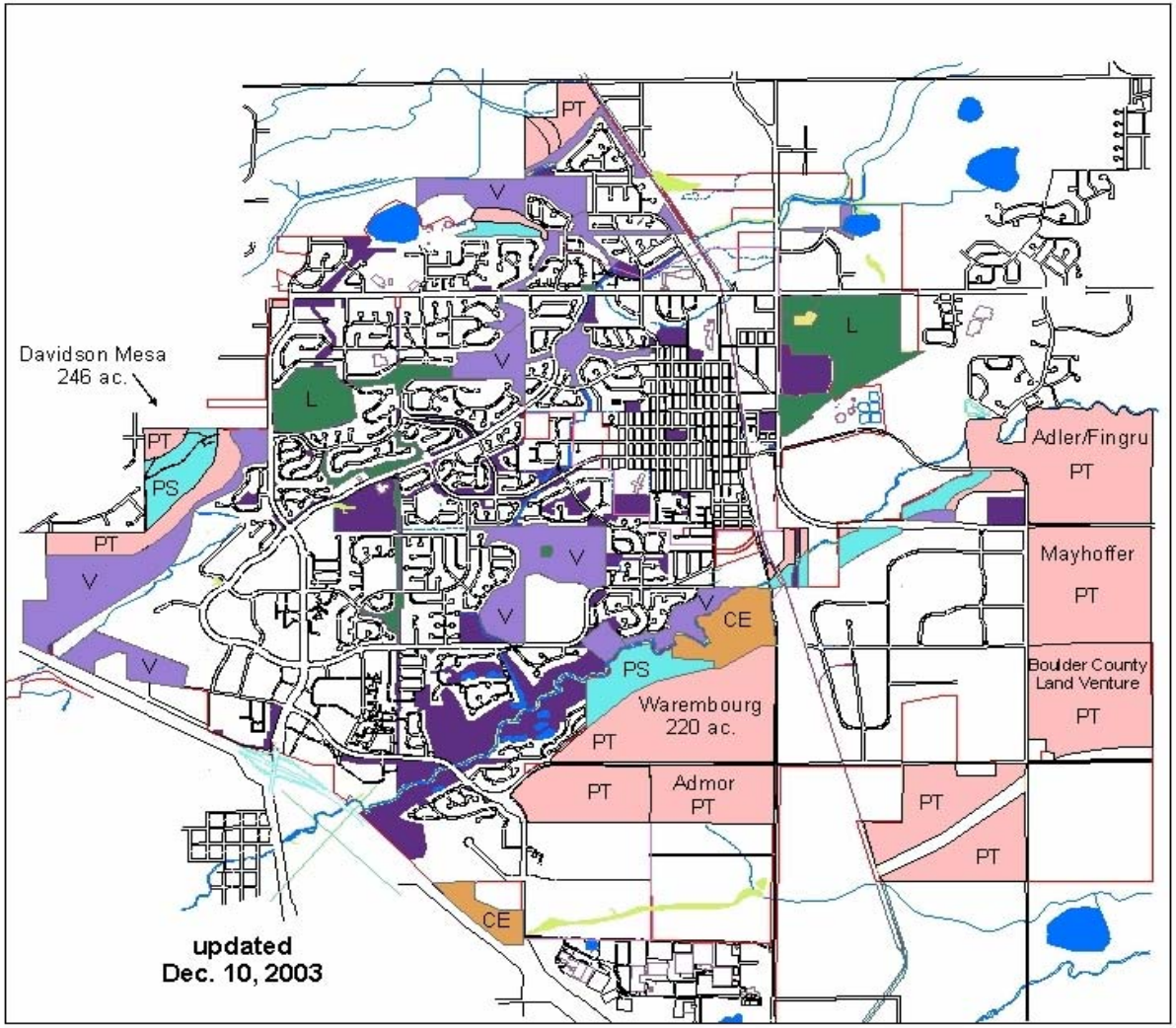
Fire potential on the Property is generally limited to wildland fire, probably in the form of a grass fire. Primary fire protection responsibility rests with the Louisville Fire Protection District, as the Property falls within its initial attack jurisdiction.

5.10.10Resource Monitoring

Resource monitoring is conducted to determine if management objectives are being achieved. Monitoring provides information about changes that are occurring on the Property and helps in the decision making process for deciding on future land management activities. The monitoring of specific resources is performed on a periodic basis in relation to resource sensitivity. Some monitoring takes place through routine staff activities, while others take place annually or every few years. The following monitoring activities are recommended for the miscellaneous small properties:

Weed monitoring----------Annual----------Staff
Weed inventory----------Every 3 yrs.--------Staff/contractor

City of Louisville Open Space



Map 1 - Open Space Master Plan Management Classifications

Based on vegetation and current wildlife use as well as ecological contiguity and restoration potential

Legend

Classification

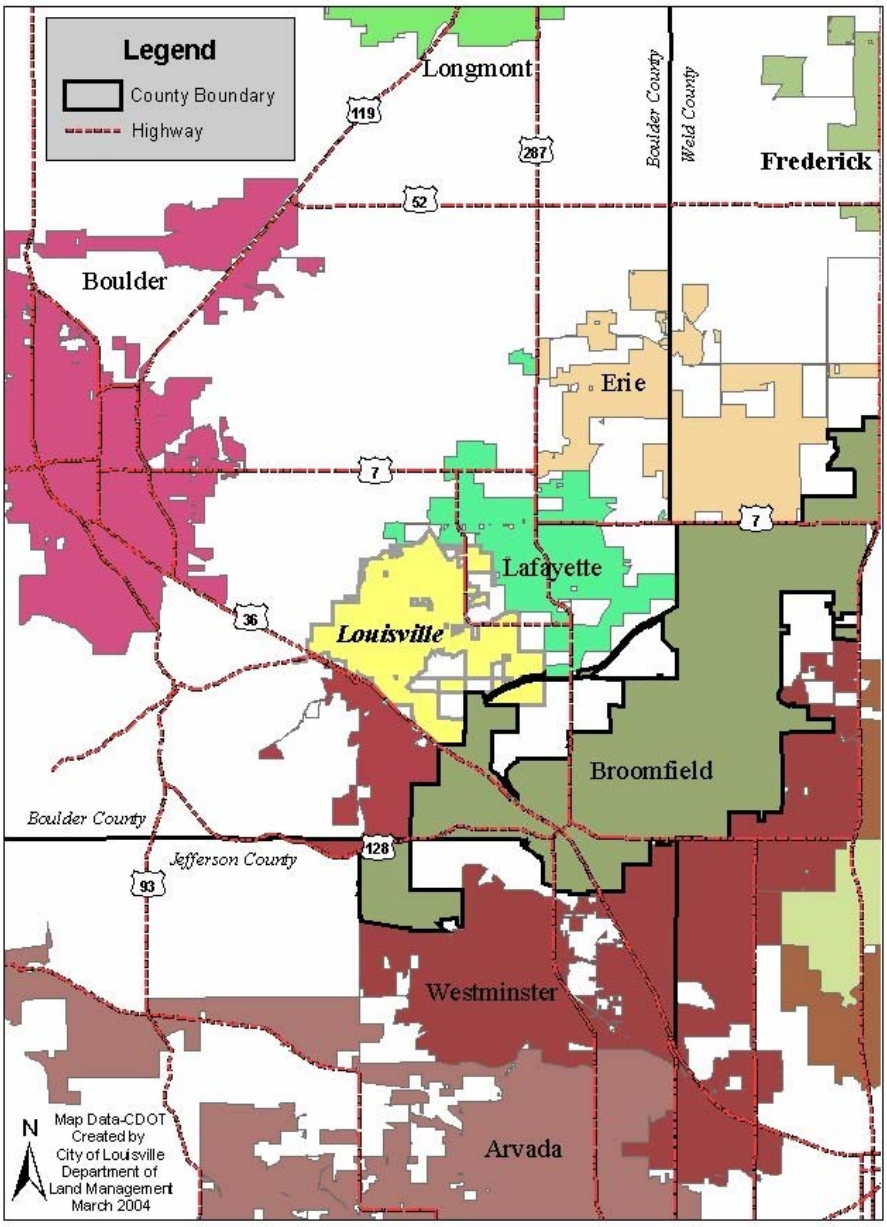
- Private Lands Under Conservation Easement (CE)
- Open Space - OTHER Lands (L)
- Open Space - PRESERVE Land (PS)
- Open Space - PROTECT Land (PT)
- Open Space - VISITOR Land (V)

N

Base Map Source:
AutoCAD 2000 drawing file
provided by City of Louisville
Public Works Department
Revisions by City of Louisville
Department of Land Management

ESCO Associates Inc.

Location Map



PLANT SPECIES PRESENT

PLANT SPECIES PRESENT	COMMON	SYNONYMS	AQUARIUS PARCEL	COAL CREEK CORRIDOR	DAVIDSON MESA	MCCASLIN PARCEL	NORTH TRACT
NATIVE ANNUAL & BIENNIAL FORBS							
Androsace occidentalis	Western rockjasmine		X			X	
Cirsium ochrocentrum	Western thistle				X	X	X
Cirsium undulatum	wavyleaf thistle				X		
Coreopsis tinctoria	coreopsis				X		
Descurainia incana	Richardson tansymustard	Descurainia richardsonii	X		X		
Descurainia pinnata	pinnate tansymustard		X		X		
Draba reptans	whitlowwort					X	
Dyssodia papposa	fetid marigold				X		
Erigeron divergens	spreading fleabane		X				
Gaura mollis	butterfly weed	G. parviflora	X				
Grindelia squarrosa	gumweed			X	X	X	X
Helianthus annuus	common sunflower		X		X		X
Ipomopsis laxiflora	gilia	Gilia laxiflora	X				
Lappula marginata	stickseed		X				
Oenothera albicaulis	prairie evening primrose	Anogra albicaulis			X	X	
Oligosporus pacificus	sagewort	O. campestris ssp. caudatus			X	X	
Oreocarya virgata	miner's candle	Cryptantha virgata			X		
Plantago patagonica	woolly plantain		X				
Pterogonum alatum	winged buckwheat	Eriogonum alatum			X		
Silene antirrhina	sleepy catchfly				X		
INTRODUCED ANNUAL & BIENNIAL FORBS							
Acosta diffusa	tumble knapweed	Centaurea diffusa	X	X	X		X
Alyssum alyssoides	alyssum		X		X	X	X
Alyssum parviflorum	alyssum	A. minus	X		X	X	X
Amaranthus blitoides	prostrate pigweed	Amaranthus graecizans	X				
Amaranthus retroflexus	amaranth		X				X
Ambrosia trifida	giant ragweed						X
Arctium minus	burdock			X			
Bassia sieversiana	burning-bush	Kochia scoparia, K. sieversiana	X		X		X
Bidens frondosa	devils beggar's tick		X	X			X
Camelina microcarpa	littlepod falseflax		X		X	X	X
Camelina rumelica	largeseed falseflax						X
Capsella bursa-pastoris	sheperd's purse				X		
Carduus nutans ssp. macrolepis	musk thistle				X	X	X
Chorispora tenella	purple mustard					X	X
Conyza canadensis	horseweed		X	X			X
Descurainia sophia	flixweed tandymustard		X		X	X	X

