

Background Information for the Marshall Mesa-Southern Grasslands Trail Study Area (TSA) Planning Inventory Report

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This document compiles various information collected and analyzed for the Marshall Mesa-Southern Grasslands Trail Study Area (TSA). A companion document, *Summary of Major Findings for the Marshall Mesa-Southern Grasslands Trail Study Area Planning Inventory Report*, integrates the various information and offers preliminary findings that will help define and evaluate alternatives for the Trail Study Area, including new trails and trail improvements, resource protection measures, and activity-specific management measures.

The Marshall Mesa-Southern Grasslands Trail Study Area (TSA) is comprised of three Visitor Plan Management Areas and a part of a fourth one. Map 1. Subareas Map shows management areas designations, subareas used for inventory analysis, water features, and other public lands adjacent to the TSA. The management areas include:

- West Marshall Mesa Passive Recreation Area (PRA)
- East Marshall Mesa Natural Area (NA)
- Southern Grasslands Habitat Conservation Area (HCA)
- Doudy Draw Natural Area (the part east of State Highway 93)

Trails and Trailheads

Map 3. Planned and Requested Trail Improvements shows existing designated trails and trailheads and proposed trails—both Boulder Valley Comprehensive Plan-approved trails and citizen-requested trails that were identified in a public questionnaire. The map also shows undesignated trails used for informal visitor use in the past.

Passive Recreational Facilities

Passive recreational facilities in the Marshall Mesa-Southern Grasslands TSA include designated access areas such as trailheads, structures, and designated multi-use trails that are signed and maintained. There are approximately seven miles of designated trails in the TSA, which all but 0.7 of a mile are multi-use. Undesignated access points and undesignated trails are areas where informal visitor use patterns have created unsustainable (in most cases) physical disturbances on the landscape. There are approximately 24 miles of undesignated trails in the TSA.

Trailheads

Marshall Mesa Trailhead: Located on the south side of Marshall Road just east of Cherryvale Road. Parking for approximately 13 vehicles currently exists and is heavily used. Two bear proof trash cans, dog station, information board, and trailhead sign are provided. No restroom facilities are currently provided.

Assessment:

- Minimal size, expansion opportunities are limited.
- Requires visitors to back-up into traffic on Marshall Road with limited sight lines.
- Adjacent to an existing wetland.
- Boulder County is planning on adding a bike lane to Marshall Road in the fall of 2006.
- Difficult to plow snow and maintain after winter storms.

Greenbelt Plateau Trailhead: Located on the north side of State Highway 128 just east of State Highway 93. Parking for approximately 25 vehicles currently exist with limited horse trailer parking; receives minimal use on weekdays with heavier use occurring on the weekends. One bike rack, bear proof trash can, information board, and trailhead sign are provided. No restroom facilities are provided.

Assessment:

- The trailhead itself is in generally good condition.
- Entrance on to State Highway 128 could be improved by extending existing asphalt apron.
- Currently requires U-turn several hundred feet east of trailhead entrance if coming from State Highway 93.
- Current use patterns may increase when the Greenbelt Plateau to Coalton Road trail connection is completed in 2006.
- Trail connection to Flatirons Vista Trailhead was constructed in 2004 with an at-grade crossing at State Highway 93 controlled by visitor-activated light.

Coalton Trail Access at State Highway 128: Informal parking area located off highway in Colorado Department of Transportation (CDOT) right-of-way; currently no amenities are provided.

Assessment:

- Currently few problems exist at this location.
- Parking appears to be very minimal at this time.
- Dumping of personal trash happens occasionally.
- When the Greenbelt Plateau to Coalton trail connection is built, this site could be reviewed for potential upgrades.

Trails:

Greenbelt Plateau Trail: This trail starts at the trailhead and goes north where it forks to the east and the west; the eastern section intersects with Community Ditch Trail and the western section ends at Highway 93. The entire trail is open to hikers, bicyclists, and equestrians; all dogs must be under voice-and-sight control. The trail is vehicle accessible and maintained as a ten-foot wide gravel surface.

Assessment:

- Most of the trail is in good condition; however, the section connecting with Community Ditch is braided in several sections because of poor drainage. This section may need to be rebuilt or re-routed.
- Visitor use of this area could increase significantly with the proposed connection to Coalton Road.
- Several undesignated trails lead off the main trail and traverse the Southern Grasslands Habitat Conservation Area (HCA) to the east.

Marshall Mesa Trail: This trail starts at the trailhead and goes west until it connects with the Community Ditch Trail. It currently is the only section of trail in the TSA that is not open to bike use.

Assessment:

- This trail receives moderate to high use and is braided in several sections because of flat terrain on the upper section and poor drainage. Sections of this trail may need to be surfaced, rebuilt or re-routed to provide better drainage.
- Self guided interpretive signs are provided giving a brief history of past coal mining activities in the area.
- Many visitors use this trail to form a loop with the Community Ditch Trail.
- Future trail connections to 66th Street and possibly to City Limits may result in an increase in use levels.

Community Ditch Trail: This trail starts at the bridge crossing Davidson Ditch and heads in an easterly direction and starts a steep climbing turn to the west where it continues until it reaches State Highway 93. Negotiations are currently underway to provide for a safe crossing using an existing box culvert under State Highway 93.

Assessment:

- The upper section of this trail is an eight-foot wide gravel surfaced trail maintained by the ditch company for maintenance of the ditch.
- The lower section is a three to five-foot wide natural surface trail that is starting to braid in several areas. A minor re-route at the apex of the climbing turn is anticipated when the connection to 66th Street is completed in the fall of 2005.
- This section of trail is also maintained once a year by a local volunteer group, Boulder Off Road Alliance (BOA).

Trail Connection to South 66th Street: This trail connection was approved by the Open Space Board in 2000 and is scheduled to be built in September of 2005 by a large community volunteer group in collaboration with the International Mountain Biking Association (IMBA) and Boulder Offroad Alliance (BOA).

Assessment:

- This trail connection provides a significant link to 66th Street.
- This trail could also potentially provide a connection to the Tall Grass Prairie East TSA.
- Currently the trail is to end at 66th Street and trail users will be expected to use the road and Coal Creek Drive to access the Single Tree Trail near Superior.
- An alternative option along the old railroad grade continuing east through the Damyanovich property and then through Boulder County Open Space connecting to the Single Tree trail may be considered.

Greenbelt Plateau to Coalton Road Trail Connection: Currently CDOT will not allow a trail connection to be made using their right-of-way along SH 128. Concerns exist with running the trail inside the fence line since it could invite off-trail use into the HCA, especially since there are visible two-track ranch roads to the north.

Additional fencing could discourage off-trail use;, however, the existing topography is bisected by several drainages that would require a longer contouring design to gain and lose elevation. This option would require a corridor further from the highway into the HCA. Building the trail along the fence line may create sections that may be non-sustainable.

Vistas, Destinations, and Connections

The area has good to excellent vistas of mixed grass prairie and the Front Range. On parts of the Coalton Trail, you can see from Pikes Peak to Arthur's Rock near Fort Collins, a span of over 120 miles.

Points of Interest, Major Destinations

There are a number of interesting historic sites. An interpretive sign on Marshall Mesa Trail promotes off-designated trail travel to the edge of the escarpment. Some people want a trail along Coal Creek and Marshall Lake. Various ponds attract people. A pedestrian gate on Marshall Road near S. 66th has promoted undesignated trails.

