

Consultants in Natural Resources and the Environment

City of Westminster

Westminster Hills Open Space

Conditions Report

Jefferson County, Colorado



Prepared for—

City of Westminster 4800 W. 92nd Ave. Westminster, CO 80031 Prepared by—

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January 10, 2024

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Westminster Hills Open Space

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Jefferson County, Colorado

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Abbreviations

Colorado Department of Agriculture
Church Ditch Water Authority
Colony Forming Units
Colorado Parks and Wildlife
Dogs Off-Leash Area
Environmental Protection Agency
ERO Resources Corporation
Geometric Mean
Jefferson County Open Space
Migratory Bird Treaty Act
Milliliters
Most Probable Number
Natural Diversity Information Source
National Hydrography Dataset
Open Space and Mountain Parks (City of Boulder)
Statistical Threshold Value
Ute-Ladies Tresses' Orchid
United States Department of Agriculture
Vail Valley Mountain Trails Alliance
Westminster Municipal Code

Project Summary

ERO Resources (ERO) was contracted by the City of Westminster to evaluate the current conditions of Westminster Hills Open Space. The ERO team conducted soil and water sampling, as well as surveys for vegetation conditions, noxious weeds, wildlife, and recreation impacts on the Property. In addition to field studies, ERO conducted a literature review of best practices for open spaces experiencing similar issues with natural resource degradation.

The current management strategy for Westminster Hills is unable to sustain resource demands from high visitation to the Property. This report outlines the results of the conditions assessment and provides recommendations for management strategies to address the City's natural resource and recreational concerns.

Westminster Hills Open Space Conditions Report

Jefferson County, Colorado

January 10, 2024

Introduction

Location and Background

The Westminster Hills Open Space (Property) consists of 1,027 acres of rolling prairie, providing an important open space buffer that defines the urban interface along the City's western edge. The Property is contiguous with Standley Lake Regional Park to the south and Rocky Flats National Wildlife Refuge to the west. About 400 acres on the eastern side are managed to allow for off-leash dog use, while the western portions require dogs to be on-leash. A regional Greenway Trail crosses through the Property from the southeast to northwest, while multiple other roads, trails, and social trails provide visitor and dog access through the prairie.

The off-leash dog area is a regional attraction, providing a unique opportunity for dog owners to walk, hike, or run with their dog through an open prairie setting. This use, however, has resulted in a proliferation of social trails, vegetation trampling, native plant degradation, and concerns about contamination from dog waste (*E. coli*).

Planning Context

The 2014 City of Westminster Open Space Stewardship Plan (Westminster 2014) classifies most of the Property as an Urban Natural area, which is defined as "sites that are natural in appearance, accommodate wildlife, and allow people to access non-developed environments." The remainder of the Property (the dog off-leash area) is considered Transitional, which is defined as "a temporary assignment (one to two year period, or until stabilized) for ecosystems moving toward Sensitive or Urban Natural classifications." The Stewardship Plan calls for a master plan for the Property, which should consider trailhead access, trail improvements, interpretive signage, and a management plan that provides more specific management direction. As part of this process, a conditions report is intended to provide a current and objective baseline from which to initiate plans for the management of natural resources and public recreation on the Property.



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Westminster Hills Open Space Management Plan

Project Area • Overhead Electrical Line

-- Social Trail XX Fence

– Trail

Figure 2 Existing Conditions

Prepared for: City of Westminster File: 23059 Figure 2 Existing.mxd [dlH] October 10, 2023

Purpose of the Conditions Assessment

The purpose of this conditions assessment is to provide a baseline of existing natural resources from which to guide resource management and public recreation on the Property. More specifically, this conditions assessment is also intended to achieve the following objectives:

- 1. Document a baseline level of existing conditions and resource management issues on the Property.
- 2. Identify and recommend strategies to address resource management and public recreation issues in order to maintain the overall integrity of resources on the Property.

Existing conditions of Westminster Hills Open Space and Dog Park are outlined in the sections below.

Existing Conditions

Soil Sampling

ERO collected five-point composite soil samples at four predetermined sites to assess *E. coli* levels in surface soils (WH-SS-1, WH-SS-2, WH-SS-3, and WH-SS-4) on the Property (see **Figure 3**). Soil samples were collected from the top three inches of the soil using a dedicated disposable acetate liner. Organic matter was removed from each sample aliquot as collected. The samples were placed in laboratory-provided, certified clean 4-ounce glass sample jars. The jars were labeled, placed on ice, and submitted under strict chain-of-custody to Industrial Laboratory in Wheat Ridge, Colorado for analysis for *E. coli* by the appropriate Environmental Protection Agency (EPA) Method.

Soil samples were collected on May 23, 2023 and contained most probable number [of colony forming units], per gram (MPN/g) concentrations <1.8 in all four composite samples. There are no regulatory standards for *E. coli* in soils and *E. coli* concentrations were determined to be less than the laboratory method detection/reporting limit.

Surface Water Sampling

ERO is currently collecting monthly surface water samples from Mower Reservoir (WH-SW-1), in the southwest portion of the Property, and two predetermined locations along the Church Ditch (WH-SW-2 and WH-SW-3), along the northeast boundary of the Property, to assess *E. coli* levels (see **Figure 3**). Sampling only occurs when the ditch is running or when surface water is present (typically May through September). According to the Church Ditch Water Authority, the ditch begins at a headgate in Clear Creek, near Golden, Colorado, and runs 26 miles in length through Jefferson County until it ends near the intersection of 100th Avenue and Simms Street at the Wilson Flume (CDWA 2023).

Four sets of water samples were collected (May 23, 2023, June 22, 2023, July 27, 2023, and August 28, 2023). The water samples were collected using clean laboratory-provided containers, and the water collected was transferred into sterile laboratory-provided 150-milliliter, preserved, poly sample bottles. The sample bottles were labeled, placed on ice, and submitted under strict chain-of-custody to Industrial Laboratory in Wheat Ridge, Colorado for *E. coli* analysis by the appropriate EPA Method.