PLANT SPECIES PRESENT

PLANT SPECIES PRESENT	COMMON	SYNONYMS	AQUARIUS PARCEL	COAL CREEK CORRIDOR	DAVIDSON MESA	MCCASLIN PARCEL	NORTH TRACT
Dipsacus fullonum	teasel			X			
INTRODUCED ANNUAL & BIENNIAL FORBS (concluded)							
Erodium cicutarium	filaree		X			X	
Fallopia convolvulus	black bindweed			X			
Lactuca serriola	prickly lettuce		X	X	X	X	X
Lappula redowskii	early stickseed		X		X	X	
Lepidium densiflorum	denseflower pepperweed		X		X		
Lepidium perfoliatum	clasping pepper-grass		X		X		
Malva neglecta	cheeseweed		X	X	X		X
Melilotus alba	white sweet-clover			X			
Melilotus officinalis	yellow sweetclover		X		X		
Neolepia campestre	field pepperweed	Lepidium campestre	X		X		
Onopordum acanthium	scotch thistle			X	X		
Plantago lanceolata	buckhorn plaintain			X			X
Poinsettia dentata	toothed spurge		X	X	X		X
Polygonum arenastrum	devil's shoestrings	Polygonum aviculare			X		
Polygonum ramosissimum	bushy knotweed				X		
Salsola australis	Russian thistle	Salsola iberica			X		X
Sisymbrium altissimum	Jim Hill mustard		X		X	X	X
Solanum rostratum	buffalobur		X	X	X		
Solanum triflorum	nightshade			X		X	
Thlaspi arvense	pennycress				X		
Tragopogon dubius ssp. major	salsify		X		X	X	X
Tribulus terrestris	puncturevine		X				
Verbascum blattaria	moth mullein		X	X			
Verbascum thapsus	mullein		X	X	X	X	X
Verbascum x pterocaulon	hybrid mullen			X			
Xanthium strumarium	cocklebur						X
Ximenesia encelioides	crownbeard		X		X	X	
NATIVE ANNUAL GRASSES							
Critesion pusillum	little barley		X		X		
Panicum capillare	witchgrass		X				
INTRODUCED ANNUAL GRASSES							
Anisantha tectorum	cheatgrass	Bromus tectorum	X	X	X	X	X
Bromus japonicus	Japanese brome		X		X		
Hordeum vulgare	barley						X
Secale cereale	cereale rye		X		X	X	

PLANT SPECIES PRESENT

PLANT SPECIES PRESENT	COMMON	SYNONYMS	AQUARIUS PARCEL	COAL CREEK CORRIDOR	DAVIDSON MESA	MCCASLIN PARCEL	NORTH TRACT
NATIVE PERENNIAL FORBS							
Adenolinum lewisii	blue flax	Linum lewisii	X		X	X	X
Allium textile	prairie onion		X		X	X	
Ambrosia psilostachya var. coronopifolia	ragweed			X	X	X	X
Antennaria parvifolia	smallleaf pussytoes				X	X	
Apocynum cannabinum	Indian hemp	Apocynum sibiricum		X	X		X
Argemone polyanthemos	prickly poppy				X	X	
Artemisia ludoviciana	pasture sage		X		X	X	
Asclepias pumila	milkweed					X	
Asclepias speciosa	showy milkweed		X	X	X	X	X
Asclepias viridiflora	greenflower milkweed				X	X	
Aster porteri	Porter aster				X		
Astragalus adsurgens var. robustior	milk vetch					X	
Astragalus agrestis	field milkvetch					X	
Astragalus shortianus	milk vetch				X	X	
Astragalus tridactylicus	milk vetch				X		
Boechera divaricarpa	spreadingpod rockcress				X		
Brickellia rosmarinifolia ssp. chlorolepis	brickellia	Kuhnia chlorolepis	X		X		X
Calylophus serrulatus	calylophus					X	
Castilleja sessiliflora	largeflowered paintbrush	Castilleja grandiflora			X		
Comandra umbellata ssp. pallida	bastard toadflax				X		X
Dalea candida var. oligophylla	white prairie clover					X	
Dalea purpurea	purple prairie clover				X	X	
Delphinium virescens ssp. pernardii	larkspur					X	
Epilobium ciliatum	ciliate willow herb			X			
Epilobium sp.	willow herb				X		
Erigeron divergens	spreading fleabane		X				
Erigeron flagellaris	wiplash fleabane				X		
Erigeron spp.	fleabane				X		
Evolvulus nuttalianus	Nuttall evolvulus		X		X		
Gaura coccinea	scarlet gaura		X		X	X	
Gastrolychnis drummondii	Drummond campion	Melandrium drummondii			X		
Glycyrrhiza lepidota	wild licorice				X	X	X
Helianthus pumilus	sunflower				X	X	
Heterotheca villosa	golden aster				X	X	X
Hymenopappus filifolius	threadleaf hymenopappus				X		
Lesquerella montana	bladderpod					X	
Leucocrinum montanum	sand lily					X	
Liatris punctata	spotted gayfeather		X		X	X	X
Lithospermum incisum	narrowleaf puccoon		X		X	X	
Lomatium orientale	biscuitroot		X		X	X	

PLANT SPECIES PRESENT

PLANT SPECIES PRESENT	COMMON	SYNONYMS	AQUARIUS PARCEL	COAL CREEK CORRIDOR	DAVIDSON MESA	MCCASLIN PARCEL	NORTH TRACT
Machaeranthera canescens	hoary tansyaster					X	X
Machaeranthera pinnatifida	ironplant goldenweed	Haplopappus spinulosus	X		X	X	X
Mertensia lanceolata	bluebells				X	X	X
Monarda pectinata	pony beebalm					X	
Musineon divaricatum	musineom					X	
Nothocalais cuspidata	false dandelion		X		X	X	
Oenothera howardii	Howard eveningprimrose	O. jamesii			X	X	
Oenothera villosa	evening-primrose	Oenothera strigosa	X	X	X	X	X
Oligoneuron rigidum	stiff goldenrod	Solidago rigidum	X		X		X
Oligosporus dracunculus ssp. glaucus	wild tarragon	Artemisia dracunculus ssp. glaucus	X		X	X	X
Oxybaphus linearis	umbrellawort		X		X		
Oxybaphus nyctagineus	umbrellawort			X			X
Oxytropis lambertii	locoweed				X	X	
Oxytropis sericea	locoweed				X	X	
Packera plattensis	prairie groundsel		X			X	
Penstemon angustifolius	narrowleaf beard-tongue				X	X	
Persicaria spp.	smartweed			X			X
Physalis heterophylla	ground-cherry		X		X		
Physalis pumila subsp. hispida	ground-cherry	Physalis virginiana var. hispida	X				
Physalis virginiana	ground-cherry		X		X		X
Potamogeton spp.	pondweed			X			
Psoralidium tenuiflorum	scurfpea	Psoralea tenuiflora	X		X	X	X
Ranunculus spp.	buttercup			X			
Ratibida columnifera	prairie coneflower					X	
Senecio fremontii var. blitoides	Tremont groundsel				X	X	X
Senecio integerrimus	lambstongue groundsel				X		
Senecio spartioides	threadleaf groundsel				X		
Solidago missouriensis	Missouri goldenrod					X	X
Solidago mollis	velvety goldenrod				X	X	X
Solidago nemoralis	Dyersweed goldenrod				X		
Solidago spp.	goldenrod		X	X			
Sphaeralcea coccinea	copper mallow		X		X	X	
Stephanomeria pauciflora	skeletonweed		X				
Thelesperma megapotamicum	Colorado greenthread				X		X
Thermopsis rhombifolia	golden banner						X
Tithymalus brachyceras	robust spurge	Tithymalus montanus			X		
Tradescantia occidentalis	Western spiderwort				X		
Verbena hastata	blue vervain			X			

PLANT SPECIES PRESENT

PLANT SPECIES PRESENT	COMMON	SYNONYMS	AQUARIUS PARCEL	COAL CREEK CORRIDOR	DAVIDSON MESA	MCCASLIN PARCEL	NORTH TRACT
Vicia americana	American vetch		X				X
Vicia sp.	vetch		X				
Viola nuttallii	yellow prairie violet	Onosmodium molle				X	
Virgulus ericoides (group)	white prairie aster	Aster ericoides (group)	X	X	X	X	X
INTRODUCED PERENNIAL FORBS							
Asparagus officinalis	asparagus		X	X			X
Breea arvensis	Canada thistle	Cirsium arvense	X	X	X		X
Cardaria chalepensis	whitetop	Lepidium chalepensis					X
Cardaria latifolia	whitetop				X		
Cichorium intybus	chicory			X	X		X
Convolvulus arvensis	field bindweed		X	X	X	X	X
Eichhornia crassipes	water hyacinth			X			
Hypericum perforatum	klamath weed, st. johnswort		X	X			
Linaria genistifolia ssp. dalmatica	dalmation toadflax	Linaria dalmatica			X		
Medicago sativa	alfalfa		X	X	X	X	X
Melandrium dioicum	whitecockle campion			X			
Mentha spicata	spearmint			X			X
Nasturtium officinale	water-cress						X
Nepeta cataria	catnip			X			
Plantago major	common plantain			X			
Potentilla recta	sulfur cinquifoil		X	X			
Rudbeckia sp.	black eyed susan						X
Rumex crispus	curly dock		X	X	X	X	X
Saponaria officinalis	bouncing bet			X			X
Sonchus arvensis	sowthistle			X			X
Taraxacum officinale	common dandelion		X		X	X	X
Tithymalus esula	leafy spurge	Euphorbia esula			X		
Trifolium pratense	red clover			X			
Trifolium repens	White Dutch clover			X			X
Verbena bracteata	vervain					X	
NATIVE PERENNIAL GRASSES (cool)							
Achnatherum robustum	sleepy grass	Stipa robusta	X				
Carex emoryi	emory sedge		X				
Carex filifolia	threadleaf sedge		X				
Carex pennsylvanica ssp. heliophila	sun sedge		X		X		
Carex praegracilis	silver sedge		X				
Carex spp.	sedge		X		X		
Elymus canadensis	Canada wildrye				X		

PLANT SPECIES PRESENT

PLANT SPECIES PRESENT	COMMON	SYNONYMS	AQUARIUS PARCEL	COAL CREEK CORRIDOR	DAVIDSON MESA	MCCASLIN PARCEL	NORTH TRACT
Elymus elymoides	bottlebrush squirreltail	Sitanion hystrix	X			X	
Elymus longifolius	bottlebrush squirreltail	Sitanion longifolium			X	X	
Elymus trachycaulus	slender wheatgrass		X				
Hesperostipa comata	needle-and-thread	Stipa comata	X		X	X	
Juncus arcticus ssp. ater	Baltic rush	Juncus ater			X		
Juncus spp.	rush						X
Koeleria macrantha	junegrass	Koeleria cristata	X		X		
Pascopyrum smithii	Western wheatgrass	Agropyron smithii	X		X		X
Poa agassizensis	Agassiz bluegrass		X		X		X
Poa compressa	Canada bluegrass		X		X		X
Poa fendleriana	mutton bluegrass		X				
Poa secunda	Sandberg bluegrass	P. ampla, P. juncifolia	X				
Schoenoplectus lacustris ssp. acutus	tule bulrush	Scirpus acutus		X			X
Schoenoplectus pungens	three square	Scirpus pungens, S. americanus					X
Typha latifolia	broadleaf cattail		X	X	X		X
INTRODUCED PERENNIAL GRASSES (cool)							
Agropyron cristatum	crested wheatgrass "fairway"		X		X	X	X
Agrostis gigantea	redtop	A. alba					X
Bromopsis bieberstienii	meadow brome	Bromus riparius			X		
Bromopsis inermis	smooth brome	Bromus inermis	X	X	X	X	X
Dactylis glomerata	orchard grass				X		X
Festuca arundinacea	tall fescue		X		X		
Festuca pratensis	meadow fescue			X			
Phleum pratense	timothy				X		
Poa pratensis	Kentucky bluegrass		X	X	X	X	X
Setaria viridis	green bristlegrass		X				
Thinopyrum intermedium	intermediate wheatgrass	Agropyron intermedium	X	X	X	X	X
NATIVE PERENNIAL GRASSES (warm)							
Andropogon gerardii	big bluestem, turkeyfoot				X	X	
Aristida purpurea	three-awn		X		X	X	
Bouteloua curtipendula	sideoats grama		X		X	X	X
Buchloe dactyloides	buffalograss		X		X		
Chondrosum gracile	blue grama grass	Bouteloua gracilis	X	X	X	X	X
Chondrosum hirsutum	hairy grama	Bouteloua hirsuta			X		
Panicum virgatum	switchgrass		X		X		X
Schizachyrium scoparium	little bluestem	Andropogon scoparius			X		
Spartina pectinata	prairie cordgrass		X	X	X		X
Sporobolus asper	tall dropseed		X				