Critical Trail Connections

There are four Boulder Valley Comprehensive Plan (BVCP) proposed connections in the area (see Map 3. Planned and Requested Trail Improvements). To the east, Coal Creek Trail coming from Louisville, Lafayette and ultimately Erie connects to the Singletree Trail, which connects to Coal Creek Drive, which is proposed to connect to the Community Ditch Trail near Marshall Trailhead via south 66th Street.

To the south, there is a conceptual trail alignment connecting the southern terminus of the Coal Creek Trail to Greenbelt Plateau. Boulder County has the connection from the Singletree Trail to Coalton Trail on its 2005 – 2010 Transportation Improvement Plan (TIP). Also in that TIP, Marshall Road is to be widened to include bikes lanes, likely in 2006 or 2007. When completed the combined trails will be a large loop, roughly following the old “Morgal Bismarck” road bike route, of State Highway 93, State Highway 128, McCaslin Boulevard, Coal Creek Drive, South 66th, and Marshall Road.

Further south, a BVCP conceptual trail alignment connects to Jefferson County on the east side of State Highway 93. Any connection to the Rocky Flats Wildlife Refuge would likely be made via this trail. Traveling north, the Front Range Trail follows the combination of the Jefferson County connection, Greenbelt Plateau Trail, Community Ditch Trail, Marshall Road, and Broadway in Boulder.

To the west, the Greenbelt Plateau and Flatirons Vista trailheads and the Douby Draw Trail were connected last year. A State Highway 93 underpass is planned for the Community Ditch Trail.

Agricultural Resources

Livestock grazing is the primary agricultural use in the TSA. The grazing rotation changes each year based on Resource Conservation and Agricultural staff input. Here is some general information based on historical use.

Season of Use: There has been livestock somewhere in the area from May - December of each year. The livestock do not stay in one field the whole time because they are moved from one field to the next throughout this time period. The Marshall Mesa area (East Rudd, Greenbelt Plateau) is generally used in the spring or winter because of the heavy recreational activity. The Waneka / Kelsall / Superior Associates area is grazed during the summer and a bit in the fall. Tracy-Collins has been grazed in the spring and fall, sometimes a bit in the late summer.

Class of Livestock: Up to 250 yearlings or up to 150 cow/calf/bulls have been grazed in the area. The yearlings are generally grazed from 15 May - 1 September. The cows/calves/bulls have been grazed from 1 June - 1 December.

Livestock water will be a major factor in determining any future fence alignments should we decide to build more fence. Large areas without a water source are a concern for agricultural management. Visitor access points in the Highway right-of-way would also cause some concerns because of the pedestrian gates. More access points mean more of an opportunity for a gate to be left open and livestock escape onto the highway.

See [Appendix A](#) for detailed information on the grazing plan for properties in the TSA.

Cultural and Paleontological Resources

Cultural Resources

Inventories of the study area have identified 45 cultural and historic sites. Map 4. Cultural Resource Areas combines much of this information and identifies general locations or areas for these cultural resources (the information is generalized to protect the security of these sites). Several of these sites have been identified as having potential for listing on the National Register of Historic Places. Evidence of Native American tribes is relatively abundant in the study area. At least 17 aboriginal or prehistoric sites have been identified. These sites include isolated flakes or rock fragments, lithic scatters, stone piles, and evidence of habitation.

The Marshall Mesa Historic Mining District was proposed in 1995 to recognize the contribution of coal mining to the history of Boulder County and the Marshall area. A concentration of historic coal mines comprised the proposed mining district. Some of the principal historic mines include the Gorham Mine-Old Crackerjack Mine complex, the Marshall No. 6 Mine, the Big Tom Mine, the Black Diamond No. 1 Mine, the Marshall No. 7 Mine, and the Pinecliff Shaft site along with several other mine adits, structure remnants, and tailings piles. Although a mining district was never officially designated, the identified mines contribute to an eligible district.

Evidence of the farming and ranching history of the area include several historic irrigation ditches--the McKenzie Ditch and the Eggleston Reservoir Filler Ditches--and foundations or remnants of farmhouses, outbuildings, and a variety of farm machinery and equipment.

Geological and Paleontological Resources

The geological bedrock formations that are exposed in the study area are the Fox Hills Sandstone, the Laramie formation, and the Pierre Shale, each of which date to the Cretaceous Period. Marshall Mesa consists of outcroppings of the Fox Hills Sandstone--a massive cross-bedded and ripple-marked sandstone evidencing beach sand and shallow marine environments--and the Laramie formation--consisting of cobbly gravels and sands evidencing stream floodplain and stream terrace depositional environments--overlying the Fox Hills formation. The Laramie formation contains the coal beds for which the Marshall area is famous. These ancient marine and stream deposits contain numerous marine and fresh-water fossils, although no significant fossil finds are reported from the Marshall Mesa area.

The cobbly sandy and clayey loam soils found in the study area support mixed grass and shortgrass prairies. These native grasslands have been grazed by native ungulates (bison and antelope, primarily) prior to European settlement and by domestic livestock since European settlement. An eastern outlier of the ponderosa pine savanna woodland more typical of foothills forests to the west occurs on Marshall Mesa.

Marshall Mesa is identified as a “unique geological feature” in Boulder County in the Boulder Valley Comprehensive Plan.

Upland Vegetation Resources

Overview of the TSA Vegetation

This overview section addresses the significance of the rare types and non-native species and a brief landscape-level description. Relevant maps include Map 5. Rare Plant Species and Vegetation Communities (some of the information is generalized to protect sensitive sites) and Map 6. Detailed Vegetation Map. Map 6 will not be made available on the OSMP website, only in large format hard copy, because the detail is such that it is unreadable in a smaller-scale map format.

West Marshall Mesa Planning Recreation Area (PRA) and East Marshall Mesa Natural Area (NA)

This area contains the farthest extension of the foothills forest into the prairie margin of any area in the Open Space and Mountain Parks system. Because of increased elevation, geology, and slightly higher moisture conditions, the area includes patches of ponderosa pine forest, a rich diversity of foothills and prairie shrubs, tallgrass and mixed grass communities, and wet meadows. Riparian areas are present in the Cowdrey drainage and along the major ditches. Wetlands exist in low-lying areas and on hill slopes where rock layers are near the surface or exposed and form seeps and springs.

While this management area was severely disturbed by mining activity in the 19th and early 20th centuries, native plant communities have recovered in some areas. The management area includes xeric tallgrass communities (Table 3) (mostly on upper, rocky portions of slopes and on mesa tops), which are important for rare butterflies (such as arogos skipper, two-spotted skipper, and cross-line skipper). Another rare plant community, green needle grass mixed grass prairie, occurs on the north-facing slopes in the eastern and central parts of the mesa (Table 3). Birdsfoot violet (*Viola pedatifida*), wavy-leaf stickleaf (*Nuttallia sinuata*), and dwarf leadplant (*Amorpha nana*), rare plants listed by the Colorado Natural Heritage Program, are present (Table 1). The xeric tallgrass communities, birdsfoot violet, and dwarf leadplant occur in a few places along the Front Range foothills at the far western edge of their distribution. These rarities are also found in the northern and northeastern Great Plains.

Shrublands on the north-facing slopes are some of the largest and most species-rich shrubland communities east of the foothills in the OSMP system. Montane species like serviceberry (*Amelanchier alnifolia*), wax currant (*Ribes cereum*), and Oregon grape (*Mahonia repens*) mix with species more common in the prairie, including yucca (*Yucca glauca*), three-leaved sumac (*Rhus aromatica* subsp. *trilobata*), and dwarf rabbitbrush (*Chrysothamnus nauseosus* subsp. *nauseosus*). Jersey tea (*Ceanothus herbaceus*), also a common shrub on Marshall Mesa, is associated with tallgrass prairie communities in the eastern Great Plains.