The highest *E. coli* concentrations were observed in the samples from Mower Reservoir (WH-SW-1) at concentrations ranging from most probable number [of colony forming units], per milliliter (MPN/100ml) concentrations of 1,119.9 to greater than 2,419.6 MPN/100ml (**Table 1**). Samples collected from Church Ditch have increased in concentration since the initial sampling event, from 32.7 MPN/100ml to greater than 2,419.6 MPN/100ml to greater than 2,419.6 MPN/100ml at WH-SW-2 and 35.5 MPN/100ml to greater than 2,419.6 MPN/100ml at WH-SW-3 (**Table 1**).

According to the EPA, individuals who encounter elevated levels of E coli and other fecal indicator organisms increase their risk of getting sick due to potential exposure to fecal pathogens (EPA 2021). *E. coli* concentrations are typically expressed as the number of colony forming units (cfu) per 100 mL (cfu/100mL). The two sets of criteria using different methods for calculating illness rates are shown in **Table 1**. The EPA "Threshold Values" are based on studies that show a link between illness and fecal contamination in recreational waters. Both are considered protective of human health, and either can be used to assess recreational water quality (EPA 2021). It is important to note that the values >2,419.6 MPN/100mL could be any number beyond the EPA's threshold.

All of the surface water samples collected from the Property contained *E. coli* concentrations that exceed the EPA Threshold Values (**Table 1**). However, the EPA recommends weekly sampling to evaluate the geometric mean (GM) and the statistical threshold value (STV) over a 30-day period (EPA 2021). Additional measures recommended by the EPA are listed in the **Preliminary Management Recommendations** section.

Sample ID	Date	Results (MPN/100mL)	EPA Threshold Value ¹	EPA Threshold Value ²
WH-SW-1 (Mower Reservoir)	5/23/2023	>2,419.6	100	320
WH-SW-1 (Mower Reservoir)	6/22/2023	1,119.9	100	320
WH-SW-1 (Mower Reservoir)	7/27/2023	1,119.9	100	320
WH-SW-1 (Mower Reservoir)	8/28/2023	>2,419.6	100	320

Table 1. Surface water *E. coli* concentrations.

WH-SW-2	5/23/2023	32.7	100	320
WH-SW-2	6/22/2023	261.3	100	320
WH-SW-2	7/27/2023	980.4	100	320
WH-SW-2	8/28/2023	>2,419.6	100	320
WH-SW-3	5/23/2023	35.5	100	320
WH-SW-3	6/22/2023	290.9	100	320
WH-SW-3	7/27/2023	816.4	100	320
WH-SW-3	8/28/2023	>2,419.6	100	320

¹ = EPA Estimated illness rate: 32 per 1,000 - Geometric Mean (colony forming units [cfu]/100mL); ² = EPA Estimated illness rate: 32 per 1,000 - statistical threshold value (STV- 90th percentile (cfu/100mL); **Bold** = Concentration exceeds one or both Threshold Values.

September 14, 2023

ERO Resources Corp.

feet

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Vegetation

The Property is located in the High Plains Front Range Fans ecoregion which consists of fans, irregular plains, and scattered low hills with intermittent and perennial streams. This ecoregion is categorized as having natural vegetation of shortgrass and mixed grass prairie typically dominated by blue grama (*Bouteloua gracilis*), needle and thread grass (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), buffalograss (*Bouteloua dactyloides*), Junegrass (*Koeleria macrantha*), and little bluestem (*Schizachyrium scoparium*)(Chapman et al. 2006).

The Property is dominated by several vegetation communities that included mixed grassland, nonnative grassland, and noxious weeds with some riparian woodland, emergent marsh wetland, herbaceous mesic/wet meadow, open water, bare ground, and disturbed/developed areas. During the 2023 site visits, vegetation communities on the Property included approximately 450 acres of mixed grassland, 303 acres of nonnative grassland, 220 acres of areas dominated by noxious weeds, 1.3 acres of riparian woodland, 3.9 acres of emergent marsh wetland, 2.9 acres of herbaceous mesic/wet meadow, 4 acres of open water, 3.1 acres of bare ground, and 41.2 acres of disturbed/developed areas. The different vegetation communities are described below and shown on **Figure 4**

Vegetation Communities

Mixed Grassland

The mixed grassland vegetation community generally occurs throughout the central portions of the Property in areas where a mix of native and nonnative grassland species predominates to support a large diversity of species (**Figure 4**). This community is dominated by alyssum (*Alyssum simplex*), prairie sagewort (*Artemisia frigida*), buffalo grass, smooth brome (*Bromus inermis*), field bindweed (*Convolvulus arvensis*), needle and thread grass, and western wheatgrass. See **Appendix A** for additional plant species present.

Nonnative Grassland

The nonnative grassland community generally occurs along the southwest, southeast, and northern boundary of the Property (**Figure 4**). This community is dominated by the nonnative grassland species smooth brome with less dominant components of noxious weed species and other native species including prairie sagewort, kochia (*Bassia scoparia*), cheatgrass (*Bromus tectorum*), musk thistle (*Carduus nutans*), field bindweed, redstem fillaree (*Erodium cicutarium*), dalmatian toadflax (*Linaria dalmatica*), alfalfa (*Medicago sativa*), western wheatgrass, scarlet globemallow (*Sphaeralcea coccinea*), common mullein (*Verbascum Thapsus*), and soapweed yucca (*Yucca glauca*).

Noxious Weeds

The noxious weed vegetation community generally occurs in the western portion of the Property (**Figure 4** and **Figure 5**) and coincides with active prairie dog colony (**Figure 7**). This community is almost entirely

dominated by noxious weed species dalmatian toadflax and field bindweed with some cheatgrass, musk thistle, sulfur cinquefoil (*Potentilla recta*), and redstem filaree.

Note: The weed mapping on Figure 5 is not representative of entirely noxious weed communities.

Riparian Woodland

The riparian woodland community occurs along ditches on the Property and as a narrow fringe along the emergent marsh wetlands within Mower Reservoir in the southwest portion of the Property (**Figure 4**). This community contains an overstory of plains cottonwood (*Populus deltoides* spp. *monilifera*), Russian olive (*Elaeagnus angustifolia*), green ash (*Fraxinus pennsylvanica*), and peachleaf willow (Salix amygdaloides), with a shrub understory of sandbar willow (*Salix exigua*), false-indigo bush (*Amorpha fruticosa*), dogbane (*Apocynum cannabinum*), golden currant (*Ribes aureum*), and Woods' rose (*Rosa woodsii*). Herbaceous species in the riparian woodland community consist of a mixture of mesic and upland species including smooth brome, showy milkweed (*Asclepias speciosa*), common teasel (*Dipsacus fullonum*), arctic rush (*Juncus arcticus balticus*), and curly dock (*Rumex crispus*).