PLANT SPECIES PRESENT

PLANT SPECIES PRESENT	COMMON	SYNONYMS	AQUARIUS PARCEL	COAL CREEK CORRIDOR	DAVIDSON MESA	MCCASLIN PARCEL	NORTH TRACT
NATIVE SUBSHRUBS							
Artemisia frigida	fringed sage		X		X	X	X
Gutierrezia sarothrae	snakeweed		X		X	X	X
NATIVE SHRUBS							
Amorpha fruticosa var. angustifolia	indigobush leadplant		X	X	X		X
Chrysothamnus nauseosus	rubber rabbitbrush		X		X	X	
Crataegus macracantha var. occidentalis	hawthorn			X			
Eriogonum effusum	wild buckwheat		X		X	X	X
Oreobatus deliciosus	Boulder raspberry	Rubus deliciosus				X	
Prunus americana	wild plum		X	X			X
Rhus aromatica ssp. trilobata	skunkbrush	Rhus trilobata			X		
Ribes aureum	golden currant			X			X
Rosa arkansana	Arkansas rose				X		X
Rosa sayi	prickly rose	Rosa acicularis ssp. sayi			X		X
Rosa sp.	wild rose		X	X	X		
Rosa woodsii	Wood's rose				X		
Salix exigua	sand bar willow		X	X	X		X
Symphoricarpos occidentalis	Western snowberry		X				X
Toxicodendron rydbergii	poison ivy			X			
INTRODUCED SHRUBS							
Rhus typhina	staghorn sumac						X
NATIVE TREES							
Juniperus sp.					X		
Negundo aceroides ssp. interius	native box elder	Acer negundo		X		X	
Picea pungens	Colorado blue spruce						X
Pinus ponderosa ssp. scopulorum	ponderosa pine						X
Populus angustifolia	narrowleaf cottonwood			X			
Populus deltoides ssp. monilifera	plains cottonwood		X	X	X	X	X
Populus x acuminata	lanceleaf cottonwood						X
Salix amygdaloides	peach-leaved willow			X			
INTRODUCED TREES							
Elaeagnus angustifolia	Russian olive		X	X	X		X
Fraxinus pensylvanica var. lanceolata	green ash			X			X
Gleditsia sp.	locust						X
Malus domestica	apple						X
Malus spp.	apple						X

PLANT SPECIES PRESENT

PLANT SPECIES PRESENT	COMMON	SYNONYMS	AQUARIUS PARCEL	COAL CREEK CORRIDOR	DAVIDSON MESA	MCCASLIN PARCEL	NORTH TRACT
Prunus sp.	plum						X
Robinia sp.	locust			X			
Salix babylonica	weeping willow						X
Salix fragilis	crack willow			X	X		X
Ulmus americana	American elm						X
Ulmus pumila	Chinese elm		X	X			X
NATIVE VINES							
Clematis ligusticifolia	Western virgin's bower			X			
Parthenocissus inserta	thicket creeper	P. laciniata, P. quinquefolia var. laciniata					X
Vitis riparia	wild grape			X			
FERNS							
Equisetum arvense	field horsetail						X
Hippochaete laevigata	smooth horsetail				X		X
Hippochaete sp.	horsetail sp.			X	X		X
MOSS							
Polytrichum piliferum	moss				X		
LICHENS							
Cladonia sp.	lichen		X				
Xanthoparmelia chlorochroa	lichen		X				
SUCCULENT							
Coryphantha missouriensis	ballcactus					X	
Echinocereus viridiflorus	hen-and-chickens		X		X		
Opuntia fragilis	brittle cactus		X		X		
Opuntia macrorhiza	big-root pricklypear cactus		X	X	X	X	
Opuntia polyacantha	many-spine pricklypear cactus				X		
Pediocactus simpsonii	ball cactus		X				
PARASITE							
Aphyllon fasciculatum	purple broomrape				X	X	
FUNGI							
Calvatia sp.	puffball mushroom		X				
AGAVOIDS							
Yucca glauca	Spanish bayonet		X		X	X	X

WILDLIFE SPECIES OBSERVED, LIKELY TO OCCUR, OR POTENTIALLY PRESENT, CITY OF LOUISVILLE OPEN SPACE

MAMMALS

COMMON NAME	*LATIN NAME*	*STATUS*[1]	*ABUNDANCE*[2]	*PRIMARY HABITATS*[3]	*WHERE SEEN OR MOST LIKELY*[4]
Masked Shrew	*Sorex cinereus*	likely	uncommon	grassland, wetland	DM, AQ-N, W-CTC
Water Shrew	*Sorex palustris*	potential	uncommon	riparian, aquatic, wetland	W-CTC, T-C
Least Shrew	*Cryptotis parva*	potential	--	riparian, wetland	W-CTC, T-C
Western Small-footed Myotis	*Myotis ciliolabrum*	potential	--	riparian, farmland, urban	W-CTC, T-C, AG LANDS
Long-eared Myotis	*Myotis evotis*	potential	--	riparian, farmland, urban	W-CTC, T-C, AG LANDS
Little Brown Myotis	*Myotis lucifugus*	potential	--	riparian, farmland, urban	W-CTC, T-C, AG LANDS
Big Brown Bat	*Eptesicus fuscus*	likely	common	riparian, farmland, urban	W-CTC, T-C, AG LANDS
Hoary Bat	*Lasiurus cinereus*	likely	uncommon	riparian, farmland, urban	W-CTC, T-C, AG LANDS
Silver-haired Bat	*Lasionycteris noctivagans*	likely	uncommon	riparian, farmland, urban	W-CTC, T-C, AG LANDS
Eastern Cottontail	*Sylvilagus floridanus*	observed	common	riparian, farmland, urban	W-CTC, T-C, LP-N, AG LANDS
Desert Cottontail	*Sylvilagus audubonii*	observed	common	grassland, farmland, urban	DM, AQ-N, W-D-S, AG LANDS
Black-tailed Jackrabbit	*Lepus californicus*	likely	uncommon	grassland, farmland	DM, AQ-N, AG LANDS
Fox Squirrel	*Sciurus niger*	observed	common	riparian, farmland, urban	W-CTC, T-C, AG LANDS
Rock Squirrel	*Spermophilus variegatus*	likely	uncommon	riparian, rocky ledges	W-CTC
13-lined Ground Squirrel	*Spermophilus tridecemlineatus*	likely	irregular	farmland, grassland	DM, W-D-S, AG LANDS

COMMON NAME	***LATIN NAME***	***STATUS[1]***	***ABUNDANCE[2]***	***PRIMARY HABITATS[3]***	***WHERE SEEN OR MOST LIKELY[4]***
Black-tailed Prairie Dog	*Cynomys ludovicianus*	observed	irregular	grassland, urban, farmland	W-D-S, DM, AG LANDS
Northern Pocket Gopher	*Thomomys talpoides*	likely	irregular	grassland, farmland	W-D-S, AQ-N
Plains Pocket Gopher	*Geomys bursarius*	potential	--	grassland (sandy soil)	AQ-N
Olive-backed Pocket Mouse	*Perognathus fasciatus*	potential	uncommon	short grassland	DM, AQ-N
Plains Pocket Mouse	*Perognathus flavescens*	potential	uncommon	short grassland	DM, AQ-N
Silky Pocket Mouse	*Perognathus flavus*	likely	common	short grassland	DM, AQ-N
Hispid Pocket Mouse	*Chaetodipus hispidus*	likely	uncommon	grassland	DM, AQ-N, W-D-S
Ord's Kangaroo Rat	*Dipodomys ordii*	likely	irregular	grassland (sandy soil)	AQ-N
Meadow Jumping Mouse	*Zapus hudsonius*	likely	rare	riparian	W-CTC
Western Harvest Mouse	*Reithrodontomys megalotis*	likely	abundant	grassland, farmland	DM, AQ-N, D-W-S, AG LANDS
Plains Harvest Mouse	*Reithrodontomys montanus*	likely	common	grassland, farmland	DM, AQ-N, D-W-S, AG LANDS
Deer Mouse	*Peromyscus maniculatus*	likely	abundant	ubiquitous	all parcels
Northern Grasshopper Mouse	*Onychomys leucogaster*	likely	uncommon	grassland	DM, AQ-N
Mexican Woodrat	*Neotoma mexicana*	likely	uncommon	riparian, rocky ledges	W-CTC
Prairie Vole	*Microtus ochrogaster*	likely	uncommon	grassland	DM, AQ-N
Meadow Vole	*Microtus pennsylvanicus*	likely	abundant	riparian, farmland, wetland	W-CTC, T-C
Long-tailed Vole	*Microtus longicaudus*	potential	--	riparian, wetland, grassland	W-CTC, T-C
House Mouse (non-native)	*Mus musculus*	likely	abundant	urban, farmland	AG LANDS, LP-N
Norway Rat (non-native)	*Rattus norvegicus*	likely	irregular	farmland, urban	AG LANDS, LP-N
Muskrat	*Ondatra zibethicus*	likely	irregular	riparian, aquatic	W-CTC

COMMON NAME	*LATIN NAME*	*STATUS*[1]	*ABUNDANCE*[2]	*PRIMARY HABITATS*[3]	*WHERE SEEN OR MOST LIKELY*[4]
Beaver	*Castor canadensis*	likely	irregular	riparian, aquatic	W-CTC
Porcupine	*Erethizon dorsatum*	likely	irregular	riparian	W-CTC
Coyote	*Canis latrans*	observed	uncommon	riparian, grassland, farmland	all parcels
Red Fox	*Vulpes vulpes*	observed	common	riparian, grassland, farmland	all parcels
Gray Fox	*Urocyon cinereoargenteus*	potential	--	riparian	W-CTC
RaW-CTCoon	*Procyon lotor*	observed	common	riparian, farmland, urban	W-CTC, LP-N, AG LANDS
Long-tailed Weasel	*Mustela frenata*	potential	--	riparian, farmland	W-CTC, AG LANDS
Badger	*Taxidea taxus*	potential	--	grassland, farmland	DM, AG LANDS
Striped Skunk	*Mephitis mephitis*	observed	common	riparian, farmland, urban	W-CTC, LP-N, AG LANDS
Bobcat	*Lynx rufus*	potential	--	riparian	W-CTC, DM
Mule Deer	*Odocoileus hemionus*	observed	uncommon	riparian, farmland, urban	W-CTC, DM
White-tailed Deer	*Odocoileus virginianus*	observed	irregular	riparian	W-CTC

BIRDS

COMMON NAME	*LATIN NAME*	*STATUS*[1]	*ABUNDANCE*[2]	*SEASON*[2]	*PRIMARY HABITATS*[3]	*WHERE SEEN OR MOST LIKELY*[4]
American Bittern	*Botaurus lentiginosus*	potential	--	summer	wetland	W-CTC
Black-crowned Night-Heron	*Nycticorax nycticorax*	likely	uncommon	summer	wetland, riparian	W-CTC
Great Blue Heron	*Aredea herodias*	observed	uncommon	summer	aquatic, riparian	W-CTC
Great Egret	*Casmerodius albus*	potential	--	summer	aquatic, riparian	W-CTC

COMMON NAME	***LATIN NAME***	***STATUS*** [1]	***ABUNDANCE*** [2]	***SEASON*** [2]	***PRIMARY HABITATS*** [3]	***WHERE SEEN OR MOST LIKELY*** [4]
Canada Goose	*Branta canadensis*	observed	common	year-round	farmland, aquatic	W-CTC, LP-N, AG LANDS
Mallard	*Anas platyrhynchos*	observed	common	year-round	aquatic	W-CTC, LP-N
Green-winged Teal	*Anas creW-CTCa*	observed	uncommon	year-round	aquatic	W-CTC, LP-N
Blue-winged Teal	*Anas discors*	observed	uncommon	summer	aquatic	W-CTC, LP-N
Cinnamon Teal	*Anas cyanoptera*	observed	uncommon	summer	aquatic	W-CTC, LP-N
Turkey Vulture	*Cathartes aura*	observed	uncommon	summer	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Bald Eagle	*Haliaeetus leucocephalus*	likely	uncommon	winter	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Northern Harrier	*Circus cyaneus*	likely	uncommon	winter	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Sharp-shinned Hawk	*AW-CTCipiter striatus*	likely	uncommon	year-round	riparian, urban	W-CTC, LP-N
Cooper's Hawk	*AW-CTCipiter cooperii*	observed	uncommon	year-round	riparian, urban	W-CTC, LP-N
Swainson's Hawk	*Buteo swainsoni*	observed	uncommon	summer	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Red-tailed Hawk	*Buteo jamaicensis*	observed	uncommon	year-round	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Ferruginous Hawk	*Buteo regalis*	observed	uncommon	year-round	grassland	DM, AQ-N, W-D-S, AG LANDS
Rough-legged Hawk	*Buteo lagopus*	observed	irregular	winter	grassland	DM, AQ-N, W-D-S, AG LANDS
GoldenEagle	*Aquila chrysaetos*	observed	uncommon	year-round	grassland	DM, AQ-N, W-D-S, AG LANDS