Forest stands are approximately 100 years old and contain high cover of small diameter trees with sparse understory vegetation. One more-open stand (woodland density) includes tallgrass prairie patches and rare plant locations.

Two utility corridors and some lower elevation meadows were seeded with non-native grasses when they were reclaimed or converted for agricultural use during the last century. One utility corridor (Louisville water line) follows the old railroad bed.

Several non-native plant species of concern (state A- and B-listed) occur in the management area (see Table 4). Species posing the greatest threat to native vegetation include: diffuse knapweed (*Acosta diffusa*), sulphur cinquefoil (*Potentilla recta*), dalmation toadflax (*Linaria genistifolia* subsp. *dalmatica*), myrtle spurge (*Tithymalus myrsinites*), and Canada thistle (*Breca arvensis*).

Livestock grazing has been the main agricultural activity in the area for over a century. Moderate levels of spring or fall grazing are typical with occasional summer grazing. Additional fencing may be needed to reduce the potential for livestock and visitor interactions, and may provide an opportunity for improved cattle grazing management.

These management areas are contiguous with several thousand acres of OSMP and Boulder County Parks and Open Space (BCPOS) lands to the south and nearly contiguous (separated by State Highway 170) with large areas of OSMP land to the north and northeast. Moderate densities of residential development are to the southwest. The Passive Recreation Area designation for western Marshall Mesa recognizes high levels of visitation.

Southern Grasslands Habitat Conservation Area (HCA) and (Greenbelt Plateau) Dowdy Draw Natural Area (NA)

This management area is the largest relatively intact block of grassland habitat in the Open Space and Mountain Parks system (a mosaic of plains riparian, mixed grass, and tallgrass habitats). It is a mixed complex of several different kinds of prairie grassland communities that form a transition from foothills to eastern plains community types. The dominant shortgrass species include buffalograss (*Buchloe dactyloides*) and blue grama (*Chondrosum gracile*). Some of the important tallgrass and mixed grass species include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), prairie dropseed (*Sporobolus heterolepis*), needle and thread grass (*Hesperostipa comata*), side-oats grama (*Bouteloua curtipendula*), western wheatgrass (*Pascopyrum smit hii*), junegrass (*Koeleria macrantha*), and purple three-awn (*Aristida purpurea*). Dwarf leadplant (*Amorpha nana*), birdsfoot violet (*Viola pedatifida*), carrion flower (*Smilax lasioneuron*), and chaffweed (*Anagallis minima*) are species documented in the HCA and listed as rare and sensitive by the Colorado Natural Heritage Program (Table 1). Narrow-leaved milkweed (*Asclepias stenophylla*), a CNHP tracked species found on the outwash mesas in the Boulder area, has been observed, but not formally documented in the management area. Fork-tip threeawn grass (*Aristida basiramea*) and the upland sedge, *Carex oreocharis*, are additional rare species occurring in adjacent grasslands and expected to occur in the Southern Grasslands (Table 2). The Coal Creek corridor contains potential habitat for Ute ladies'-tresses orchid (*Spiranthes diluvialis*), a federally-listed species.

Xeric tallgrass communities (Table 3, Map 5) occurring on the Rocky Flats Mesa and on slightly younger outwash mesa surfaces in the Boulder area (including the Marshall Mesa-Southern Grassland Trail Study Area) are thought to be the largest remnants of this tallgrass type in North America. Tallgrass prairie communities are among the rarest community types in the world, making the Colorado Front Range tallgrass communities exceptional in their conservation significance and value.

Contiguous grassland areas within the HCA are large enough and intact enough to serve as a site for threatened and endangered prairie species reintroduction (e.g., sharp-tailed grouse). Much of the management area includes important prairie dog habitat, distant from urban development and other human presence. The largest black-tailed prairie dog Conservation Area designated on Open Space and Mountain Parks falls within the management area. The relatively large blocks

of uninterrupted xeric tallgrass and needle and thread grass communities on the mesa tops, mixed grass within the southern block of the management area, and the riparian woodlands associated with Coal Creek provide diversity of habitat that supports a high number of bird species, several rare butterfly species, and many mammal species, both small and large (see Wildlife section).

Large areas of short grass and mixed grass prairie in the central part of the area south of Coal Creek are in variable condition, and have good restoration potential. Active restoration of a historic sand and gravel mine includes riparian and upland grassland habitat.

Several non-native plant species of concern (state A- and B-listed) occur in the management area (Table 4). Species posing the greatest threat to native vegetation include: diffuse knapweed (*Acosta diffusa*), sulphur cinquefoil (*Potentilla recta*), dalmation toadflax (*Linaria genistifolia* subsp. *dalmatica*), cutleaf teasel (*Dipsacus laciniatus*), Scotch thistle (*Onopordum acanthium*), and Canada thistle (*Breea arvensis*).

Livestock grazing is a current and historic agricultural use for parts of the area. Presently, a large portion of the area is leased for cattle grazing by Albert and Leo Hogan. Moderate levels of spring, summer and fall grazing are typical. Several large fenced areas with water sources allow for a rotational grazing regime.

In addition to being the largest grassland habitat block in the OSMP system, the Southern Grasslands are bounded on the east by a large block of Boulder County Parks and Open Space land, on the south by the Rocky Flats National Wildlife Refuge and the National Renewable Energy Laboratory, and on the west and north by OSMP land. State highways 93 and 128 are the only developments separating the management area from these adjacent, publicly owned lands. This landscape context creates a significant buffer for the Southern Grasslands from the urban interface.

Vegetation Maps

The vegetation maps display vegetation types at the “Alliance” level of the National Vegetation Classification. Plant communities of special concern and plant species of concern are identified and located.

Sensitive Species and Communities

The following tables identify rare and imperiled plant species (Tables 1 and 2) and rare and imperiled upland plant communities (Table 3) located in the Marshall Mesa-Southern Grassland Trail Study Area, which are listed by the Colorado Natural Heritage Program (CNHP). These tables include their ranking of rarity for each rare plant species.

Table 1
Rare and Imperiled Plant Species Listed by the Colorado Natural Heritage Program and Occurring in the Marshall Mesa – Southern Grasslands Trail Study Area, OSMP

Common Name	Scientific Name	Global Rank	State Rank	Subarea
Dwarf wild indigo (leadplant)	<i>Amorpha nana</i>	Secure (G5)	Imperiled to vulnerable (S2S3)	WMM, EMM, SG/DD
Chaffweed	<i>Anagallis minima</i>	Secure (G5)	Critically imperiled (S1)	SG
Narrow-leaved milkweed	<i>Asclepias stenophylla</i>	Apparently secure (G4G5)	Imperiled (S2)	SG
Wavy-leaf stickleaf	<i>Nutallia sinuata</i>	Vulnerable to extirpation (G3)	Imperiled (S2)	WMM
Carrion-flower	<i>Smilax lasioneuron</i>	Secure (G5)	Vulnerable to secure (S3S4)	SG
Birdsfoot violet, prairie violet	<i>Viola pedatifida</i>	Secure (G5)	Imperiled (S2)	WMM, SG/DD

Table 2
Rare and Imperiled Plant Species Listed by the Colorado Natural Heritage Program and Expected in the Marshall Mesa – Southern Grasslands Trail Study Area, OSMP