Emergent Marsh Wetlands

The emergent marsh wetland community occurs along Mower Reservoir in the southwest portion of the Property (**Figure 4**). Vegetation in this community is dominated by cattail species including broadleaf cattail (*Typha latifolia*) and narrowleaf cattail (*Typha angustifolia*).

Herbaceous Mesic/Wet Meadow

The herbaceous meadow community occurs primarily along an unnamed intermittent drainage in the northeastern portion of the Property west of Dry Creek Valley Ditch as well as along the unnamed intermittent drainage downgradient of Mower Reservoir in the southwest portion of the Property (**Figure 4**). The herbaceous mesic/wet meadow community is dominated by artic rush with some jointed goatgrass (*Aegilops cylindrica*), annual ragweed (*Ambrosia artemisiifolia*), smooth brome, sedges (*Carex* spp.), field bindweed, Russian olive, foxtail barley (*Hordeum jubataum*), rushes (*Juncus* spp.), western wheatgrass, reed canarygrass (*Phalaris arundinacea*), curly dock, Canada goldenrod (*Solidago canadensis*), and common cocklebur (*Xanthium strumarium*).

Open Water

The open water areas are associated with Mower Reservoir, Church Ditch, and Dry Creek Valley Ditch on the Property.

Bare Ground

The bare ground areas include areas associated with high visitor use areas on the Property. These areas are frequently disturbed and contain a low amount of vegetative cover, if any, relative to the remainder of the Property.

Developed Areas

The developed areas include areas associated with trails and trailhead parking areas on the Property.

Photo 1. Mixed Grassland.

Photo 3. Noxious Weeds.

Photo 2. Nonnative Grassland.

Photo 4. Riparian Woodland.

Photo 5. Emergent Marsh.

Photo 6. Herbaceous Mesic/Wet Meadow.

Westminster Hills Open Space Management Plan

Open Space Boundary Emergent Marsh Mesic/Wet Meadow Open Water Riparian Woodland Mixed Grassland Nonnative Grassland Disturbed/Developed Bare Ground Noxious Weeds Figure 4 Vegetation Communities

800 ______ feet

Prepared for: City of Westminster File: 23059 Figure 4 Vegetation.mxd [dlH October 10, 2023

400

State Noxious Weeds

ERO surveyed the Property for noxious weeds on the Colorado Department of Agriculture (CDOA) A, B, and C lists (Colorado Department of Agriculture 2022). No List A species were found on the Property during the 2023 site visits, eleven CDOA noxious weed List B species, and seven List C species were documented during the 2023 site visits. The observed weed populations within the Property ranged from small and scattered individuals to larger dense populations that occurred throughout the Property listed below and shown on **Figure 5** and **Figure 6**. A comprehensive map of state listed noxious weeds on the Property can be found in **Appendix B**. The percent cover of discreet weed populations was assessed and categorized as shown in **Table 2**.

The most present noxious weed at Westminster Hills is Dalmatian toadflax (*Linaria dalmatica*) which is present on nearly 500 acres of the Property.

List B Weed Species

- Canada thistle (*Cirsium arvense*)
- Common teasel (*Dipsacus fullonum*)
- Cutleaf teasel (Dipsacus laciniatus)
- Dalmatian toadflax (Linaria dalmatica)
- Diffuse knapweed (Centaurea diffusa)
- Jointed goatgrass (Aegilops cylindrica)
- Musk thistle (*Carduus nutans*)
- Perennial pepperweed (Lepidium latifolium)
- Russian olive (Elaeagnus angustifolia)
- Scotch Thistle (*Onopordum acanthium*)
- Sulfur cinquefoil (*Potentilla recta*)

List C Weed Species

- Cheatgrass (Bromus tectorum)
- Common mullein (*Verbascum thapsus*)
- Common St. Johnswort (*Hypericum perforatum*)
- Field bindweed (*Convolvulus arvensis*)
- Quackgrass (*Elymus repens*)
- Redstem filaree (*Erodium cicutarium*)
- Siberian elm (*Ulmus pumila*)

Table 2. Noxious weed cover classes.

Cover Class	Percent Cover of Mapped Population
1	Less than or equal to 10
2	11-20
3	21-50
4	51-80
5	Greater than 80

Westminster Hills Open Space Management Plan

Open Space Boundary

List B Noxious Weeds CT - Canada Thistle DK - Diffuse Knapweed DT - Dalmatian Toadflax HC - Hoary Cres JG - Jointed Goatgrass MM - Moth Mullien

MT - Musk Thistle RO - Russian Olive SC - Sulfur Cinquefoil ST- Scotch Thistle TE - Common Teasel

Figure 5 List B Noxious Weeds

Prepared for: City of Westminster File: 23059 Figure 5 List B Heatmap.mxd [dlH] October 10, 2023

Westminster Hills Open Space Management Plan

Open Space Boundary

List C Noxious Weeds CG - Cheatgrass CM - Common Mullein FB - Field Bindweed QG- Quack Grass – List C RSF - Redstem Filaree - List C SJ - Common St. Johnswort - List C SE - Siberian Elm - List C

 Noxious Weed Density

 1
 = 10% or Less

 2
 = 11-20%

 3
 = 21-50 %

 4
 = 51-80%

Figure 6 List C Noxious Weeds

Prepared for: City of Westminster File: 23059 Figure 6 List C Heatmap.mxd [dlH January 9, 2024

Wildlife Resources

This section includes a discussion of general quality of wildlife habitat and the species that occur or are likely to occur on the Property, as well as federally listed species, and other species of special concern.

General Wildlife

Westminster Hills Open Space provides habitat for a variety of wildlife species within the general vegetation communities found on the Property (see **Figure 4**). The grasslands (mixed grassland and nonnative grassland), riparian woodlands, and wetland (emergent marsh, wet meadow, and open water) habitats provide high-quality nesting and foraging habitats for grassland bird, arboreal bird, ducks, and raptor species as well as reptiles, small and large mammals. The black-tailed prairie dog (*Cynomys ludovicianus*) colonies found on the Property provide food and shelter for many other grassland species and can have a considerable effect on community structure and ecosystem function. Wildlife species observed during the 2023 site visit are shown in the table in **Appendix C**.