COMMON NAME	***LATIN NAME***	***STATUS***[1]	***ABUNDANCE***[2]	***SEASON***[2]	***PRIMARY HABITATS***[3]	***WHERE SEEN OR MOST LIKELY***[4]
American Kestrel	*Falco sparverius*	observed	common	year-round	farmland, riparian	DM, AQ-N, W-D-S, AG LANDS
Merlin	*Falco columbarius*	potential	--	winter	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Prairie Falcon	*Falco mexicanus*	likely	uncommon	year-round	grassland	DM, AQ-N, W-D-S, AG LANDS
Peregrine Falcon	*Falco peregrinus*	potential	--	migration	grassland	DM, AQ-N, W-D-S, AG LANDS
Ring-necked Pheasant	*Phasianus colchicus*	observed	common	year-round	farmland	AG LANDS
Northern Bobwhite	*Collinus virgianus*	potential	--	year-round	farmland, riparian	AG LANDS, W-CTC
Virginia Rail	*Rallus limicola*	potential	--	summer	wetland	W-CTC, T-C
Sora	*Porzana carolina*	likely	uncommon	summer	wetland	W-CTC, T-C
American Coot	*Fulica americana*	observed	uncommon	year-round	aquatic	W-CTC, LP-N
Sandhill Crane	*Grus canadensis*	potential	--	migration	wetland, farmland	AG LANDS
Killdeer	*Charadrius vociferus*	observed	common	summer	farmland, shores	AG LANDS (ponds)
Mountain Plover	*Charadrius montanus*	potential	--	summer	grassland	DM, W-D-S, AG LANDS (pastures
Spotted Sandpiper	*Actitis macularia*	likely	irregular	migration	riparian	W-CTC
Common Snipe	*Gallinago gallinago*	likely	uncommon	summer	wetlands, shores	W-CTC, T-C
Franklin's Gull	*Larus pipixcan*	likely	common	migration	farmland	W-D-S, AG LANDS
Bonaparte's Gull	*Larus philadelphia*	likely	uncommon	migration	farmland	W-D-S, AG LANDS

COMMON NAME	***LATIN NAME***	***STATUS*** [1]	***ABUNDANCE*** [2]	***SEASON*** [2]	***PRIMARY HABITATS*** [3]	***WHERE SEEN OR MOST LIKELY*** [4]
Ring-billed Gull	*Larus delawarensis*	likely	common	year-round	farmland	W-D-S, AG LANDS
California Gull	*Larus californicus*	likely	uncommon	year-round	farmland	W-D-S, AG LANDS
Herring Gull	*Larus argenteus*	likely	common	year-round	farmland	W-D-S, AG LANDS
Rock Dove (Pigeon, non-native)	*Columba livia*	observed	common	year-round	farmland, urban	W-D-S, T-C, AG LANDS
Mourning Dove	*Zenaida macroura*	observed	common	summer	ubiquitous	all parcels
Yellow-billed Cuckoo	*CoW-CTCyzus americanus*	observed	irregular	summer	riparian	W-CTC
Barn Owl	*Tyto alba*	potential	--	year-round	farmland, riparian	W-CTC, AG LANDS
Eastern Screech-Owl	*Otus asio*	likely	uncommon	year-round	riparian, urban, farmland	W-CTC, AG LANDS
Great Horned Owl	*Bubo virginianus*	observed	common	year-round	riparian, urban, farmland	W-CTC, LP-N, AG LANDS
Long-eared Owl	*Asio otus*	observed	uncommon	year-round	riparian, farmland	W-CTC, AG LANDS
Short-eared Owl	*Asio flammeus*	potential	--	winter	grassland, farmland	DM, AQ-N, AG LANDS
Burrowing Owl	*Athene cunicularia*	potential	--	summer	prairie dog towns	DM, W-D-S, AG LANDS
Common Nighthawk	*Chordeiles minor*	observed	common	summer	ubiquitous	all parcels
Chimney Swift	*Chaetura pelagica*	likely	uncommon	summer	urban	AG LANDS (buildings, chimneys)
Broad-tailed Hummingbird	*Selasphorus platycercus*	likely	uncommon	summer	riparian, urban	W-CTC, LP-N

COMMON NAME	***LATIN NAME***	***STATUS***[1]	***ABUNDANCE***[2]	***SEASON***[2]	***PRIMARY HABITATS***[3]	***WHERE SEEN OR MOST LIKELY***[4]
Rufous Hummingbird	*Selasphorus rufus*	likely	uncommon	migration	riparian, urban	W-CTC, LP-N
Belted Kingfisher	*Ceryle alcyon*	observed	uncommon	year-round	riparian	W-CTC
Lewis' Woodpecker	*Melanerpes lewis*	potential	--	year-round	riparian, farmland	W-CTC, AG LANDS
Red-headed Woodpecker	*Melanerpes erythrocephalus*	potential	--	summer	riparian, farmland	W-CTC, AG LANDS
Yellow-breasted Sapsucker	*Sphyrapicus varius*	likely	uncommon	migration	riparian	W-CTC, LP-N
Red-naped Sapsucker	*Sphyrapicus nuchalis*	potential	--	migration	riparian	W-CTC
Downy Woodpecker	*Picoides pubescens*	observed	common	year-round	riparian, farmland, urban	W-CTC, LP-N
Hairy Woodpecker	*Picoides villosus*	likely	uncommon	winter	riparian, urban	W-CTC, LP-N
Northern Flicker	*Colaptes auratus*	observed	common	year-round	riparian, farmland, urban	W-CTC, LP-N, AG LANDS
Western Wood-Pewee	*Contopus sordidulus*	observed	uncommon	summer	riparian	W-CTC
Hammond's Flycatcher	*Empidonax hammondii*	likely	uncommon	migration	riparian	W-CTC
Dusky Flycatcher	*Empidonax oberholseri*	likely	uncommon	migration	riparian	W-CTC
Cordilleran Flycatcher	*Empidonax oW-CTCidentalis*	observed	uncommon	summer	riparian	W-CTC
Western Kingbird	*Tyrannus verticalis*	observed	uncommon	summer	grassland, farmland	DM, AQ-N, AG LANDS
Eastern Kingbird	*Tyrannus tyrannus*	observed	common	summer	grassland, farmland	DM, AQ-N, AG LANDS

COMMON NAME	*LATIN NAME*	*STATUS*[1]	*ABUNDANCE*[2]	*SEASON*[2]	*PRIMARY HABITATS*[3]	*WHERE SEEN OR MOST LIKELY*[4]
Loggerhead Shrike	*Lanius ludovicianus*	observed	uncommon	summer	grassland, farmland	DM, AQ-N, AG LANDS
Northern Shrike	*Lanius excubitor*	observed	uncommon	winter	grassland, farmland	DM, AQ-N, AG LANDS
Plumbeous Vireo	*Vireo plumbeus*	potential	--	migration	riparian, urban	W-CTC
Warbling Vireo	*Vireo gilvus*	observed	common	summer	riparian, urban	W-CTC, LP-N
Red-eyed Vireo	*Vireo olivaceus*	likely	uncommon	migration	riparian, urban	W-CTC
Blue Jay	*Cyanocitta cristata*	observed	common	year-round	urban, riparian	W-CTC, LP-N, AG LANDS
Western Scrub-Jay	*Aphelocoma californica*	likely	uncommon	year-round	urban, riparian	W-CTC, LP-N
Black-billed Magpie	*Pica hudsonia*	observed	common	year-round	ubiquitous	all parcels
American Crow	*Corvus brachyrhynchos*	observed	common	year-round	ubiquitous	all parcels
Common Raven	*Corvus corax*	observed	uncommon	year-round	farmland, grassland	DM, AQ-N, AG LANDS
Horned Lark	*Eremophila alpestris*	observed	common	year-round	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Tree Swallow	*Tachycineta bicolor*	likely	uncommon	summer	riparian, farmland	W-CTC, AG LANDS
Violet-green Swallow	*Tachycineta thalassina*	likely	uncommon	summer	riparian, farmland	W-CTC, AG LANDS
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*	observed	common	summer	riparian, farmland	W-CTC
Bank Swallow	*Riparia riparia*	potential	--	summer	riparian	W-CTC

COMMON NAME	***LATIN NAME***	***STATUS***[1]	***ABUNDANCE***[2]	***SEASON***[2]	***PRIMARY HABITATS***[3]	***WHERE SEEN OR MOST LIKELY***[4]
Cliff Swallow	*Hirundo pyrrhonota*	observed	common	summer	farmland	W-CTC, LP-N, AG LANDS
Barn Swallow	*Hirundo rustica*	observed	common	summer	urban, farmland	W-CTC, AG LANDS
Black-capped Chickadee	*Poecile atricapilla*	observed	abundant	year-round	riparian, urban	W-CTC, LP-N, AG LANDS
Mountain Chickadee	*Poecile gambeli*	potential	--	winter	riparian, urban	W-CTC
Common Bushtit	*Psaltriparus minimus*	potential	--	winter	riparian	W-CTC
Brown Creeper	*Certhia americana*	observed	common	year-round	riparian, urban	W-CTC, LP-N
White-breasted Nuthatch	*Sitta carolinensis*	observed	uncommon	year-round	riparian, urban	W-CTC, LP-N
Red-breasted Nuthatch	*Sitta canadensis*	observed	uncommon	winter	riparian, urban	W-CTC, LP-N
House Wren	*Troglodytes aedon*	observed	common	summer	riparian	W-CTC
Winter Wren	*Troglodytes troglodytes*	potential	--	winter	riparian	W-CTC
Marsh Wren	*Cistothorus palustris*	potential	--	summer	wetland	W-CTC, T-C
American Dipper	*Cinclus mexicanus*	potential	--	winter	aquatic	W-CTC
Golden-crowned Kinglet	*Regulus satrapa*	potential	--	winter	riparian, urban	W-CTC, LP-N
Ruby-crowned Kinglet	*Regulus calendula*	likely	uncommon	migration	riparian, urban	W-CTC, LP-N
Blue-gray Gnatcatcher	*Polioptila caerulea*	likely	irregular	summer	riparian, urban	W-CTC

COMMON NAME	*LATIN NAME*	*STATUS*[1]	*ABUNDANCE*[2]	*SEASON*[2]	*PRIMARY HABITATS*[3]	*WHERE SEEN OR MOST LIKELY*[4]
Eastern Bluebird	*Sialia sialis*	potential	--	migration	farmland, urban	AQ-N, W-D-S, AG LANDS
Western Bluebird	*Sialia mexicana*	likely	irregular	migration	farmland, urban	AQ-N, W-D-S, AG LANDS
Mountain Bluebird	*Sialia currucoides*	observed	irregular	migration	farmland, grassland	DM, AQ-N, W-D-S, AG LANDS
Townsend's Solitaire	*Myadestes townsendi*	observed	uncommon	year-round	riparian, urban	W-CTC
Swainson's Thrush	*Catharus ustulatus*	observed	uncommon	migration	riparian	W-CTC
American Robin	*Turdus migratorius*	observed	abundant	year-round	ubiquitous	all parcels
Gray Catbird	*Dumetella carolinensis*	observed	uncommon	summer	riparian	W-CTC
Northern Mockingbird	*Mimus polyglottos*	likely	uncommon	summer	riparian, agricultural	W-CTC, LP-N, AG LANDS
Brown Thrasher	*Toxostoma rufum*	observed	uncommon	migration	riparian	W-CTC
European Starling (non-native)	*Sturnus vulgaris*	observed	abundant	year-round	ubiquitous	all parcels
American Pipit	*Anthus rubescens*	likely	irregular	winter	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Bohemian Waxwing	*Bombycilla garrulus*	likely	irregular	winter	riparian, urban	W-CTC, LP-N
Cedar Waxwing	*Bombycilla cedrorum*	likely	irregular	winter	riparian, urban	W-CTC, LP-N
Orange-crowned Warbler	*Vermivora celata*	observed	uncommon	migration	riparian	W-CTC
Northern Parula	*Parula americana*	likely	uncommon	migration	riparian	W-CTC