Common Name	Scientific Name	Global Rank	State Rank	Fed Status
Fork-tip three-awn	<i>Aristida basiramea</i>	Secure (G5)	Critically imperiled (S1)	
Upland sedge	<i>Carex oreocharis</i>	Vulnerable to extirpation (G3)	Critically imperiled (S1)	
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	Imperiled (G2)	Imperiled (S2)	Threatened (LT)

Table 3
Rare and Imperiled (Upland) Plant Communities Listed by the Colorado Natural Heritage Program and Occurring in the Marshall Mesa – Southern Grasslands Trail Study Area, OSMP

Common Name	Scientific Name	Global Rank	State Rank
Xeric Tallgrass Prairie	<i>Andropogon gerardii</i> / <i>Schizachyrium scoparium</i>	Imperiled (G2)	Imperiled (S2)
Xeric Tallgrass Prairie	<i>Andropogon gerardii</i> / <i>Sporobolus heterolepis</i>	Imperiled (G2)	Critically imperiled to imperiled (S1S2)
Shortgrass Prairie	<i>Chondrosum (Bouteloua) gracile</i> – <i>Buchloe dactyloides</i>	Apparently secure (G4)	Imperiled (S2?)
Needle and Thread Grass – East (Colorado): Great Plains Mixed Grass Prairie	<i>Hespirostipa comata</i> --East	Imperiled (G2)	Imperiled (S2)
New Mexico Feathergrass: Great Plains Mixed Grass Prairie	<i>Hesperostipa neomexicana</i>	Imperiled (G2)	Imperiled (S2)
Green Needle Grass: Great Plains Mixed Grass Prairie	<i>Nasella viridula</i>	Unranked: need for additional information (GU)	State rank not yet assessed (SNR)

Non-Native Plant Species of Concern

The following table (Table 4) identifies non-native plant species that, to varying degrees, are threats to the native flora and fauna in the Trail Study Area.

Table 4
Non-Native Plant Species of Concern Occurring in the Marshall Mesa – Southern Grasslands Trail Study Area, OSMP

State rankings for noxious weed species: List A = Eradication mandated, List B = Management recommended, List C = Management not required at this time (not displayed in table)

Common Name	Scientific Name	State Rank	Primary Habitat
Myrtle spurge	<i>Tithymalus myrsinites</i>	List A	Upland
Bouncingbet	<i>Saponaria officinalis</i>	List B	Riparian
Canada thistle	<i>Breea arvensis</i>	List B	Wetland, riparian
Common teasel	<i>Dipsacus fullonum</i>	List B	Wetland, riparian
Cutleaf teasel	<i>Dipsacus laciniatus</i>	List B	Wetland, riparian
Dalmation toadflax	<i>Linaria genistifolia</i> subsp. <i>dalmatica</i>	List B	Upland
Diffuse knapweed	<i>Acosta diffusa</i>	List B	Upland
Houndstongue	<i>Cynoglossum officinale</i>	List B	Upland, riparian, forest
Musk thistle	<i>Carduus nutans</i>	List B	Upland
Oxeye daisy	<i>Leucanthemum vulgare</i>	List B	Wet meadow, riparian
Scotch thistle	<i>Onopordum acanthium</i>	List B	Upland, riparian
Sulphur cinquefoil	<i>Potentilla recta</i>	List B	Upland, riparian

Plant Species List

OSMP is compiling a plant species list for the TSA, including upland, wetland and riparian vegetation. When completed, this list will be available to the public.

Wetland and Riparian Resources

Map 7. Riparian and Wetland Resources shows the location of relevant information for this portion of the inventory.

Introduction

Riparian areas are extremely important landscapes in Colorado because they support disproportionately high levels of biological diversity. Although they comprise less than two

percent of the land cover, riparian areas supply habitat for approximately 80 percent of birds, mammals, reptiles, amphibians and fish native to Colorado (citation). Many are obligate riparian species and depend almost entirely on these streamside and aquatic habitats for their survival.

Riparian areas are as endangered as they are important. The availability of water, gravel, and abundant vegetation has attracted a host of human uses to riparian areas. Since the 1800's gravel mining, flood control projects, urban development, agricultural practices, and hydrologic modifications in riparian areas have decreased their extent and ecological integrity. Along the Colorado Front Range, none remain unaffected by human disturbances.

Background

Since 1981, the City of Boulder has acquired over 90 percent of the undeveloped riparian lands along Coal Creek in Boulder and Jefferson Counties creating a nearly contiguous seven-mile riparian corridor from the town of Superior to the mouth of Coal Creek Canyon at State Highway 72.

Coal Creek is the most remote riparian system in the City of Boulder Open Space and Mountain Parks system and the only riparian area without an associated recreational trail. Through much of its length, the creek has not been mined for gravel and has not been channelized. There are no main-stem reservoirs on Coal Creek. Although several ditches at the mouth of Coal Creek Canyon divert much of the creek's water, there is considerable spring and summer flow from thunderstorms and snowmelt from higher in the watershed. These annual high flows have maintained a complex floodplain. Where it flows through Open Space, Coal Creek's multiple channels are dynamic. Each year they cut into their banks and redeposit the eroded material as point bars further downstream. Consequently, the Coal Creek floodplain has a rich variety of wetland, riparian, and upland plant communities.

Coal Creek Riparian Vegetation Sampling

In 1999, a vegetation monitoring project was initiated on Coal Creek to collect baseline vegetation data within the fenced riparian corridor. Sixteen permanent transects were established along the creek from the Flatirons Vista property to the eastern most portion of the Superior Associates property. Transects were spaced 400 meters apart from a randomly chosen starting point and placed perpendicular to the flow of the creek. Distinct plant assemblages were subjectively demarcated, and along each transect permanent one-square meter plots were randomly placed within them. (In riparian areas, plant species changes are primarily due to elevation changes in the terrain relative to the channel and consequently the ground water.) A total of 96 permanent plots were placed along 16 transects. A nine-square meter plot was centered over each of the 96 one-meter plots, and cover of the overstory component was also measured (shrubs and trees). Permanent photo points were set up at the endpoints of each transect. All plots and transects were documented with a Global Positioning System. Vegetation data at all transects were collected in 1999, 2001 and 2004 and entered into a Microsoft Access database.

Despite gravel mining and changes in the natural hydrologic regime since the 1800's, the vegetation of the Coal Creek riparian area is still diverse and dominated by an overstory of native

species. Because Coal Creek winds its way down from higher elevations on the Front Range and out to the high plains, it intersects a variety of diverse upland habitats that occur as a result of steep environmental gradients. As a result of these gradients, biological diversity is high in this section of the Front Range known as the foothills.

Riparian and Wetland Plant Associations in the Study Area

The overstory species *Populus angustifolia* (narrowleaf cottonwood) is prolific along the higher reaches of Coal Creek and slowly intermixes with *Populus deltoides* (plains cottonwood). Many of the hybrid cottonwoods *Populus x acuminata* are common in this transition zone with more *Populus deltoides* and fewer *Populus angustifolia* becoming apparent on the lower reaches as the creek meanders further out of the foothills and onto the plains.

Several Colorado Natural Heritage Program (CNHP) tracked plains cottonwood riparian woodland associations occur along Coal Creek. These range from the common human created and grazing induced *Populus deltoides*/*Bromus inermis* (plains cottonwood/smooth brome) woodland to the very rare *Populus deltoides*/*Prunus virginiana* (plains cottonwood/chokecherry) woodland.

The *Populus deltoides* (*Salix amygdaloides*)/ *Salix exigua* (plains cottonwood/ peach-leaf willow/ coyote willow) association described as rare to uncommon in Colorado (S3) is found along the Coal Creek riparian area and also in Cowdrey Draw. This association is typically an early seral stage community with small plains cottonwood trees intermixed with a coyote willow understory although older cottonwood trees can be numerous. Peachleaf willow is common in this association along the Front Range.