Federally-Listed Wildlife Species

ERO assessed the Property for habitat for federally threatened, endangered, and candidate species under the ESA (Endangered Species Act). Federally threatened and endangered species are protected under the ESA of 1973, as amended (16 U.S.C. 1531 et seq.). Significant adverse effects on a federally listed species or its habitat require consultation with the Service under Section 7 or 10 of the ESA. The Service's Information for Planning and Consultation (IPaC) resource list for the Property identifies several threatened and endangered species that could be potentially affected by the project (**Table 3**) (U.S. Fish and Wildlife Service 2023).

The Service indicates that eight threatened, endangered, or candidate wildlife species have potential for occurrence on the Property or to be affected by projects on the Property: gray wolf, Preble's meadow jumping mouse (Preble's), piping plover, whooping crane, pallid sturgeon, monarch butterfly, Ute-ladies tresses' orchid (ULTO), and western prairie fringed orchid (U.S. Fish and Wildlife Service 2023). However, these species were not observed during the site visits, the Property does not contain suitable habitat for most of these species, and they are not likely to occur on the Property, as described in **Table 3** below.

Table 3.	ederally threatened, endangered, and candidate animal species potentially found on the
Property	

Common Name	Scientific Name	Status*	Habitat	Habitat Present?	
Mammals					
Gray wolf	Canis lupus	Т	Temperate forests, mountains, tundra, taiga, grasslands, and deserts	No, outside of the current known range	
Preble's meadow jumping mouse (Preble's)	Zapus hudsonius preblei	Т	Shrub riparian/wet meadows	Minimal habitat	
		Birds			
Piping plover**	Charadrius melodus	Т	Sandy lakeshore beaches and river sandbars	No habitat and no depletions anticipated	
Whooping crane**	Grus americana	E	Mudflats around reservoirs and in agricultural areas	Low quality habitat, no depletions anticipated	
		Fish			
Pallid sturgeon**	Scaphirhynchus albus	E	Large, turbid, free-flowing rivers with a strong current and gravel or sandy substrate	No habitat and no depletions anticipated	
		Invertebrates			
Monarch butterfly	Danaus plexippus plexippus	С	Dependent on milkweeds (Asclepiadoideae) as host plants and forage on blooming flowers; a summer resident	Few milkweeds found; minimal to no habitat	
Plants					
Ute ladies'-tresses orchid (ULTO)	Spiranthes diluvialis	Т	Moist to wet alluvial meadows, floodplains of perennial streams, and around springs and lakes below 7,800 feet in elevation	Habitat conditions not suitable for ULTO establishment	
Western prairie fringed orchid**	Platanthera praeclara	Т	Moist to wet prairies and meadows	No habitat, no depletions anticipated	

T = Federally Threatened Species, E = Federally Endangered Species, C = Candidate for Federal Listing, P = Proposed for Listing.

Source: (U.S. Fish and Wildlife Service 2023)

It is not likely for any projects on the Property to affect the gray wolf because the Property is outside of the current known range for the species and because it is ERO's understanding that activities on the Property do not require a predator management program that could result in taking of the species (U.S. Fish and Wildlife Service 2023).

The piping plover, whooping crane, pallid sturgeon, and western prairie fringed orchid are species that are affected by depletions to the Platte River system. There are no drainages on the Property with a continuous surface connection to the South Platte River. As such, there would be no potential for depletions to the South Platte River and no further action is needed regarding depletion species.

The Property is not within a designated migration corridor or breeding or overwintering area for the monarch butterfly (U.S. Fish and Wildlife Service 2019) although some monarch butterflies migrate through Colorado in the summer. A few individual milkweeds (the primary host plant) were observed on the Property during the 2023 site visits, but ERO did not observe any adult or larval monarch butterflies during the 2023 site visits. This species may occasionally travel through the Property but is not likely to adversely affected because host plants are sparse and because of the potential predation by invasive paper wasps (*Polistes dominula*) (Baker and Potter 2020). As a candidate species, monarch butterflies are not currently under federal regulation. Should the monarch butterfly's status be elevated to that of a threatened or endangered species, future consultation with the Service may be required.

Portions of Property support riparian vegetation communities, which are potential Preble's habitat. Sandbar willow, Woods' rose, and other mesic shrubs occur along the riparian woodlands in the southwestern section of the Property and may provide the forage and cover that Preble's requires; however, portions of the riparian corridor and surrounding areas have been disturbed by human activities. Mapped Preble's critical habitat occurs just west of the Property across Indiana Street along Woman Creek and the closest known Preble's capture locations are approximately 1.5 miles west of the Property along Woman Creek(U.S. Fish and Wildlife Service 2010; Rocky Flats ETS 1995). Although portions of the riparian corridor are fragmented, it may still allow movement of Preble's between the known capture sites and the Property; therefore, Preble's may occupy the Property or have potential to move into the site. It is not known if the Service considers the Property occupied Preble's habitat.

During the 2023 site visits, ERO assessed the Property for potential ULTO habitat. Although the Property is located in Jefferson County and along several National Hydrography Dataset (NHD) mapped intermittent drainages, no defined stream channels were found during the site visits. The Property does contain wetlands and mesic wet meadow areas that may provide potentially suitable habitat for ULTO. However, the wetland vegetation is dominated by densely growing species such as cattails, reed canarygrass, and sandbar willow, which are species not typically associated with ULTO habitat, and the mesic wet meadow areas located on the Property appear to lack conditions suitable for ULTO establishment including hydrologic regime and an upstream seed source.

Other Species and Habitats of Concern

Black-Tailed Prairie Dog

The black-tailed prairie dog is a Colorado species of special concern (Colorado Parks and Wildlife (CPW) 2023a). Black-tailed prairie dogs are important components of the short and mesic grasslands systems. Threats to this species include habitat loss and degradation, habitat fragmentation, disease (sylvatic plague), and lethal control activities. Typically, areas occupied by prairie dogs have greater cover and abundance of perennial grasses and annual forbs compared with unoccupied sites (Whicker and Detling 1988; Witmer et al. 2000).