COMMON NAME	***LATIN NAME***	***STATUS*** [1]	***ABUNDANCE*** [2]	***SEASON*** [2]	***PRIMARY HABITATS*** [3]	***WHERE SEEN OR MOST LIKELY*** [4]
Yellow Warbler	*Dendroica petechia*	observed	common	summer	riparian, urban	W-CTC, LP-N
Yellow-rumped Warbler	*Dendroica coronata*	observed	common	migration	riparian, urban	W-CTC, LP-N
Chestnut-sided Warbler	*Dendroica pensylvanica*	potential	--	migration	riparian	W-CTC
Blackburnian Warbler	*Dendroica fusca*	potential	--	migration	riparian	W-CTC
Pine Warbler	*Dendroica pinus*	potential	--	migration	riparian	W-CTC
Palm Warbler	*Dendroica palmarum*	potential	--	migration	riparian	W-CTC
Bay-breasted Warbler	*Dendroica castanea*	potential	--	migration	riparian	W-CTC
Blackpoll Warbler	*Dendroica striata*	likely	irregular	migration	riparian	W-CTC
Black-anW-Dhite Warbler	*Mniotilta varia*	likely	irregular	migration	riparian	W-CTC
American Redstart	*Setophaga ruficilla*	potential	--	summer	riparian	W-CTC
Ovenbird	*Seiurus aurocapillus*	potential	--	summer	riparian	W-CTC
Northern Waterthrush	*Seiurus noveboracensis*	potential	--	migration	riparian	W-CTC
MacGillivray's Warbler	*Oporornis tolmiei*	likely	uncommon	migration	riparian	W-CTC
Common Yellowthroat	*Geothlypis trichas*	observed	irregular	summer	wetland	W-CTC, T-C
Hooded Warbler	*Wilsonia citrina*	potential	--	migration	riparian	W-CTC

COMMON NAME	***LATIN NAME***	***STATUS[1]***	***ABUNDANCE[2]***	***SEASON[2]***	***PRIMARY HABITATS[3]***	***WHERE SEEN OR MOST LIKELY[4]***
Yellow-breasted Chat	*Icteria virens*	potential	--	summer	riparian	W-CTC
Western Tanager	*Piranga ludoviciana*	observed	irregular	migration	riparian, urban	W-CTC, LP-N
Eastern Towhee	*Pipilo erythrophthalmus*	potential	--	winter	riparian	W-CTC
Spotted Towhee	*Pipilo maculatus*	observed	uncommon	summer	riparian	W-CTC
Green-tailed Towhee	*Pipilo chlorurus*	potential	--	migration	riparian	W-CTC
American Tree Sparrow	*Spizella arborea*	likely	irregular	winter	riparian, farmland	W-CTC, AG LANDS
Chipping Sparrow	*Spizella passerina*	observed	common	summer	riparian, urban	W-CTC, LP-N
Clay-colored Sparrow	*Spizella pallida*	likely	uncommon	migration	grassland, farmland	DM, AQ-N, W-D-S
Lark Sparrow	*Chondestes grammacus*	observed	uncommon	summer	urban, grassland, riparian	W-CTC, AQ-N, LP-N, AG LANDS
Lark Bunting	*Calamospiza melanocorys*	observed	irregular	migration	grassland	DM, AQ-N
Savannah Sparrow	*Passerculus sandwichensis*	observed	uncommon	summer	grassland (moist)	W-CTC, T-C, AG LANDS
Grasshopper Sparrow	*Ammodramus savannarum*	observed	common	summer	grassland	DM, AQ-N, W-D-S
Fox Sparrow	*Passerella iliaca*	likely	uncommon	migration	riparian	W-CTC
Lincoln's Sparrow	*Melospiza lincolnii*	likely	uncommon	migration	wetland	W-CTC, T-C
Song Sparrow	*Melospiza melodia*	observed	common	year-round	wetland, riparian	W-CTC , T-C, AG LANDS

COMMON NAME	***LATIN NAME***	***STATUS*** [1]	***ABUNDANCE*** [2]	***SEASON*** [2]	***PRIMARY HABITATS*** [3]	***WHERE SEEN OR MOST LIKELY*** [4]
Swamp Sparrow	*Melospiza georgiana*	potential	--	winter	wetland, riparian	W-CTC, T-C
Vesper Sparrow	*Pooecetes gramineus*	observed	common	summer	grassland	DM, AQ-N, W-D-S, T-C
White-throated Sparrow	*Zonotrichia albicollis*	likely	irregular	winter	riparian	W-CTC, LP-N
White-crowned Sparrow	*Zonotrichia leucophrys*	observed	irregular	winter	riparian, urban	W-CTC, LP-N
Harris' Sparrow	*Zonotrichia querula*	potential	--	winter	riparian	W-CTC
Dark-eyed Junco	*Junco hymalis*	observed	common	winter	riparian	W-CTC, LP-N
Chestnut-collared Longspur	*Calcarius ornatus*	potential	--	migration	grassland	DM, AQ-N
MW-CTCown's Longspur	*Calcarius mW-CTCownii*	potential	--	migration	grassland	DM, AQ-N
Lapland Longspur	*Calcarius lapponicus*	potential	--	migration	grassland	DM, AQ-N
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	potential	--	migration	riparian	W-CTC
Black-headed Grosbeak	*Pheucticus melanocephalus*	observed	uncommon	summer	riparian	W-CTC
Blue Grosbeak	*Guiraca caerulea*	observed	uncommon	summer	riparian	W-CTC
Indigo Bunting	*Passerina cyanea*	observed	uncommon	summer	riparian	W-CTC
Lazuli Bunting	*Passerina amoena*	observed	uncommon	summer	riparian	W-CTC
Dicksissel	*Spiza americana*	potential	--	summer	farmland, grassland	AG LANDS

COMMON NAME	*LATIN NAME*	*STATUS*[1]	*ABUNDANCE*[2]	*SEASON*[2]	*PRIMARY HABITATS*[3]	*WHERE SEEN OR MOST LIKELY*[4]
Bobolink	*Dolichonyx oryzivorus*	potential	--	summer	farmland, grassland	AG LANDS
ReW-Dinged Blackbird	*Agelaius phoeniceus*	observed	common	year-round	farmland, wetland	W-CTC, T-C, AG LANDS
Western Meadowlark	*Sturnella neglecta*	observed	common	year-round	grassland, farmland	DM, AQ-N, W-D-S, AG LANDS
Yellow-headed Blackbird	*Xanthocephalus xanthocephalus*	likely	uncommon	summer	wetland	T-C, W-CTC
Brewer's Blackbird	*Euphagus cyanocephalus*	observed	common	year-round	ubiquitous	all parcels
Common Grackle	*Quiscalus quiscula*	observed	common	summer	urban, farmland, riparian	W-CTC, LP-N, AG LANDS
Brown-headed Cowbird	*Molothrus ater*	observed	common	summer	urban, farmland, riparian	W-CTC, LP-N, AG LANDS
Orchard Oriole	*Icterus spurius*	likely	irregular	summer	farmland, riparian	W-CTC, AG LANDS
Bullock's Oriole	*Icterus bullockii*	observed	common	summer	urban, farmland, riparian	W-CTC, LP-N, AG LANDS
Purple Finch	*Carpodacus purpureus*	potential	--	winter	urban, riparian	W-CTC, LP-N
Cassin's Finch	*Carpodacus cassinii*	potential	--	winter	urban, riparian	W-CTC, LP-N
House Finch	*Carpodacus mexicana*	observed	abundant	year-round	ubiquitous	all parcels
Red Crossbill	*Loxia curvirostra*	potential	--	winter	riparian, urban	W-CTC
Pine Siskin	*Carduelis pinus*	observed	common	year-round	riparian, urban	W-CTC, LP-N
Lesser Goldfinch	*Carduelis psaltria*	observed	common	summer	urban, riparian, farmland	W-CTC, LP-N, AG LANDS

COMMON NAME	*LATIN NAME*	*STATUS[1]*	*ABUNDANCE[2]*	*SEASON[2]*	*PRIMARY HABITATS[3]*	*WHERE SEEN OR MOST LIKELY[4]*
American Goldfinch	*Carduelis tristis*	observed	common	year-round	urban, riparian, farmland	W-CTC, LP-N, AG LANDS
Evening Grosbeak	*CoW-CTCothraustes vespertinus*	likely	irregular	winter	urban, riparian	W-CTC, LP-N
House Sparrow	*Passer domesticus*	observed	abundant	year-round	ubiquitous	all parcels

REPTILES

COMMON NAME	*LATIN NAME*	*STATUS[1]*	*ABUNDANCE[2]*	*PRIMARY HABITATS[3]*	*WHERE SEEN OR MOST LIKELY[4]*
Ornate Box Turtle	*Terrapene ornata*	potential	--	grassland, riparian	W-CTC, DM, AQ-N
Lesser Earless Lizard	*Holbrookia maculata*	potential	--	grassland (sandy)	AQ-N
Short-horned Lizard	*Phrynosoma hernandesi*	likely	uncommon	grassland	DM, AQ-N
Eastern Fence Lizard	*Sceloporus undulatus*	likely	uncommon	rocky areas, riparian	W-CTC, AQ-N
Six-lined Racerunner	*Cnemidophorus sexlineatus*	potential	--	grassland, riparian	W-CTC, DM
Many-lined Skink	*Eumeces multivirgatus*	potential	--	grassland (sandy)	AQ-N
Racer	*Coluber constrictor*	observed	common	grassland, riparian	W-CTC, DM, AQ-N
Western Hognose Snake	*Heterodon nasicus*	likely	uncommon	grassland, riparian	W-CTC, DM, AQ-N
Milk Snake	*Lampropeltis triangulum*	likely	uncommon	riparian	W-CTC
Coachwhip	*Masticophis flagellum*	likely	uncommon	grassland, riparian	W-CTC, DM, AQ-N
Smooth Green Snake	*Liochlorophis vernalis*	likely	uncommon	riparian, grassland	W-CTC, DM, AQ-N
Northern Water Snake	*Nerodia sipedon*	potential	--	aquatic	W-CTC
Bullsnake/Gopher Snake	*Pituophis catenifer*	observed	common	grassland, riparian, farmland	W-CTC, DM, AQ-N, AG LANDS
Western Terrestrial Garter Snake	*Thamnophis elegans*	observed	common	riparian, grassland, farmland	W-CTC, DM, AQ-N, AG LANDS

COMMON NAME	*LATIN NAME*	*STATUS*[1]	*ABUNDANCE*[2]	*PRIMARY HABITATS*[3]	*WHERE SEEN OR MOST LIKELY*[4]
Plains Garter Snake	*Thamnophis radix*	likely	uncommon	riparian, grassland, farmland	W-CTC, DM, AQ-N, AG LANDS
Common Garter Snake	*Thamnophis sirtalis*	observed	uncommon	riparian, grassland	W-CTC, DM, AQ-N
Lined Snake	*Tropidoclonion lineatum*	potential	--	grassland, riparian	W-CTC, DM, AQ-N
Western/Prairie Rattlesnake	*Crotalus viridis*	likely	irregular	grassland, rocky areas	AQ-N, DM

AMPHIBIANS

COMMON NAME	*LATIN NAME*	*STATUS*[1]	*ABUNDANCE*[2]	*PRIMARY HABITATS*[3]	*WHERE SEEN OR MOST LIKELY*[4]
Tiger Salamander	*Ambystoma tigrinum*	likely	irregular	aquatic, riparian	W-CTC, AG LANDS (ponds)
Great Plains Toad	*Bufo cognatus*	potential	--	aquatic, wetland	W-CTC, T-C, AG LANDS (ponds)
Woodhouse's Toad	*Bufo woodhousei*	likely	irregular	aquatic, wetland	W-CTC, T-C, AG LANDS (ponds)
Western Chorus Frog	*Pseudacris triseriata*	observed	irregular	wetland	W-CTC, T-C, AG LANDS (ponds)
Bullfrog (non-native)	*Rana catesbiana*	likely	common	aquatic	W-CTC, AG LANDS (ponds)
Northern Leopard Frog	*Rana pipiens*	potential	--	aquatic	W-CTC, AG LANDS (ponds)
Plains Spadefoot (Toad)	*Spea bombifrons*	likely	irregular	wetland	W-CTC, T-C, AG LANDS (ponds)

Key to Table X.