Two rare to very rare riparian plant communities along Coal Creek have been identified by OSMP staff and described by CNHP. The *Populus angustifolia*/*Salix irrorata* (narrowleaf cottonwood/ bluestem willow) plant association has been found to occur only along the foothill streams of the Colorado Front Range and in the Rio Grande Valley of New Mexico. It often occupies the transition zone where plains cottonwood and narrowleaf cottonwood co-occur and hybridize to form cross type *Populus x acuminata*.

The extremely rare (S1) *Populus angustifolia*/*Prunus virginiana* (narrowleaf cottonwood/ chokecherry) association is found in small areas along Coal Creek. Chokecherry is found in scattered patches along the riparian corridor, but many were heavily browsed in the past. With recent changes in management, such as fencing to exclude cattle and restoration of the gravel mined channel to raise ground water levels streamside, these species could potentially recover and increase enough to warrant additional occurrences.

The *Salix amygdaloides* (peachleaf willow) woodland (S1) is uncommon in Colorado and is found in Cowdrey Draw. It occurs in small clumps adjacent to the narrow floodplain channel in the drainage. Understory species may include coyote willow and western snowberry.

The *Crataegus macracantha* var. *occidentalis* (hawthorn) plant association was described in a 1998 report by CNHP on the South Platte River Basin as being known from Colorado only along Coal Creek.

Several plant species growing along Coal Creek are listed as dominants within CNHP's record of Colorado's riparian plant associations and have as yet not been formally documented. The extremely rare to very rare (S1S2) *Populus deltoides*/*Sporobolus cryptandrus* (plains cottonwood/sand dropseed) association may also occur along Coal Creek because both species are found in the riparian corridor. .

In upper Cowdrey draw, *Schoenoplectus pungens* (common three-square) forms an uncommon (S3) herbaceous vegetation association in low lying swales where soil remains saturated for much of the growing season. The species is salt tolerant and occurs most frequently in near pure stands in alkaline soils. Disturbance from grazing can lead to an increase in *Juncus balticus* and *Hordeum jubatum*.

Symphoricarpos occidentalis (western snowberry) shrubland (S3) is also an uncommon plant association that occurs in the Coal Creek riparian area, in Cowdrey Draw and in isolated small drainages in the TSA. This association is typically found in the drier riparian sites and appears to be transitional between riverine and upland communities.

Carex nebrascensis (Nebraska sedge) herbaceous vegetation association (S3) is found in the flood irrigated meadows of lower Coal Creek. Under heavy grazing Nebraska sedge increases in abundance and can crowd out other species.

Riparian Restoration and Protection Project

In 1999, the City of Boulder Open Space and Mountain Parks Department began a project to protect and restore the riparian habitat of Coal Creek in southern Boulder County. The main goals of this multi-disciplinary project are to conserve and improve the native riparian plant, animal, and fish communities of Coal Creek and the ecological processes that sustain them. The project is multi-faceted involving fencing the riparian corridor, restoring channelized sections of the creek, recreating historic riparian wetlands, constructing fish passage structures, and monitoring the success of the project.

Many public agencies and private organizations participated in the project design, funding, construction, and monitoring. Public agencies include Boulder County Parks and Open Space, Colorado Division of Wildlife, and U.S. Fish and Wildlife Service. Participating private and non-profit organizations include The Terra Foundation, National Audubon Society, Colorado Audubon Council, Boulder County Audubon Society, Boulder County Nature Association, and Boulder Flycasters (local Chapter of Trout Unlimited).

Project Descriptions

Fencing

The fencing component of the project involved fencing the seven-mile Coal Creek riparian corridor from State Highway 72 to the town of Superior to improve vegetation cover and diversity. The width of the “exclosure” varies from one-eighth to one-half mile depending on several factors including the width of riparian vegetation, terrain, and soil type. Several small irrigation reservoirs as well as non-tributary springs exist in upland areas and serve as livestock water sources. The riparian exclosure was constructed with gates so that livestock grazing could be used prescriptively to address weed control or other vegetation management issues.

Stream Channel Restoration

Historically, gravel mining has affected several areas along Coal Creek. In one area, gravel was mined around and through the creek channel. In a nearby area the stream was diverted into a bypass ditch to divert flow from areas that were mined. As a result, the original stream channel was cut off. The ditch increased the stream gradient and caused channel downcutting, streambank erosion, and a lowering of the local water table. The original flow in the channel was stored by filling in the ditch and directing flow into the historic channel. Planting and seeding with native riparian trees, shrubs, and herbaceous vegetation took place after final grading.

Wetland Restoration

Wetlands typically occur in riparian areas as freshwater marshes and willow shrublands in abandoned channel meanders (“oxbows”) or other depressions where the water table is at or near the ground surface. Water diversions and gravel mining along Coal Creek are thought to have reduced the extent and possibly destroyed some of these wetlands. As part of this project, off-channel wetlands were recreated in areas where gravel mining occurred. This involved monitoring the depth to ground water in shallow monitoring wells and excavating areas to expose the water table. The size, shape and location of these wetlands are similar to natural, historic conditions. Native plants were also reintroduced into these areas.

Fish Passage Structures

The water flow in Coal Creek is seasonal most years. However, many shallow pools remain in the channel due to the high alluvial groundwater table and natural springs adjacent to the stream. These pools allow for fish to survive during low-flow or no-flow periods. In 2000, an unprecedented drought caused Coal Creek to completely dry out, including the isolated pools. As a result, all fish were extirpated from the project area. Re-colonization of fishes from upstream and downstream fish populations has been slowly occurring since then.

Three low-head diversion dams existed in the project area blocking upstream movement of fish. OSMP constructed two rock-ramp fishways on the functioning diversion dams to allow fish to move freely past the dams. An abandoned diversion dam was also removed and the channel

regraded to match the existing channel. Rock-ramp fishways consist of gently sloping (eight to ten percent slope) concrete and natural rock ramps that slow water velocities and direct water during low flows into the low flow channel. Small boulders are imbedded into the ramp to provide holding pools and resting areas for small fish as they navigate up the ramp. The rock ramps blend naturally with the stream channel and function much like a natural riffle. Extensive revegetation took place at each diversion dam where native riparian trees, shrubs and grasses were planted and seeded.

Fish Sampling

The city of Boulder Open Space and Mountain Parks Department and the Colorado Division of Wildlife performed fish sampling in August 1999 and 2000. Sample sites were located on the Superior Associates property (upstream of the town of Superior), Tracy-Collins property (between State Highways 128 and 93) and the Jewell Mountain property (in Jefferson County). The highest native species diversity was found on the Superior Associates property and included the following species: Longnose dace, fathead minnow, creek chub, central stoneroller, Johnny darter, and white sucker. Rainbow trout and creek chub were collected on the Tracy-Collins property. The Jewell Mountain property contained rainbow trout and longnose dace. Rainbow trout was the only non-native species collected on Coal Creek

Fish have been observed above and below the modified and removed diversion dams. Although quantitative data that compare pre- and post-project species diversity have not yet been collected, fish population monitoring will take place in 2005 and beyond.

As with all restoration projects, monitoring is critical to assess change and determine if the goals of the project have been met. Documentation is important to explain the value and benefits of ecosystem restoration. Measuring the ecological conditions in riparian areas and aquatic ecosystems can also provide land managers with a better idea of environmental conditions that might characterize a more sustainable or “natural” system. As additional information from this project is gathered, analyzed and reported, it will be shared with other land management agencies and researchers to contribute further to our understanding of riparian ecosystem restoration.