Black-tailed prairie dogs are commonly considered a "keystone" species because their activities (burrowing and intense grazing) provide food and shelter for many other grassland species and have a large effect on community structure and ecosystem function (Power et al. 1996). Prairie dogs can contribute to overall landscape heterogeneity, affect nutrient cycling, and provide nest sites and shelter for wildlife (Whicker and Detling 1988). Species such as black-footed ferret, burrowing owl, prairie rattlesnake, and mountain plover are closely linked to prairie dog burrow systems for food and cover. Prairie dogs also provide an important prey resource for numerous predators including American badger, coyote, red fox, bald eagle, golden eagle, ferruginous hawk, and other raptors. Prairie dogs also can denude the surface by clipping aboveground vegetation and contributing to exposed bare ground by digging up roots (Kuford 1958; Smith 1967).

Sparsely populated, active black-tailed prairie dog burrows were observed throughout much of the western portions of the Property and just south of West 100th Avenue during the 2023 site visits (**Figure 7**). Prior to management activities occurring in or adjacent to active or inactive prairie dog towns, CPW recommends conducting burrowing owl clearance surveys in during the period from March 15 through October 31 (CPW 2021a). Management activities occurring from November 1 through March 14 would not require clearance surveys.

Western Burrowing Owl

The western burrowing owl (burrowing owl) is a small migrant owl listed by the state of Colorado as a threatened species and is federally protected under the Migratory Bird Treaty Act (MBTA). Primary threats to the burrowing owl include habitat loss and fragmentation, anthropogenic sources of mortality such as vehicular collisions, and loss of wintering grounds, largely in Mexico (McDonald, Korfanta, and Lantz 2004). In general, burrowing owls are found in grasslands with vegetation less than 4 inches high and a relatively large proportion of bare ground (Gillihan and Hutchings 2000). In Colorado, burrowing owls are usually associated with black-tailed prairie dog colonies (Andrews and Righter 1992).

The prairie dog burrows in and adjacent to the Property are potential habitat for burrowing owls and burrowing owls have been known to nest in the northeastern portion of the Property although none were observed during the 2023 site visits (**Figure 7**). Inadvertent killing of burrowing owls could occur during habitat management, construction, or projects during the breeding period, as well as up to a

month before egg laying and several months after young have fledged. CPW has a recommended buffer of ½ mile (660 feet) to ¼ mile (1,320 feet) surrounding active burrowing owl nests, depending on the nature of the disturbance, during the nesting season (March 15 through August 31) (Colorado Parks and Wildlife 2020). Burrowing owls could be impacted by activities if work would occur within CPW's recommended buffer of any burrows.

Raptors and Migratory Birds

A wide variety of bird species use different habitat types in the Property for shelter, breeding, wintering, and foraging at various times during the year. The grasslands, wetlands, and riparian areas in and adjacent to the Property are potential nesting habitat for migratory birds. During the 2023 site visits, ERO observed red-tailed hawk, Swainson's hawk, turkey vulture, American kestrel, red-winged black bird, great blue heron, redhead duck, cattle egret, killdeer, northern flicker, American crow, horned lark, Brewer's blackbird, common yellowthroat, house finch. barn swallow, ruddy duck, American white pelican, double-crested cormorant, black-billed magpie, vesper sparrow, great-tailed grackle, common grackle, Say's phoebe, western meadowlark, European starling, American robin, yellow-headed blackbird, and mourning dove in or soaring over the Property.

ERO surveyed the Property for nests during the 2023 site visits. ERO observed one inactive raptor nest and one active bald eagle nest site within ½ mile of the Property (**Figure 7**), however, the survey was conducted in June and July when full foliage makes nests hard to observe. No actively nesting birds were observed in or adjacent to identified nests during the 2023 site visits.

Bald Eagle and Golden Eagle

Several known bald nests occur within a ½-mile radius of the Property (the CPW-recommended buffer) including one active nest site and two historic nest sites (**Figure 7**), but no bald eagles were observed during the 2023 site visits. Additionally, the Property is in CPW-mapped bald eagle roost site, winter range, and winter forage, and is adjacent to a mapped bald eagle summer forage area (NDIS 2021). Winter range typically refers to those areas where bald eagles have been observed from November 15 through March 15 (CPW 2020).

The Property occurs within CPW-mapped breeding range for golden eagle, but no known golden eagle nest or roost sites occur in the Property or within a ½-mile radius of the Property (the CPW-recommended buffer). The closest known golden eagle nest is approximately 6 miles southwest from the Property (CPW 2023b). No golden eagles were observed during the 2023 site visits; however, golden eagles may forage on the open country in the vicinity of the Property. Individuals could be displaced by disturbance from noise and human presence during maintenance activities.

Species of Management Interest

CPW tracks a number of species that are regionally important for big game hunting and overall conservation, including sensitive or seasonal activity areas for several species. The Property contains

activity areas mapped by CPW for a variety of species (CPW 2021; Colorado Parks and Wildlife 2021b). These species are shown below in **Table 4**. Important wildlife habitats are shown on **Figure 7**, except for species activity maps covering the entirety of the Property, i.e. overall range, summer range, forage areas.

Common Name	Scientific Name	CPW Seasonal Activity Area Present
NA	NA	High Priority Habitat – Aquatic Native Species Conservation Waters
Bald eagle	Haliaeetus leucocephalus	High Priority Habitat – Bald Eagle Active Nest Site
Bald eagle	Haliaeetus leucocephalus	High Priority Habitat – Bald Eagle Roost Site
Bald eagle	Haliaeetus leucocephalus	Summer Forage
Bald eagle	Haliaeetus leucocephalus	Winter Forage
Bald eagle	Haliaeetus leucocephalus	Winter Range
Black-tailed prairie dog	Cynomys ludovicianus	Medium Occurrence Area
Burrowing owl	Athene cunicularia	High Priority Habitat – Burrowing Owl Active Nest Site
Canada goose	Branta canadensis	Foraging Area
Canada goose	Branta canadensis	Winter Range
Mule deer	Odocoileus hemionus	Summer Range
Mule deer	Odocoileus hemionus	Overall Range
Olive-backed pocket mouse	Perognathus fasciatus	Overall Range
Preble's meadow jumping mouse	Zapus hudsonius preblei	Overall Range
White-tailed deer	Odocoileus virginianus	Overall Range
White-tailed jackrabbit	Lepus townsendii	Overall Range

Table 4. C	CPW-tracked	wildlife species	s in the vicir	nity of the	Property.
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Source: (Colorado Parks and Wildlife 2021c; 2021b)

Photo 7. Black-tailed prairie dog colony

Photo 8. Bald Eagle Active Nest Site.