[1] Status:	Observed – Seen during wildlife inventory or other surveys of Louisville Open Space. Likely – Expected to occur, based on documented presence in similar habitats nearby. Potential – Could occur, based on habitat types present.
[2] Abundance:	Abundant – Regularly seen in large numbers in suitable habitat. Common – Regularly seen in intermediate numbers in suitable habitat. Uncommon – Regularly seen in small numbers in suitable habitat. Irregular – Not regularly seen in suitable habitat. Numbers observed may vary widely.
[2] Season (Birds):	Migration – Passes through during spring and/or fall migrations. Summer – Migrates in and remains during summer; leaves in fall; most also nest. Winter – Migrates in and remains during winter; leaves in spring. Year-round – Species present all year; summer and winter individuals not necessarily the same.
[3] Primary Habitats:	Aquatic – Surface water; streams, ponds. Farmland – Variously includes pastures, shade trees, and cultivated cropland. Grassland – Areas of native grassland or abandoned non-native pasture. Riparian – Deciduous woodland or shrubland along streams and major ditches. Ubiquitous – Found in nearly all habitat types; widespread throughout study area. Urban – Areas within City that have mature trees and/or shrub thickets (e.g., city parks, cemeteries). Wetland – Cattail marshes or similar habitats.
[4] Where Seen or Most Likely:	AG LANDS – Bowes-Admore Trillium, Boulder Co. Land Venture, Lastoka, Callahan, Warembourg pastures. AQ-N – Native grasslands of North and Aquarius. W-CTC – Warembourg and CTC riparian corridor along Coal Creek. DM – Davidson Mesa. LP-N – Lake Park and park-like portions of North. T-C – Tamarisk and Callahan wetland areas. W-D-SWarembourg-Daughenbaugh-Scriffiny

APPENDIX A

LOUISVILLE HORTICULTURE AND FORESTRY ADVISORY BOARD

RECOMMENDATION FOR LANDSCAPING PLANT LIST FOR CLASS 4 OPEN SPACE

PARCELS DESIGNATED AS "OTHER"

DECEMBER 5, 2001

- The availability of a nursery-grown plant pallette -- especially perennials and grasses -- endemic to the Front Range ecological is expanding, and changes rapidly from year to year.

- Boulder County has more ecological diversity than anywhere else along the Front Range.

- Each of the following lists can be used on Class 4 open space as appropriate and as plants are available commercially:

    - *Suggested Native Plants for Horticultural Use on the Front Range of Colorado*, published by the Colorado Native Plant Society Horticulture and Restoration Committee, revised April 2001 *See* attached list.

    - Indigenous native plants list as proposed by the Louisville Open Space Board for Ordinance 1329, date unknown. *See* attached list.

- The Horticulture and Forestry Advisory Board will endeavor to revisit each list every five years for continued suitability, beginning in 2006.

The Horticulture and Forestry Advisory Board recognizes that these lists are not comprehensive of all native plants. While affirming a commitment to recommend native plants for use in Class 4 Open Space whenever reasonable and practical, the Board has discovered during its research numerous commercially available native forbs and graminoids not included in either referenced list. Therefore, the Board advises that other available native forbs and graminoids may be used on Class 4 Open Space as commercially available and appropriate to the specific site.

Louisville Ordinance 1329-2000 requires that native plants be used in three of four classifications of open space lands and that reasonable attempts be made to use native plants on the fourth classification.

1) Native plants are plants that are indigenous to the area. Indigenous means the plant originated in the area. For the purpose of this ordinance, the following plants shall be constitute the native plants that can be used on Louisville Open Space.

Short-grass Prairie (dominant species in bold type)

GRAMINOIDS	
Bouteloua gracilis	**blue grama**
Bouteloua hirsuta	hairy grama
Buchloe dactyloides	**buffalograss**
Koeleria macrantha	junegrass
Pascopyrum smithii	**western wheatgrass**
Poa secunda	Sandberg bluegrass
Sporobolus cryptandrus	sand dropseed
Stipa comata	needleandthread
FORBS	
Argemone polyanthemos	crested pricklypoppy
Artemisia ludoviciana	prairie sage
Artemisia frigida	**fringed sagewort**
Astragalus shortainus	milkvetch
Heterotheca villosa	goldenaster
Dalea candida	white prairieclover
Dalea purpurea	purple prairieclover
Delphinium carolinium ssp. virescens	Carolina larkspur
Eriogonum effusum	spreading buckwheat
Erysimum asperum	plains wallflower
Gaillardia aristata	blanketflower
Gaura coccinea	scarlet beeblossom
Liatris punctata	**dotted gayfeather**
Linum lewisii	Lewis' flax
Mirabilis linearis	narrowleaf four o'clock
Oenothera caespitosa	clumped evening primrose
Psoralidium tenuiflorum	**slimflower scurfpea**
Ratibida columnifera	**upright prairie coneflower**
Solidago missouriensis	goldenrod
Sphaeralcea coccinea	**scarlet globemallow**
Tetraneuris acaulis	stemless hymenoxys

TREES AND SHRUBS
(INCLUDING SUCCULENTS)

Atriplex canescens	fourwing saltbush
Chrysothamnus naneosus	**dwarf rabbitbrush**
Echinocereus viridiflorus	nylon hedgehog cactus
Krascheninnikovia lanata	winterfat
Opuntia fragilis	brittle pricklypear
Opuntia macrorhiza	twistspine pricklypear
Opuntia phaeacantha	**Mojave pricklypear**
Opuntia polyacantha	hairspine pricklypear
Yucca glauca	**small soapweed**

Mid-grass Prairie (dominant species in bold type)

GRAMINOIDS

Bouteloua curtipendula	sideoats grama
Bouteloua gracilis	**blue grama**
Koeleria macrantha	**prairie junegrass**
Pascopyrum smithii	**western wheatgrass**
Schizachyrium scoparium	**little bluestem**
Stipa comata	**needleandthread**
Stipa viridula	green needlegrass

FORBS

Amorpha canescens	leadplant
Dalea candida	white prairieclover
Dalea purpurea	**purple prairieclover**
Eriogonum effusum	spreading buckwheat
Gaura coccinea	scarlet beeblossom
Liatris punctata	**dotted gayfeather**
Psoralidium tenuiflorum	**slimflower scurfpea**
Ratibida columnifera	**upright prairie coneflower**
Sphaeralcea coccinea	**scarlet globemallow**
Virgulus ericoides	white prairieaster

TREES AND SHRUBS

Krascheninnikovia lanata	winterfat
Rosa woodsii	prairie rose
Yucca glauca	**small soapweed**

Riparian – Plains (dominant species in bold type)

GRAMINOIDS	
Distichlis spicata	inland saltgrass
Glyceria striata	manna grass
Hordeum jubatum	foxtail barley
Juncus arcticus	arctic rush
Panicum virgatum	switchgrass
Pascopyron smithii	western wheatgrass
Spartina pectinata	prairie cordgrass
Sporobolus airoides	alkali sacaton
FORBS	
Apocynum androsea mifolium	dogbane
Asclepias incarnata	swamp milkweed
Clematis ligusticifolia	western white clematis
Glycyrrhiza lepidota	wild licorice
Hydrophyllum fendleri	Fendler's waterleaf
Iris missouriensis	Rocky Mountain iris
Maianthemum stellatum	starry false Solomon's seal
Mentha arvensis	wild mint
Monarda fistulosa	wildbergamot beebalm
Parthenocissus vitacea	Virginia creeper
Potentilla rivalis	brook cinquefoil
Solidago canadensis	Canada goldenrod
TREES AND SHRUBS	
Acer negundo	**box-elder**
Amorpha fruiticosa	desert indigobush
Celtis reticulata	netleaf hackberry
Chrysothamnus nauseosus	rubber rabbitbrush
Juniperus scopulorum	Rocky Mountain juniper
Prunus virginiana	**black chokecherry**
Populus angustifolia	**narrowleaf cottonwood**
Populus deltoides	**plains cottonwood**
Rhus trilobata	skunkbush sumac
Ribes aureum	golden currant
Rosa woodsii	Woods' rose
Salix amygdaloides	**peachleaf willow**
Salix bebbiana	**Bebb willow**
Salix exigua	**sandbar (coyote) willow**

2) Native plants should be placed consistent with the setting that would be present before Euro-American settlement to the maximum extent possible. Collection location for plants and seeds purchased from commercial venders shall be the closest available to Louisville to help maintain genetic integrity.

3) City lands being landscaped adjacent to open space are recommended to be landscaped in a character consistent with these requirements to form a transition area.

4) For perennial cropped and/or grazed lands, native plants shall be used when revegetating or augmenting vegetation, unless it makes the agricultural activity uneconomical.

5) For annual cropped areas, non native vegetation may be used.

APPENDIX B
Protocol for Prairie Dog Removal by Property

5.3. Daughenbaugh

5.3.9.1 Black-Tailed Prairie Dog

5.3.9.1.4 Population Management

- ***Removal Activities***

Acceptable removal activities, in order of preference, include:

1. Live, wild-to-wild relocation of the animal(s) if the following are satisfied:
   a. In cases where prairie dogs have established within the buffer area, relocation of these animals back to the core area is acceptable IF:
      1) The core population is less than 100 animals at the time of relocation; and
      2) Abandoned pre-existing holes are available which are at least 50 yards away from the nearest coterie.
   b. In cases where ≥ 60 prairie dogs are in need of removal, a suitable relocation site must be available at the time of need which:
      1) Does not violate any other land use or wildlife objectives;
      2) Follows the habitat suitability guidelines set forth in Appendix A; and
      3) A Colorado Division of Wildlife relocation permit is obtainable.
   c. In cases where <60 prairie dogs are in need of removal, a suitable relocation site must be available at the time of need which:
      1) Currently harbors an existing prairie dog population which is below site carrying capacity;
      2) Does not violate any other land use or wildlife objectives;
      3) Follows the habitat suitability guidelines set forth in Appendix A; and
      4) A Colorado Division of Wildlife relocation permit is obtainable.
2. Live removal and donation of the animal(s) to wildlife research or rehabilitation centers, provided removal and transportation methods are humane as set forth in Appendix B.
3. The most humane method of lethal control may be used when all non-lethal options for prairie dog control have been fully considered. The use of toxic grain bait is never acceptable. A wildlife survey to assess and mitigate for any negative impacts to other species that may be utilizing the burrows must be completed before any lethal control activities.

5.4 Davidson Mesa

5.4.9 Management Direction

5.4.9.1. Black-Tailed Prairie Dog

5.4.9.1.4 Population Management

- Removal Activities for Protected Land

Acceptable removal activities, in order of preference, include:

1. Live, wild-to-wild relocation of the animal(s) if the following are satisfied:
    a. In cases where ≥ 60 prairie dogs are in need of removal, a suitable relocation site must be available at the time of need which:
        1) Does not violate any other land use or wildlife objectives;
        2) Follows the habitat suitability guidelines set forth in Appendix A; and
        3) A Colorado Division of Wildlife relocation permit is obtainable.
    b. In cases where 11 – 59 prairie dogs are in need of removal, a suitable relocation site must be available at the time of need which:
        1) Currently harbors an existing prairie dog population which is below site carrying capacity;
        2) Does not violate any other land use or wildlife objectives;
        3) Follows the habitat suitability guidelines set forth in Appendix A; and
        4) A Colorado Division of Wildlife relocation permit is obtainable.
2. Live removal and donation of the animal(s) to wildlife research or rehabilitation centers, provided removal and transportation methods are humane as set forth in Appendix B.
3. Fumigation is permitted for ≤ 10 prairie dogs if live removal and donation is not possible or beyond economically feasible. Fumigation is also permitted for > 10 prairie dogs if live wild-to-wild relocation or live removal and donation are not feasible. A wildlife survey to assess and mitigate for any negative impacts to other species that may be utilizing the burrows must be completed before any fumigation activities.