Wildlife Resources

Map 8. Wildlife Resources shows the location of relevant information for this portion of the inventory (some of the information is generalized to protect sensitive sites).

Marshall Mesa

Overall importance for Wildlife

Marshall Mesa supports several habitat types including shrubland, ponderosa pine forest, grassland, and wetland areas. The areas of shrubland are high quality wildlife habitat that is unfragmented and embedded in a matrix of grassland habitat. These shrublands provide habitat for songbirds and a variety of other taxa. Extensive data is not available on the wildlife community in this particular shrubland. However, shrublands in general and north-facing

shrublands in particular are rare across the Front Range and support a diverse wildlife community.

Marshall Mesa also supports ponderosa pine forest unique in its easterly location. These forests support a community of bird species typical of ponderosa pine forests to the west, but absent from other habitats this far east. These include species such as Western Wood-pewee and White-breasted Nuthatch. These forests also provide shelter for large mammals such as Mule Deer and coyotes.

Grassland habitats on Marshall Mesa support grassland nesting birds and rare species of butterflies (see below for details). In addition, the prairie dog colony provides hunting opportunities for both wintering and breeding raptors.

Two small ponds provide habitat for waterfowl seasonally and watering bats have been documented. Northern Leopard Frogs have also been documented.

Butterflies

Three species of locally imperiled and globally rare butterflies have been documented on Marshall Mesa. These are the Ottoo Skipper, a prairie specialist that prefers undisturbed grasslands, the Arogos Skipper, and the Mottled Duskywing.

Birds

Documented occurrences of rare imperiled birds include Bald Eagle, Golden Eagle, Ferruginous Hawk, Bobolink, Yellow-headed Blackbird, and Long-eared Owl. A complete list can be found in Table 5. Wildlife Species of Special Concern.

Prairie Dogs

Marshall Mesa supports a single prairie dog colony that covers approximately 36 acres (identified on Map 8. Wildlife Resources). This colony provides important hunting areas for raptors and mammalian predators as well as providing habitat for species commensal with prairie dogs.

Greenbelt Plateau

Greenbelt Plateau consists mainly of grassland habitat with smaller areas of ponderosa pine forest and wetlands that support species associated with grasslands including raptors, grassland nesting birds, reptiles and amphibians, large and small mammals, and insects. The ponderosa pine forests on Greenbelt Plateau support the species discussed above for Marshall Mesa ponderosa forests.

Species of Special Concern

Species documented in the Greenbelt Plateau area include Bald Eagles, Lark Bunting, Grasshopper Sparrow, and Northern Leopard Frogs.

Bird Diversity

Hastings et al. 2005 found that the Greenbelt Plateau had the highest density of Grasshopper Sparrows and Vesper Sparrows and the second highest density of Western Meadowlarks of seven grassland sites studied on OSMP. In addition, Greenbelt Plateau had the highest nest density of all 18 study sites for all species. Only Greenbelt Plateau and Superior Associates (included in Southern Grasslands discussion) supported the full suite of five primary grassland nesting species: Western Meadowlark, Vesper Sparrow, Grasshopper Sparrow, Horned Lark, and Lark Sparrow.

This data shows that Greenbelt Plateau is an important area for grassland nesting birds and supports high species richness, high abundance of a species of special concern (Grasshopper Sparrow), and overall grassland bird nesting density.

Southern Grasslands

HCA Importance for Wildlife

The Southern Grasslands HCA includes the largest intact block of grassland habitat on OSMP properties. The size of this habitat is important for wildlife for a variety of reasons. First, the ecosystem processes that are necessary for natural wildlife communities are more likely to occur in an undisturbed state in large habitat blocks. Factors affecting communities and individual species such as predator-prey dynamics, free movement of animals, both individuals and populations, and complete biological communities are more likely to be intact in an area of habitat that is large. As a result, the size of this unfragmented habitat block presents the best grassland habitat area on OSMP lands to preserve and restore this biological functioning and the wildlife populations that accompany it.

The Southern Grasslands HCA is also unique in its distance from the urban areas of Boulder. Other large grasslands on the OSMP system occur in much closer proximity to urban development, increasing the chances that impacts from development will affect the wildlife communities and biological functioning of these habitat areas. In addition, the location of the Southern Grasslands presents the opportunity to preserve this habitat in a landscape context that contains extensive Boulder County Open Space properties as well as Federal Lands (i.e., Rocky Flats) that create an even more extensive grassland habitat area remote from urban development. This is particularly critical for wide-ranging species or species particularly susceptible to human disturbance such as non-habituated wintering elk, hunting Golden Eagles and Ferruginous Hawks, and extirpated species such as Plains Sharp-tailed Grouse and Pronghorns.

The unique nature of this habitat in the OSMP land system also presents the opportunity for research examining the impacts of fragmentation, urbanization, and other disturbances in a setting less impacted than many other OSMP grassland areas. This also presents the opportunity for researchers to utilize this area as a control site to be compared to other areas that are either smaller habitat patches or exist in closer proximity to the urban edge. Additionally, researchers can examine community dynamics that are less well preserved on smaller or more impacted areas.

Overall, the Southern Grasslands present the best opportunity on the OSMP system to preserve and restore grassland ecosystem dynamics and wildlife communities and populations in a setting allowing natural and unimpeded functioning.

Raptors

The Southern Grasslands area supports both breeding and wintering raptor species. In census efforts across this area, five species of special concern (Bald Eagle, Golden Eagle, Ferruginous Hawk, Northern Harrier, and Prairie Falcon) were seen hunting during the winter. In addition to these species, Swainson's Hawks were observed during the breeding season. Other species not appearing on the Species of Special Concern list included Rough-legged Hawk, Red-tailed Hawk, and American Kestrel. The Mesa Sand and Gravel site had the highest number of Golden Eagle sightings at prairie dog towns of any OSMP property surveyed.

The heavy raptor usage of this area suggests that the large habitat block present along with ample prey such as prairie dogs and other small mammals offer these species valuable habitat during both the nesting and wintering seasons. This area represents one of the few sites on OSMP where raptor predator-prey relationships (particularly with prairie dogs) are intact and functioning normally.

Burrowing Owl

The Southern Grasslands supported a breeding pair of Burrowing Owls in 2005, which successfully fledged three young. This was the only known breeding location in 2005 for this species in the county. Burrowing Owls are listed as threatened by the State of Colorado and are dependent on prairie dog colonies for nesting sites. Burrowing Owls are considered to be sensitive to disturbance in breeding areas. This is supported by the fact that this pair nested in one of the most remote prairie dog areas on the OSMP system.

Bald Eagle

In 2003, Bald Eagles began nesting in the Southern Grasslands/Coal Creek area. A more detailed account of nesting is provided under section on Coal Creek. However, the habitat in the Southern Grasslands provides important hunting grounds for these breeding bald eagles. In addition, other non-breeding, wintering bald eagles hunt in this area.

Prairie Dogs

The Southern Grasslands area is identified in the 1996 Open Space Black-Tailed Prairie Dog Habitat Conservation Plan as a conservation area for the species. The reasons for this designation include the large, unfragmented nature of this grassland area and the remoteness from conflicting land uses and urbanization. This was one area that was identified as important for providing a natural setting for prairie dog existence with freedom of movement and expansion of the colonies, as well as an intact predator community including not only raptors, but also mammalian predators.