Recreation Impacts

Property Access

Designated Trails

The tread of the designated trails on the Property are generally in good condition, though these areas have experienced significant widening than original design. In areas of high congestion due to people and dogs, trail widening and bare ground is common. The off-leash area from the eastern parking lot on Simms Street has experienced the most significant widening.

When a trail is already in place, trampling and compaction may occur along the trail corridor (Jordan 2000). In high-use areas, widening of the trail tread is common, along with braiding and the development of parallel social trails. In addition to negative visual impacts of trail widening, some impacts such as the introduction of invasive plants and disturbance of wildlife can extend considerably further into natural landscapes (Tyser & Worley 1992). Substantial use reductions must occur on highly visited trails to achieve any significant reduction in trail widening and vegetation impacts (Marion and Leung 2001).

Social Trails

There are a significant number of social trails throughout the Property. These social trails range in severity of condition based on how frequently they are used by visitors and their location on the Property. Most social trails are concentrated on the east side of the Property, likely due to the off-leash dog park area. **Figure 2** illustrates the number of social trails on the Property.

According to the United States Department of Agriculture's (USDA) report on "Sustaining Wildlife with Recreation on Public Lands: A Synthesis of Research Findings, Management Practices, and Research Needs," both human and wildlife systems need to be considered to address issues which stem from human-wildlife interactions. As more visitors venture off sanctioned trails, the more likely they are to cause a disturbance to wildlife and sensitive wildlife habitats. The report emphasizes the importance of minimizing overlap with important habitats for species which are sensitive to recreation (Miller et al. 2020). This can be achieved with help from various strategies, though one example would be to implement a buffer zone for sensitive species and restrict recreational activity within a predetermined distance away from these habitats. A starting point for establishing buffer zones is identifying the distance, etc.). A study conducted in Colorado concluded the zone of influence (i.e., where individuals were alert or flushed) for woodland and grassland bird species in the state is approximately 75 meters from trails for most species (Miller et al. 1998).

Fencing

Fencing has been utilized throughout the Property to indicate the boundary between the on and offleash areas as well as for social trail closures. Smooth wire fencing is used along the west side of the Rocky Mountain Greenway Trail to prevent visitors from traveling off-trail and to specify where the change in leash policy starts on the Property. Social trail closures are enacted by split rail wood fencing that vary in length and size based on the location.

Photo 9. Smooth wire fencing.

Photo 11. Medium split rail fencing with signage.

Photo 10. Large split rail fencing.

Photo 12. Church Ditch footbridge.

Dogs

Leash Compliance

The most problematic issue for the Property is the prevalence of off-leash dogs in the on-leash dog area. Off-leash dogs are approaching prairie dog colonies and sensitive burrowing owl nests on the western portion of the Property which can cause impacts to wildlife. Improving habitat conditions at Westminster Hills by limiting dog access may promote increased species presence of elk, deer, burrowing owls, and other ground nesting birds. The Rocky Mountain Greenway Trail also transects this portion of the Property making off-leash dogs a hazard to cyclists on the trail. The Westminster Municipal Code (WMC) states dogs may be allowed off-leash if it does not impact the Open Space Purposes for which the land was acquired (Westminster 2023b). Current off-leash activity and volume do not meet this standard and should be addressed by the recommendations provided in the **Visitor and Recreation Use Management** section.

Congested Areas

Based on observations, the main area for congestion is at the dog park entrance off Simms Street. The trail heading west out of the parking lot ranges from roughly 60 to 160 feet wide due to the sheer volume of users in the vicinity at any given time.

The footbridge crossing Church Ditch (shown on **Figure 2** and in **Photo 12**) also causes congestion among user groups when the ditch is flowing. If multiple dogs and people are on the bridge at once, the dogs can become territorial making it difficult, and potentially dangerous, for other visitors and dogs to cross. The area nearby and around the footbridge is heavily trafficked by people and dogs.

Studies have shown that dogs can be avid chasers of wildlife and though they often stay within five meters of a trail, they can travel as far as 85 meters away from the trail (Lenth et al. 2008). Trails that allow off-leash dogs have a wider area of influence on mule deer and particularly can cause disruptions to small mammals and bird populations (Bekoff and Meaney 1997). Off-trail use elicits a greater flush response for grassland birds than on-trail use, possibly due to habituation to activity along designated trails (Miller et al. 2001).

Feces

Dog feces were notably present throughout the Property. High waste occurrences were noted at the eastern parking area on Simms Street and adjacent to the south parking area off West 100th Ave. While the volume of dog waste decreases on the western portion of the Property, it is still a significant issue. Anecdotally, it appears that dog owners with their dogs on-leash comply with waste removal more frequently than those with their dogs off-leash. According to the WMC, dog feces left behind by an owner is considered damage to property and shall be enforced as such (Westminster 2023a).

Signage and Wayfinding

Trail Signage

There is signage on the Property, though its consistency in messaging and tone varies. There are very few opportunities for wayfinding. Users are likely to use social trails because there are not many signs indicating where the designated trails are located on the Property.

Leash Compliance Signage

Leash compliance signage is well-noted along the smooth wire fencing across the Property. Roughly 50 percent of visitors observed blatantly walked past leash compliance signage and ignored the on-leash regulations.

Best Practices

Case Studies

Respect the Wild Campaign – Town of Eagle, Colorado

In Eagle, Colorado, community members often coexist with ungulates like elk and deer in their backyards, trails, and open spaces. This is a special part of living in Eagle, but with it comes extreme stress on the animals that are using town open spaces and properties for resting, calving, and surviving extreme winter conditions.