- Removal Activities for Protected Land

Acceptable removal activities, in order of preference, include:

1. Live, wild-to-wild relocation of the animal(s) if the following are satisfied:

a. In cases where ≥ 60 prairie dogs are in need of removal, a suitable relocation site must be available at the time of need which:
    1) Does not violate any other land use or wildlife objectives;
    2) Follows the habitat suitability guidelines set forth in Appendix A; and
    3) A Colorado Division of Wildlife relocation permit is obtainable.
b. In cases where 11 – 59 prairie dogs are in need of removal, a suitable relocation site must be available at the time of need which:
    1) Currently harbors an existing prairie dog population which is below site carrying capacity;
    2) Does not violate any other land use or wildlife objectives;
    3) Follows the habitat suitability guidelines set forth in Appendix A; and
    4) A Colorado Division of Wildlife relocation permit is obtainable.

2. Live removal and donation of the animal(s) to wildlife research or rehabilitation centers, provided removal and transportation methods are humane as set forth in Appendix B.
3. Fumigation is permitted for ≤ 10 prairie dogs if live removal and donation is not possible or beyond economically feasible. Fumigation is also permitted for > 10 prairie dogs if live wild-to-wild relocation or live removal and donation are not feasible. A wildlife survey to assess and mitigate for any negative impacts to other species that may be utilizing the burrows must be completed before any fumigation activities.

5.8 Warembourg

5.8.9. Management Direction

5.8.9.1. Black-Tailed Prairie Dog

5.8.9.1.4 Population Management

In the event that prairie dogs successfully disperse and establish on the Warembourg parcel, the animals will be removed promptly and humanely.

Acceptable removal activities, in order of preference, include:

1. Live, wild-to-wild relocation of the animal(s) if the following are satisfied:
    a. In cases where ≤10 prairie dogs have dispersed specifically from the Daughenbaugh parcel, relocation of these animals back to the core area of the Daughenbaugh parcel is acceptable IF:
        1) The core population is less than 100 animals at the time of relocation; and
        2) Abandoned pre-existing holes are available which are at least 50 yards away from the nearest coterie.
    b. In cases where ≥ 60 prairie dogs are in need of removal, a suitable relocation site must be available at the time of need which:
        1) Does not violate any other land use or wildlife objectives;
        2) Follows the habitat suitability guidelines set forth in Appendix A; and
        3) A Colorado Division of Wildlife relocation permit is obtainable.
    c. In cases where 11 – 59 prairie dogs are in need of removal, a suitable relocation site must be available at the time of need which:
        1) Currently harbors an existing prairie dog population which is below site carrying capacity;
        2) Does not violate any other land use or wildlife objectives;
        3) Follows the habitat suitability guidelines set forth in Appendix A; and
        4) A Colorado Division of Wildlife relocation permit is obtainable.
2. Live removal and donation of the animal(s) to wildlife research or rehabilitation centers, provided removal and transportation methods are humane as set forth in Appendix B.
3. Fumigation is permitted for ≤ 10 prairie dogs if live removal and donation is not possible or beyond economically feasible. Fumigation is also permitted for > 10 prairie dogs if live wild-to-wild relocation or live removal and donation are not feasible. A wildlife survey to assess and mitigate for any negative impacts to other species that may be utilizing the burrows must be completed before any fumigation activities.

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Habitat selection guidelines for black-tailed prairie dog relocations

September 2003

by

Kelly A. Roe, Senior Wildlife Biologist
Christopher M. Roe, Senior Wildlife Biologist

ROE ECOLOGICAL SERVICES, LLC
PO Box 438
Green Mountain Falls, Colorado 80819

(719) 684-1122
FAX (719) 684-1133
TOLL FREE (866) 4-Wildlife (494-5354)

www.YourWildlife.com

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Kelly A. Roe
Roe Ecological Services, LLC
PO Box 438
Green Mountain Falls, CO 80819
(719) 684-1122; Fax: (719) 684-1133
kelly@yourwildlife.com

RH: Habitat selection for prairie dog relocations • Roe and Roe.

Habitat selection guidelines for black-tailed prairie dog relocations

Kelly A. Roe, Roe Ecological Services, LLC, PO Box 438, Green Mountain Falls, CO, 80819, USA, kelly@yourwildlife.com

Christopher M. Roe, Roe Ecological Services, LLC, PO Box 438, Green Mountain Falls, CO, 80819, USA

Abstract: In 1998, two petitions were filed to list the black-tailed prairie dog (*Cynomys ludovicianus*) as threatened under the Endangered Species Act of 1973, as amended. The 12-month finding was that the black-tailed prairie dog was warranted but precluded for listing. In order to meet or maintain minimum conservation standards set forth in the Conservation Assessment and Strategy and the Multi-State Conservation Plan, which were developed in an effort to promote conservation and avoid the listing of the black-tailed prairie dog, some states may need to conduct live relocations. By conducting relocation efforts under the guidance of recent scientific information and best management practices, wildlife and range managers will be able to maximize retention, decrease impacts to the habitat and other species of wildlife, minimize potential negative impacts to adjacent landowners, and increase tolerance by the public and agricultural industry. Soil, vegetation, slope, elevation, previous use of the relocation site by prairie dogs, proximity of the site to existing prairie dogs, proximity of the site to neighboring properties, and natural dispersal barriers are important factors to consider when evaluating the suitability of a relocation site.

Key words: black-tailed prairie dog, *Cynomys ludovicianus*, habitat selection, habitat suitability, relocation

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In 1998, two petitions to list the black-tailed prairie dog (*Cynomys ludovicianus*) as threatened under the Endangered Species Act of 1973, as amended (ESA), were received by the United States Fish and Wildlife Service (USFWS) (USFWS 1999). These petitions listed several factors as major threats to the long-term viability and conservation of this species. The threats included habitat loss, habitat fragmentation, disease, and unregulated shooting and poisoning. The USFWS's 12-month finding was that the black-tailed prairie dog was warranted but precluded for listing under the ESA (USFWS 2000). As a result, the black-tailed prairie dog rose to the forefront of conservation initiatives in those states that made up its historical range.

The challenge to state and regional conservation efforts is that the black-tailed prairie dog can be one of the most controversial species of wildlife to manage. Populations of prairie dogs in rural portions of its range often influence the lifecycles of other species of wildlife; however, they are often viewed as "destructive rodent pests" by agricultural and livestock producers. On the other end of the spectrum, prairie dogs within urban areas often serve limited ecological roles in many cases, but can have tremendous social value as valuable watchable wildlife resources for urban residents.

In order to meet or maintain minimum conservation standards set forth in the Conservation Assessment and Strategy (Van Pelt 1999) and the Multi-State Conservation Plan (Luce 2003), which were developed in an effort to promote conservation and avoid the listing of the black-tailed prairie dog, some states may need to conduct live relocations. This may be to ensure no net loss of prairie dog acreage in the face of development or agricultural activities, or may be to re-establish prairie dogs in areas where they were previously extirpated. By conducting relocation efforts under the guidance of recent scientific information and best management practices, wildlife and range managers will be able to maximize retention, decrease impacts to the habitat and other species of wildlife, minimize potential negative impacts to adjacent landowners, and increase tolerance by the public and agricultural industry.

Determination of habitat suitability guidelines

Soil, vegetation, slope, elevation, previous use of the relocation site by prairie dogs, proximity of the site to existing prairie dogs, proximity of the site to neighboring properties, and natural dispersal barriers are important factors to consider when evaluating the suitability of a relocation site. Attention to these factors will help to ensure the overall success of the relocation effort. Success can be measured by the percentage of relocated prairie dogs that are retained on the site.

Currently, no comprehensive science-based habitat selection guidelines exist to guide prairie dog relocation efforts. Therefore, we created these guidelines, based on current science and experience gained from prairie dog relocation efforts, in order to encourage consistent and science-based evaluation of suitable habitat for relocation efforts (Table 1). These guidelines represent the best information currently available, and provide the most comprehensive and straightforward approach for determining, and scientifically justifying, habitat and relocation site suitability for prairie dog relocation efforts.

Soils

Soil type is extremely important to the success or failure of a relocation effort. Relocations attempted on soil types that are not conducive to burrowing and the development of burrow systems will not support prairie dogs and will not result in a successful relocation effort. Research indicates that sand, and rocky or gravely soils are not acceptable for burrows (Sheets et al. 1971, Lewis et al. 1979, Turner 1979, Reading and Matchett 1997). Research on American

badgers (*Taxidea taxus*), a species that can be closely associated with prairie dogs, indicated that soil types influenced the ability of both badgers and their prey to burrow (Apps et al. 2002). Fine sandy-loams with little gravel and good drainage have been suggested to provide optimal conditions for burrows (Hoff 1998, Apps et al. 2002). Apps et al. (2002) reported that burrows higher in silt and clay may become highly saturated and collapse when wet. Gravelly soils can also be prone to collapse, even when dry, and high gravel content can also impair the ability of burrowing animals to dig (Apps et al. 2002). Treviño-Villarreal et al. (1997) found that the majority of colonies of Mexican prairie dogs (*Cynomys mexicanus*) studied were found on silt loam soils low in clay (generally <30%), medium in sand (~50%), and medium to high in silt (>70%). There was no gravel in any of the soil samples on these active colonies. Both Treviño-Villarreal et al. (1997) and King (1955) found that Mexican and black-tailed prairie dogs conducted exploratory diggings in rocky ground or loose soils; however, these were not favorable or preferred sites and should be avoided when selecting release sites.

In Boulder County, Colorado, several relocation attempts on soils classified as Valmont cobbly clay loam (Moreland and Moreland 1975) failed completely, or had extremely low retention rates despite the installation of artificial underground burrow structures (Boulder County Staff 2002). Boulder County believed that the soils were a factor in the failure of these relocations. Prairie dogs released onto areas of unsuitable soil structure are likely to disperse away from the relocation site, are likely to experience elevated risks of predation, and may disperse onto adjacent lands of higher quality. This dispersal may or may not be desirable depending on neighboring land uses and landowner attitudes toward prairie dogs.

Soils on relocation sites should also be deep enough to allow protection from predators and temperature extremes in winter and summer (Turner 1979, Dalsted et al. 1981). Hoogland (1995) reported that the average depth of prairie dog nest chambers

was approximately 2.0 m. The average depth of frost layers along the Front Range and eastern Colorado is approximately 0.9 m; however, this depth may vary across the prairie dog's range. In addition, prairie dogs must be able to establish burrows above water tables and any bedrock or caliche layers. For example, Boulder County Staff (2002) recommend a minimum of approximately 2.4 m of suitable soil above the water table in the Boulder, Colorado area, and Coffeen and Pederson (1989) recommend at least 1.2 m of suitable soil over a caliche layer.

Vegetation height

Black-tailed prairie dogs prefer habitats with vegetation shorter than 30 cm, which they will often clip to enhance visibility of the landscape (Clippinger 1989, Coffeen and Pederson 1989, Fitzgerald et al. 1994, Hoogland 1995). On sites dominated by typical shortgrass prairie grasses, vegetation height may not be important due to the small stature of these grasses. However, on sites with mixed vegetation (including forbs, grasses and shrubs), average vegetative height may be an important factor in the success of the relocation effort. In moist, highly productive years on mid- and mixed-grass grasslands, it is often necessary to mow the vegetation height to <25–30 cm before the relocation effort.

Suitable vegetative cover

We define suitable vegetative cover as the amount of quality forage on a site, whereas total canopy cover includes all of the vegetation on the site. Total canopy cover within prairie dog colonies generally ranges from 25–91% depending on the grassland type and region in which the prairie dogs are located (Clippinger 1989). For example,

vegetative cover measurements from short-grass prairie grasslands in northern Colorado ranged from 58–70% (Clippinger 1989). In contrast, suitable vegetative cover does not include dead vegetative matter, plants that are not likely to grow during that growing season (due to drought or other stress), or plants that the prairie dogs will not eat or generally avoid (Table 2). Prairie dogs typically avoid sagebrush (*Artemisia tridentata*), threeawn (*Aristida purpurea*), horseweed (*Conyza canadensis*), diffuse knapweed (*Centaurea diffusa*), Mediterranean sage (*Salvia aethiopis*), buffalo bur (*Solanum rostratum*), inland salt grass (*Distichlis spicata*), tumblegrass (*Schedonnardus* spp.), and prairie dog weed or fetid marigold (*Dyssodia papposa*) (Koford 1958, Hansen and Gold 1977, Summers and Linder 1978, Fagerstone 1979).