The Southern Grasslands contain 16 distinct prairie dog towns organized loosely into three complexes. The total acreage occupied in 2004 was approximately 373 acres. Prairie dog towns in this area are shown on the Map 8. Wildlife Resources.

Prairie dog towns provide habitat for a variety of species in addition to prairie dogs including Burrowing Owls (one of these towns had a breeding pair in 2005), several species of amphibians and reptiles and other small mammals such as rabbits, mice, and voles. They also provide hunting and feeding opportunities for a variety of predators including Ferruginous Hawks, Golden Eagles, and Coyotes.

In the Black-Tailed Prairie Dog Conservation Plan, OSMP has identified grassland biodiversity preservation as the top priority in this area.

Wildlife Preservation Area (WPA)

As delineated on various maps, an area surrounding Eggleston Reservoir No. 4 has been designated a Wildlife Preservation Area. As part of the agreement with the previous owner of this land, the area was closed to all public access. The purpose of the Wildlife Preservation Area as stated in the Eggleston Reservoir No. 4 Wildlife Preservation Area agreement dated May 26, 1992 is “to create a buffer zone for the protection and enhancement of appropriate vegetation, wildlife habitat and the ecological condition of the Wildlife Preservation Area, as determined by the city... In addition, the WPA provides a controlled area that allows for environmental, vegetation, and wildlife education and research.”

Plains Sharp-tailed Grouse

Plains Sharp-tailed Grouse are listed as endangered in the state of Colorado. Despite a previous relocation effort, none are known to inhabit Boulder County. However, the Division of Wildlife and the Fish and Wildlife Service have both expressed interest in future relocation efforts of this endangered grouse. The complex of open grassland consisting of OSMP lands, Boulder County Open Space lands, and Rocky Flats represents a substantially large area of habitat to support the grouse. In addition, the habitat in this area is suitable, with appropriate management, for the needs of the grouse throughout their lifecycle including areas for wintering and breeding. This area represents the only suitable habitat for the grouse found in Boulder County. Although current fragmentation of the area exists in the form of major roads (State Highways 93 and 128),

future fragmentation of the area could lead to a significant decline in the suitability of this area for Plains Sharp-tailed Grouse.

Pronghorn

Like the Plains Sharp-tailed Grouse, Pronghorn have been extirpated from grasslands of Boulder County. Biologists from the Colorado Division of Wildlife and the US Fish and Wildlife Service believe that the Southern Grasslands along with adjoining lands represent the best possibility for future reintroduction of this species for many of the same reasons as discussed for the Plains Sharp-tailed Grouse.

Coal Creek

Overall Importance for Wildlife

Coal Creek is an important plains riparian area providing habitat for a variety of species including Bald Eagles, shrubland and riparian birds, small mammals, Prebles Meadow Jumping Mice, amphibians, fish and larger mammals such as coyotes, raccoons, and occasionally bears. In addition, with the restoration of the riparian habitat, this represents an important east-west corridor to allow the movement of large animals such as elk to and from wintering areas as well as being a stopover habitat for migrating songbirds. Riparian corridors and the associated riparian forest and shrubland are rare habitats in the grasslands of Boulder County with many being heavily disturbed by mining, water diversion, and urbanization. Despite its history of mining and other disturbances, the remote nature of Coal Creek makes it an important and unique restoration site that provides important wildlife habitat that will only increase in value as restoration is completed and vegetation recovers and matures.

Birds

Boulder County Audubon Society volunteers have been surveying birds in the Coal Creek drainage since 1998. Overall in that time period, they have documented 142 species of birds, 35 of which appear on lists of species of special concern. In addition, six of those appear on federal or state lists of special concern or regulatory protection. Bird species have responded positively to the re-growth of vegetation associated with the restoration project in the area and shrub-nesting and cavity-nesting birds have increased.

Overall, this riparian corridor contains habitat that supports high avian species diversity and is increasing in its importance as bird habitat as vegetation recovers.

Bald Eagle

Beginning in 2003, a pair of Bald Eagles nested in the Coal Creek riparian area. This nest was one of only two known nests in Boulder County in 2003 and 2004. The pair nested in 2003 and 2004 but did not return in 2005. However, individuals have been seen in the area throughout the breeding season, suggesting they may return in future years.

Prebles Meadow Jumping Mouse

Prebles Meadow Jumping Mice have been trapped along Coal Creek in this area. As a result, the entire stretch of Coal Creek is either confirmed or potential Prebles' habitat. As a federally threatened species, the habitat of Preble's Meadow Jumping Mice is protected under the Endangered Species Act and subject to regulations dictated by the Act.

Fish

Fish in Coal Creek are discussed in the wetlands portion of the inventory report.

Small Mammals

The restoration of the Coal Creek drainage is expected to increase habitat available for small mammals, although at this time, recent data is not available. In trapping efforts from 1999-2001, 9 species of small mammal were located. These included the Prebles Meadow Jumping Mouse (*Zapus hudsonius preblei*) (Federally threatened species), Deer Mouse (*Peromyscus maniculatus*), Hispid Pocket Mouse (*Chaetodipus hispidus*), House Mouse (*Mus musculus*), Western Harvest Mouse (*Reithrodontomys megalotis*), Meadow Vole (*Microtus pennsylvanicus*), Prairie Vole (*Microtus ochregaster*), Mexican Woodrat (*Neotoma mexicanus*), and Masked Shrew (*Sorex cineros*).

Amphibians

Northern Leopard Frogs use the habitats in and adjacent to the Coal Creek drainage including ephemeral wetlands along the creek corridor. Northern Leopard Frogs are a species of special concern. In addition, Woodhouse Toads and Painted Turtles have been found in th

Table 5
Wildlife Species of Special Concern by Management Area

Marshall Mesa

Species	Listing/ Designation*	Other information
American White Pelican	State- Special Concern CNHP- Globally rare, locally vulnerable	
Arogos Skipper	CNHP- globally vulnerable, locally imperiled	
Bald Eagle	Federal- Threatened State- Threatened CNHP- locally critically imperiled breeding, vulnerable non-breeding	Federal regulation under Endangered Species Act and Eagle Protection Act
Black-crowned Night-heron	BCNA	
Black-tailed Prairie Dog	State- Special Concern CNHP- locally vulnerable	

Species	Listing/ Designation*	Other information
Bobolink	CNHP- locally vulnerable Audubon	
Cedar Waxwing	BCNA	
Cooper's Hawk	OSMP	
Ferruginous Hawk	State- Special Concern	
Golden Eagle	BCNA	Federal regulation under Eagle Protection Act
Great Blue Heron	BCNA	
Lark Bunting	BCNA- rare and declining PIF	
Long-eared Owl	BCNA- rare and declining	
Mottled Duskywing	CNHP- globally vulnerable, locally imperiled	
Northern Leopard Frog	Federal- Sensitive State- Special Concern CNHP- locally vulnerable	
Osprey	State- sensitive BCNA- rare	
Ottoo Skipper	CNHP- Globally vulnerable, Locally imperiled	
Rock Squirrel	OSMP	
Sharp-shinned Hawk	OSMP	
Turkey Vulture	OSMP	
Yellow-headed Blackbird	BCNA	

Greenbelt Plateau

Species	Listing/ Designation*	Other information
Bald Eagle	Federal- Threatened State- Threatened CNHP- locally critically imperiled breeding, vulnerable non-breeding	Federal regulation under Endangered Species Act and Eagle Protection Act
Grasshopper Sparrow	BCNA	
Lark Bunting	BCNA- rare and declining PIF	
Northern Leopard Frog	Federal- Sensitive State- Special Concern CNHP- locally vulnerable	