In an effort to combat the issues that have arisen from human-wildlife conflicts, particularly on trails and town open space properties, several local organizations teamed up to create the Respect the Wild Campaign (VVMTA 2023). This campaign has an overarching goal for the protection and preservation of wildlife with three key educational components:

- 1. Respect Wildlife When you see wildlife, it's essential to not approach or harass them. Human disturbances can exacerbate loss of body weight, reduce reproductive success, and decrease survivability of the fawns and calves.
- Respect Trail Closures Trails are closed to protect critical winter habitat and migratory & feeding routes. Violation of seasonal trail closures can keep wildlife from precious resources and resting spaces.
- 3. Keep Your Dog Leashed When dogs chase wildlife, it burns precious calories and can separate infants and nursing mothers. In addition, just the presence of unleashed dogs may scare animals away from their natural grounds.

Community members who took the pledge to "respect the wild" were entered in a giveaway for one of ten \$100 gift certificates to local businesses. In addition to the pledge, partnering organizations pushed consistent and funny messaging across various social media platforms to further engage the public. See **Photo 13** below for an example. Messaging was well received because it was humorous, educational, consistent across multiple organizations, and not negative or shaming to users.

Photo 13. Respect the Wild campaign poster example.

Source: VVMTA 2023b.

The "Respect the Wild" campaign is successful because it taps into the local network of user groups and organizations who share the materials via their own social media accounts which helps to create community buy-in and promotes consistent messaging.

To review the campaign, visit https://www.vvmta.org/respectthewild/.

Open Space Seasonal Closures – City of Boulder Open Space and Mountain Parks

The City of Boulder Open Space and Mountain Parks' (OSMP) serves as an example of best practice for seasonal wildlife closures to inform management at Westminster Hills. OSMP introduces seasonal closures as a method for preserving sensitive habitat and wildlife in the 2005 Visitor Master Plan. The plan recognizes off-trail dogs and human impacts to ground nesting birds and provides recommended management strategies to improve these habitats during sensitive nesting periods. One recommendation is to enact a seasonal closure at the Gunbarrel/Heatherwood Passive Recreation Area (City of Boulder 2005). The Visitor Master Plan suggests requiring "seasonal closures or dog exclusions to protect seasonal nesting of grassland birds" due to recurring issues of off-trail dogs and humans around ground nesting birds. This recommendation is taken one step further in the subsequent

Grassland Ecosystem Management Plan by suggesting a redesignation of a portion of this property to a Natural Area to support seasonal closures and dog exclusions (City of Boulder 2009).

Additionally, a strategy that helps to achieve this goal is localized protection measures where wildlife closures are implemented in the vicinity of raptor nests or concentrated large mammal feeding areas. Closures are activated seasonally or temporarily to protect wildlife and people from each other or to prevent resource damage by visitors. Sensitive species which can enact a seasonal closure include but are not limited to ferruginous hawk, rough-legged hawk, northern harrier, golden eagle, American badger, and burrowing owl. Further, OSMP has designated multiple areas as "Habitat Conservation Areas" where all visitors and visitors' activities are required to be on-trail unless approved by an off-trail permit to protect the habitat of the sensitive species (City of Boulder 2023). If sensitive species are known to occur or suspected to occur in a prairie dog colony, the area shall fall under Criteria for Designation in other Management Categories such as Multiple Objective Area, Transition Area, Removal Area, or if the presence of burrowing owls or badgers are confirmed that area shall be designated as a Grassland Preserve.

Boulder Reservoir Raptor Protections – City of Boulder OSMP

The Boulder Reservoir Master Plan (2012) utilizes innovative strategies to manage critical habitats and species. The plan prioritizes osprey conservation by preserving old utility poles and creating nesting platforms to address their limited nesting sites in the region. Buffer zones around these platforms are closed to human activity during nesting season (February 1 - September 10) and marked with clear signage. Monitoring of nests by City staff and volunteers further supports osprey conservation. The West Shore area, valued for its wetland and grassland habitat, is designated as a protected zone. Annual evaluations of wildlife closures, particularly for nesting species, underscore the commitment to habitat preservation. Volunteer engagement is integral, as volunteers annually monitor bird activity, document nests, and educate the public. Although the Site Management Plan is yet to be finalized, the Boulder Reservoir Management Plan emphasizes future development of access and wildlife area closure policies. Meanwhile, the existing strategies play a vital role in responsible habitat management and species conservation.

Off-Leash Management Strategies – Colorado Parks and Wildlife

Two of the largest off-leash designated areas in the Denver Metropolitan Area are found in Chatfield and Cherry Creek State Parks. Both sites employ a Daily Dog Off-Leash Pass where visitors wishing to let their dogs off-leash can purchase a \$3 daily pass for up to three dogs. At both parks, the owner must always have their dog within visual distance and under voice control when off-leash.

Cherry Creek State Park developed a Dog Off-Leash Area Management Plan in 2010 to outline a series of visions, goals, and practices to support the long-term success of their off-leash areas. A management plan approach was deemed necessary due to the ongoing issues with visitor experiences and conflicts, an increase in visitation and overall growth of the area, and a lack of regulatory framework and operative guidance (Cherry Creek State Park 2010). In this plan, a 2008 study was mentioned which determined

the effects of dog off-leash areas on birds and small mammals in Cherry Creek and Chatfield State Parks. The researchers identified significantly lower riparian bird densities in the dog off-leash areas and an overall lower abundance of small mammals in these areas as well (Ensight Technical Services, Inc. 2008). The specialized policies governing the dog off-leash area at Cherry Creek State Park prioritize safety, hygiene, proper upkeep, rule enforcement, and effective oversight.

Additionally, Chatfield State Park planned for rotational use of dog off-leash areas at various locations in the park. Ultimately these efforts were not successful due to staff capacity, management, and resource damage caused by insufficient vegetation recuperation between rotations.

Though signage, rules, and fees are helpful for curbing misbehavior, the main need revolves around enforcement. Without constant enforcement and monitoring of off-leash areas, it is difficult to completely combat the negative impacts to trails, vegetation, and sensitive wildlife habitats.

Off-Leash Management Strategies – Jefferson County Open Space

The Elk Meadow Park Dog Off-Leash Area (DOLA) in the Jefferson County Open Space (JCOS) system has experienced similar issues as Westminster Hills over the years. In 2017, JCOS published a report to provide background on the establishment of the Elk Meadow DOLA and to chronicle the park development and management efforts up to that point (JCOS 2017). As the first dog park owned and operated by JCOS, operation and management of the area presented a series of management challenges and public health and safety concerns. Since 2001, these issues have challenged the expertise and operational capacity of a traditional land management agency. One of the goals of the report was to illustrate how JCOS applied existing best management practices for design and operation of the DOLA to improve the sustainability of the area.