How to measure percent suitable vegetative cover. ***Percent suitable vegetative cover can be measured using a number of methods. For the purposes of these guidelines, we recommend that suitable vegetative cover be measured using circular plots with ocular estimation. The only equipment needed for this method is a circle to delineate sample plots (e.g., hula-hoop approximately 1.0 m in diameter; a string approximately 0.5 m in length to be used as the radius of the circle).***

Randomly distribute ten 1.0-m circular plots within each acre of the overall relocation area. Measure and document the percentage of basal cover (i.e., the area of all of the viable plants in the circle at or near the ground surface) relative to the entire circular plot (100% – percentage of basal cover = percentage of bare soil). Next, measure and document the percentage of each type of vegetation (grass vs. forb vs. shrub) relative to the percentage of basal cover. Finally, measure and document the percentage of each type of suitable vegetation relative to the percentage of basal cover including cool season

grasses, warm season grasses, and forbs. Only include those plants outlined in Table 2 unless it can be scientifically documented that additional vegetation is palatable, high in nutritive content, tolerant to grazing, and utilized by prairie dogs. The equation for percent suitable vegetative cover is:

Percent suitable vegetative cover =

Average percentage of suitable cool season grasses across all plots

+ Average percentage of suitable warm season grasses across all plots

+ Average percentage of suitable forbs across all plots

Slope

Black-tailed prairie dogs generally prefer slopes <10% (Koford 1958, Tileston and Lechleitner 1966, Dalsted et al. 1981, Clippinger 1989). While prairie dogs may inhabit slopes >20%, relocations and natural establishment on those areas should be discouraged in an effort to decrease soil erosion. One can ascertain slope from a clinometer or high-resolution topographic map.

Abandoned preexisting burrow systems

Sites that show historical use by prairie dogs are preferred especially if they contain abandoned, yet structurally sound, natural burrows. According to Jacquart et al. (1986), and our experience, these preexisting holes minimize dispersal of recently relocated prairie dogs. In addition, if preexisting holes exist, there is a greater likelihood of suitable soils and vegetation (Truett et al. 2001). These holes may also provide adequate refugia from predators (Jacquart et al. 1986, McDonald 1993). One should not conduct a relocation on sites with natural, preexisting burrows where prairie dogs were extirpated by plague for a minimum of one year from the date of the outbreak. Fleas

infected with plague have been recovered from prairie dog burrows 3 months to 1 year after disappearance of the last prairie dog (Lechleitner et al. 1968, Fitzgerald 1970, Cully et al. 1997). If plague is not a potential problem, sites with preexisting burrow systems are preferred over all other sites if other requirements are within acceptable levels.

If the site does not contain abandoned natural burrows, artificial systems should be installed to mimic natural burrows. These systems should include an underground nest chamber, a tunnel leading from the chamber to the surface, and a temporary aboveground retention structure to allow the prairie dogs to become acclimated to the site before final release (Truett et al. 2001, K. Roe and C. Roe unpublished reports). These structures are much more effective than augured holes. Prairie dogs released into augured holes seldom if ever stay in the location they were released and utilize the augured holes regardless of whether or not aboveground retention structures were used (Lewis et al. 1979, Turner 1979, Jacquart et al. 1986, Truett and Savage 1998 Truett et al. 2001).

Proximity of existing prairie dogs

Black-tailed prairie dogs are highly social and territorial animals (Clippinger 1989, Hoogland 1995). As such, evaluations of proposed relocation sites should take into account the presence/absence of existing prairie dog colonies at the site, the overall condition of the existing colony(ies), and the size/proportion of the existing population in relation to overall property and proposed relocation area. All of these factors may influence the suitability of the

relocation site (Coffeen and Pederson 1989, McDonald 1993, Boulder County Staff 2002).

When relocating prairie dogs to existing towns, prairie dogs should be placed in unoccupied burrows around the periphery of the colony (Coffeen and Pederson 1989, McDonald 1993). In addition, one should not release prairie dogs closer than approximately 46 m from any active coterie(s) (Boulder County Staff 2002) and should be monitored for aggressive interactions. Coffeen and Pederson (1989) suggest that if the preexisting prairie dogs are highly aggressive toward the relocated prairie dogs, or if there are no unoccupied burrows, then the relocation site should be situated at least 185–277 m away from occupied areas. This distance is typically far enough to minimize territorial disputes between introduced and resident animals yet close enough to provide the comfort of social grouping that black-tailed prairie dogs prefer.

Neighboring landowner concerns

Because of the controversial nature of prairie dog conservation and relocation efforts, extreme caution should be given when identifying potential relocation sites in proximity to adjacent private lands. Under natural dispersal conditions, prairie dogs can travel as far as 5.5 km with an average distance of roughly 2.5 km (Garrett and Franklin 1988). After a relocation effort, prairie dogs can disperse several hundred meters or more away from the release site (C. M. Roe, Roe Ecological Services, LLC, unpublished data). Therefore, consideration should be given as to the likelihood and ability of prairie dogs to disperse onto neighboring lands, and steps should be taken that will minimize dispersal. The likelihood of dispersal often increases with the presence of an existing colony on the neighboring property, high quality habitat (particularly if it is of higher quality than the

relocation site), and ease of dispersal made possible by gentle topography, good visibility, and short distance. It has been suggested that in order to reduce the potential for neighboring landowner conflicts and concerns, relocation sites should be ≥1.6 km from neighboring properties (Coffeen and Pederson 1989, USFWS 1991).

If the distance is <1.6 km, a barrier should exist between the relocation site and the private land for at least the full extent of the entire relocation area. Preferred barriers are natural in function and appearance such as tall, dense vegetation (Truett and Savage 1998) or topographical features that will either reduce the visibility or will physically inhibit the dispersal between the introduced and resident populations (e.g., a steep rock face). However, if no natural barrier exists, artificial barriers can be constructed out of materials such as vinyl or wood to restrict visibility and movement. Because of a prairie dog's relatively low stature, visual barriers as short as 60 cm can be effective in reducing prairie dog dispersal into an area or beyond (Crosby and Graham 1986**,** Truett and Savage 1998, Boulder County Staff 2002, K. Hollenbeck and C. Roe, Wildlife Property Management, LLC, unpublished report).

Conclusion

Black-tailed prairie dog conservation efforts in the future may require the use of live relocations to meet conservation objectives in certain parts of the prairie dog's former range. Although still controversial and often highly contentious, properly conducted relocations on suitable habitats can be highly successful. When assessing the overall suitability of an area for a potential relocation effort, wildlife and natural resource managers should consider all the factors that affect the success of a relocation effort. These factors include, at a minimum, the biological needs of the prairie dog, consideration of the grassland habitat to which the prairie dogs are relocated, landowner concerns regarding the relocation, and how prairie dog behavior can affect

all of the above. The development of these guidelines may help wildlife and natural resource managers conduct more scientifically defensible, and ultimately more successful and publicly acceptable, prairie dog relocations in the future. Under comprehensive science-based guidelines, prairie dog relocations may be a valuable tool for states to use in efforts to keep the black-tailed prairie dog from being listed under the Endangered Species Act.

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Table 1. Habitat suitability guidelines for black-tailed prairie dogs used in determination of suitable relocation sites, attributes to which each guideline applies, and publications used to develop the suitability guidelines.

Suitability guidelines	Attributes			Relevant literature
	Habitat characteristic	Wildlife biology and behavior	Social and political characteristics	
1. The relocation site should have <40% bare soil.	X			
2. Sand and rocky or gravely soils (which includes particles ≤8 cm in diameter) are not acceptable for burrows.	X			Sheets et al. 1971, Dalsted et al. 1981, Reading and Matchett 1997, Apps et al. 2002
3. Release site soils should be loamy with little to no gravel, low in clay (<30%), medium in sand (~50%), and medium to high in silt (>70%) with good drainage.	X			Treviño-Villarreal et al. 1997, Apps et al. 2002

4.	Soil should be ≥2.0 m deep.	X		Turner 1979, Dalsted et al. 1981, Coffeen and Pederson 1989, Hoogland 1995
5.	Vegetation should be <30 cm high.	X	X	Turner 1979, Clippinger 1989, Fitzgerald et al. 1994, Hoogland 1995
6.	Vegetation should be >25% total productive (is or will grow during its appropriate growing season) suitable vegetative cover relative to total basal cover.	X	X	Clippinger 1989
7.	Slope should be <20% and preferably ≤10%.	X	X	Tileston and Lechleitner 1966, Dalsted et al. 1981, Clippinger 1989, Truett et al. 2001
8.	Elevation should be <1,700 m	X		Hoogland 1995
9.	Preexisting holes are preferred sites.	X		Jacquart et al. 1986, McDonald 1993, Truett et al. 2001
10.	If a population was extirpated by plague, relocation should not occur on that site for ≥1 year from		X	Lechleitner et al. 1968, Fitzgerald 1970, Cully et al. 1997

	the date of the outbreak.				
11.	Because of their highly territorial nature, if prairie dogs are to be relocated to existing towns, they should be placed in unoccupied burrows around the periphery of the colony and generally ≥46 m and up to 185–277 m from any active coteries.		X		Coffeen and Pederson 1989, McDonald 1993, Boulder County Staff 2002
12.	Prairie dogs should not be relocated into an existing colony if it will increase the total population above carrying capacity for the property.	X	X		
13.	Relocated populations should not occur for densities greater than 40 prairie dogs per ha.	X	X		O'Meilia et al. 1982, Crosby and Graham 1986, Archer et al. 1987, Clippinger 1989
14.	There should be an ~ one-mile distance between the relocation site and adjacent private property, or a structural barrier erected between the release site		X	X	Coffeen and Pederson 1989, U.S. Fish and Wildlife Service 1991

and private land.

Table 2. Vegetation preferred by prairie dogs; many of which show moderate to high grazing tolerance and at least some nutritional benefit to wildlife, particularly prairie dogs.

Plant name	Season	Grazing tolerance	Forage value	Relevant literature showing preference by prairie dogs
Western wheatgrass (*Pascopyrum smithii*)	Cool [1]	Moderate [2]	Good spring and winter forage [1]	Koford 1958, Tileston and Lechleitner 1966, Summers and Linder 1978, Fagerstone 1979
Blue grama (*Bouteloua gracilis*)	Warm [1]	High [1]	Good year round [1]	Koford 1958, Tileston and Lechleitner 1966, Summers and Linder 1978, Fagerstone 1979
Buffalograss (*Buchloe dactyloides*)	Warm [1]	High [1]	Good year round [1]	Koford 1958, Tileston and Lechleitner 1966, Summers and Linder 1978, Fagerstone 1979
Sand dropseed (*Sporobolus cryptandrus*)	Warm [1]	High [1]	Fair to good [1]	Clippinger 1989
Cheatgrass (*Bromus tectorum*)	Cool [1]	High [1]	Fair to good [1]	Clippinger 1989
Sixweeks fescue (*Vulpia octoflora*)	Cool [1]	High - Indicator of heavy	Good in early spring [1]	Clippinger 1989

		grazing [1]		
Ring muhly (*Muhlenbergia torreyi*)	Warm [1]	High - Indicator of poor rangeland [1]	Fair to good particularly in the spring [1]	Clippinger 1989
Sedges (*Carex* spp.)	Cool [1]		Fair to good particularly in the fall [1]	Uresk 1984
Scarlet globemallow (*Sphaeralcea coccinea*)	Warm [1]	High - Increases with overgrazing [1]	Fair to excellent [1]	Clippinger 1989, Boulder County Staff 2002
Plains prickly pear (*Opuntia polyacantha*)		High - Increases with overgrazing [3]		Koford 1958, Bonham and Lerwick 1976, Summers and Linder 1978, Fagerstone et al. 1981

[1]Stubbendieck et al. (1997)

[2]Everson (1966)

[3]Ross and Hunter (1976)