Southern Grasslands/ Coal Creek

Species	Listing/ Designation*	Other information
American Peregrine Falcon	State- Special concern CHNP- State imperiled breeding BCNA	
Bald Eagle	Federal- Threatened State- Threatened CNHP- locally critically imperiled breeding, vulnerable non-breeding	Federal regulation under Endangered Species Act and Eagle Protection Act
Black-crowned Night-heron	BCNA	
Black-tailed Prairie Dog	State- Special Concern CNHP- locally vulnerable	
Brewer's Sparrow	Audubon	
Brown Thrasher	BCNA- rare and declining	
Burrowing Owl	State- Threatened PIF BCNA- Rare and declining	State regulation under Endangered Species Act
Cedar Waxwing	BCNA	
Cooper's Hawk	OSMP	
Double-crested Cormorant	BCNA	
Ferruginous Hawk	Federal- Sensitive State- Special Concern BCNA	
Golden Eagle	BCNA	Federal regulation under Eagle Protection Act
Grasshopper Sparrow	BCNA	
Gray Catbird	BCNA	
Great Blue Heron	BCNA	
Green-winged Teal	OSMP	
Indigo Bunting	OSMP	
Lark Bunting	PIF BCNA	
Loggerhead Shrike	USFS PIF BCNA- rare and declining	
Long-eared Owl	BCNA- rare and declining	
MacGillivrays Warbler	PIF	
Merlin	OSMP	
Northern Bobwhite	BCNA- rare and declining	
Northern Harrier	PIF BCNA- Rare and declining	
Northern Leopard Frog	Federal- Sensitive State- Special Concern	

Species	Listing/ Designation*	Other information
	CNHP- locally vulnerable	
Northern Mockingbird	BCNA- rare	
Northern Pocket Gopher, macroctis subsp.	State- Special concern CNHP- locally critically imperiled	
Osprey	State- sensitive BCNA- rare	
Plains Sharp-tailed Grouse	State-Endangered CNHP- critically imperiled PIF BCNA	State regulation under Endangered Species Act No individuals remain from earlier reintroduction efforts
Prairie Falcon	BCNA	
Prebles Meadow Jumping Mouse	Federal- Threatened State- Threatened	Federal and State regulation under Endangered Species Act
Red-eyed Vireo	OSMP	
Rock Squirrel	OSMP	
Rose-breasted Grosbeak	OSMP	
Ring-necked Duck	BCNA	
Rose-breasted Grosbeak	OSMP	
Sage Thrasher	BCNA-rare	
Savannah Sparrow	BCNA	
Sharp-shinned Hawk	OSMP	
Short-eared Owl	CNHP- locally imperiled breeding PIF BCNA- rare Audubon	
Swainson's Hawk	PIF BCNA	
Turkey Vulture	OSMP	
Utah Milksnake	OSMP	
Virginias Warbler	Audubon	
Western Scrub Jay	BCNA	
Western Tanager	PIF	
Wood Duck	BCNA	
Yellow-headed Blackbird	BCNA	

*** Lists referenced:**

Federal- US Fish and Wildlife Service-Federal Endangered Species List

State- Colorado Division of Wildlife-State Endangered Species List

USFS- US Forest Service-Threatened, Endangered and Sensitive Plants and Animals

CNHP- Colorado Natural Heritage Program- Tracked Species and Communities

PIF- Partners in Flight Conservation Targets

BCNA- Boulder County Nature Association Avian Species of Special Concern

Audubon- Audubon Society Watchlist

OSMP- Open Space and Mountain Parks Species of Special Concern (includes all species featured on lists identified above as well as species uniquely identified as OSMP listed)

Appendix A

Grazing Plan Information for Properties in the Marshall Mesa-Southern Grasslands TSA

8/12/05

Property	End Date of Lease	Condition	Category of Grassland	2005 Grazing Plan	Long Term Grazing Plan	Comments
Damyanovich East of S. 66 th . St.	12/31/06 Long term lease	Fair	Disturbed native / seeded grassland	Winter grazing	Winter grazing	Disturbance is from historic railroad and mining activities. This pasture is used to keep bulls separate from visitors and cows during the winter and calving season.
Damyanovich West of S. 66 th . St.	12/31/06 Long term lease	Good	Native grassland	Spring grazing	No summer grazing	This property has a pond with associated wetlands. Summer grazing might lead to undesirable impacts to these communities. This property also has a xeric tallgrass community on the top of the mesa. Annual brome grasses and Canada thistle would be prescriptive grazing targets.
East Rudd	12/31/06 Long term lease	Good	Native grassland / shrubland	Spring / early summer grazing	Minimize summer grazing	This parcel has significant shrublands and riparian communities on the north end. Spring or fall grazing minimizes the impact to these communities while allowing for some level of non-native cool season species control (Canada thistle, non-native bluegrasses, annual brome)
Greenbelt Plateau	12/31/06 Long term lease	Good	Native grassland	Early summer and winter grazing	Minimize summer grazing	Significant xeric tallgrass as well as mesic tallgrass communities are found in this area. The communities found on this property are some of our better examples of these community types. Grazing targets have included diffuse knapweed and non-native perennial grasses including smooth brome and orchard grass.
Varra / Salstrand	12/31/06 Long term lease	Fair	Native grassland / introduced grassland	Summer grazing	Seasonal use	This area has a significant black-tailed prairie dog population. Recent grazing has tried to account for this by controlling overall levels of use and season of grazing. Livestock water availability limits the number of livestock that can be grazed (around 40 animals). Grazing targets have included diffuse knapweed and Canada thistle.

Property	End Date of Lease	Condition	Category of Grassland	2005 Grazing Plan	Long Term Grazing Plan	Comments
Waneka	12/31/06 Long term lease	Fair	Native grassland	Summer grazing	Rest rotation grazing	This area has a significant black-tailed prairie dog population. Recent grazing has tried to account for this by controlling overall levels of use and season of grazing. The Waneka / Kelsall / South Superior Associates area are evaluated each year to determine the timing of livestock grazing for each parcel. Maintenance of grassland conditions has been the primary grazing management objective. Vegetation transects have been installed in this pasture to monitor the vegetation trends on and off prairie dog colonies. Diffuse knapweed has been a grazing management target.
Kelsall	12/31/06 Long term lease	Good	Native grassland	Summer grazing	Rest rotation grazing	The Waneka / Kelsall / South Superior Associates area are evaluated each year to determine the timing of livestock grazing for each parcel. Diffuse knapweed has been a grazing management target.
Superior Associates south of Coal Creek	12/31/06 Long term lease	Fair	Native grassland	Fall grazing	Rest rotation grazing	This area has a significant black-tailed prairie dog population. Recent grazing has tried to account for this by controlling overall levels of use and season of grazing. The Waneka / Kelsall / South Superior Associates area are evaluated each year to determine the timing of livestock grazing for each parcel. Vegetation transects have been installed on the mesa near the Coalton trail. Diffuse knapweed has been a grazing management target.
Mesa Sand and Gravel / Superior Associates	12/31/06 Long term lease	Fair	Native grassland	Spring grazing	Seasonal grazing use	This area has a significant black-tailed prairie dog population. Recent grazing has tried to account for this by controlling overall levels of use and season of grazing.
Tracy-Collins	12/31/06 Long term lease	Good	Native grassland / shrubland	Summer grazing	Spring or fall grazing	This parcel has significant shrub communities on the north and west facing slopes. A significant xeric tallgrass community is found on the mesa top. Grazing targets have included non-native cool season grasses.