The Elk Meadow DOLA encompassed five acres of the southern portion of Elk Meadow Park, located south of Stagecoach Road in Evergreen. After years of heavy degradation due to intense visitation, the site experienced denuded areas of bare ground, water quality impacts from fecal contamination, soil compaction, noxious weed infestations, and a loss of high-quality wildlife habitat. In April of 2017, the Elk Meadow DOLA was closed for restoration and has not been reopened to off-leash use (now referred to as the Stagecoach South Site) (JCOS 2023). JCOS ultimately felt that despite their commitment and dedication of resources, they were not able to maintain the Elk Meadow DOLA in a sustainable manner (JCOS 2017). The park location, elevation, and terrain limited additional design improvements to mitigate resource impacts and provide additional visitor capacity.

Prior to the complete closure of the area, a community meeting series was held to discuss challenges and collect input on potential solutions. Staff provided detailed responses to the potential solutions generated at these meetings and discussed the feasibility, costs, benefits, and tradeoffs associated with pursuing the proposed solutions generated by the community. Many of the ideas could be applied and be of value for a new dog park, but would not remedy the site challenges and degradation at the Elk Meadow DOLA. In addition, many of the proposed solutions had either been tried previously, were not realistic, or were beyond the scope of implementation for a county agency. While the public meetings yielded a potential compromise that might have enabled a small area to potentially remain open in the short term, in the final analysis, JCOS believed the site was unsuitable and does not retain the proper characteristics and infrastructure to support the increasing volume of visitors. As a result, after careful consideration of the land, visitors and the impacts, the decision was made to close the park for restoration, and to let the land rest.

The public was not initially supportive of the closure, but JCOS has committed to providing a suitable DOLA in the Evergreen area in the future. The Stagecoach Site is currently being restored and has seen major improvements in revegetation, wildlife habitat, and water quality.

Adjacent Public Lands Management – Rocky Flats National Wildlife Refuge

The Rocky Flats National Wildlife Refuge (Refuge) is located adjacent to Westminster Hills Open Space to the west. The Refuge has a pet policy that does not allow dogs on the property. The policy states the following reasoning:

"Many wildlife species perceive dogs (pets) as a predator and in some instances as prey to larger predatory species. Dogs (pets) can chase wildlife or be a visual threat to wildlife and birds, causing wildlife and birds to flee nesting, burrowing, feeding, and resting sites. The lingering scent of the dog (pet) can signal the presence of a predator, long after the dog (pet) is gone. The disturbance of wildlife burns much needed energy that animals need to survive and raise their young."

-Refuge Pet Policy, Rocky Flats National Wildlife Refuge, n.d.

Though the policy is a statutory regulation which federally restricts amenities for pets, it has created a sanctuary for sensitive wildlife habitats.

Preliminary Management Recommendations

Resource management issues are specific occurrences or situations that can compromise the natural resource values on the Property. Known or potential resource management issues for the Property are listed below and addressed with management recommendations. Based on information and data gathered during the conditions assessment, ERO proposes the following management concerns and recommendations be considered in the forthcoming management plan.

Soil and Surface Water Quality Management

Environmental Concern – E. coli

Existing Condition:

Surface Soil: *E. coli* concentrations in surface soil on the Property were determined to be less than the laboratory method detection/reporting limit in the composite soil samples collected from four high traffic areas of the Property.

Surface Water: The Mower Reservoir was observed to have less human recreational use and off-leash dogs in the water, though ducks, geese, and other aquatic species activity was noted. Off-leash dogs were observed playing in and near the Church Ditch primarily in the east portion of the Property. Due to the type of activity the Property is used for, *E. coli* and other potential harmful pathogens may be present in the soil and surface water, as was shown in the surface water sampling conducted as part of this study. Additionally, the Church Ditch runs through agricultural lands and grazing areas which may affect increased levels of pathogens in the water.

Recommendations:

According to the EPA, when elevated *E. coli* concentrations are observed, it is important to respond in a timely manner by collecting additional data, posting a public notice, and/or closing the waterbody to recreational activities. The EPA provides these general actions to take when responding to elevated *E. coli* concentrations in recreational waters (EPA 2021):

- Take action immediately in the event of an exceedance to prevent human exposure to *E. coli*. Exposure can cause infection, diarrhea, and other illness in humans. Additional data may be needed to understand the cause of the exceedance.
- Issue a public notice and post advisories to notify the public that the waterbody is closed to recreational activities.
- To prevent future *E. coli* exceedances, identify the source of the bacteria. Depending on the source, different steps will be necessary to remediate the problem and reduce the likelihood of future events.

- Place permanent signage in known areas of recorded dog waste issues and around water bodies to remind owners to remove dog waste.
- Post all water bodies as being potentially unsafe for recreational use.

Vegetation Management

Noxious Weeds

Existing Condition: Noxious weed infestations were found throughout the Property (Figure 5, Figure 6, and Appendix B).

Recommendations:

- Develop a noxious weed management plan for the Property and implement recommended weed mitigation measures.
- Prioritize efforts on the area east of the Brauch Property where noxious weeds are the most dense.
- All herbicide treatments should follow CDOA recommendations and guidelines (CDOA 2022).

Grassland Disturbance

Existing Condition: Visitors with off-leash dogs were observed off-trail within the leash areas causing vegetation disturbance, erosion, and potentially spreading noxious weeds.

Recommendations:

- Install signage and implement off-trail closures.
- Cite visitors when recreating inappropriately within the closure areas.
- Identify areas of highest restoration potential and implement restoration plans.

Wildlife Management

Habitat Protection – Burrowing Owls

Existing Condition: Prairie dog burrows on the Property are potential nesting habitat for western burrowing owls, a state-listed threatened species, and off-leash dogs were observed running loose in the prairie dog colonies that have been identified as a historic burrowing owl nesting area.

Recommendations:

- Seasonally monitor the prairie dog colonies for nesting burrowing owls and implement appropriate closures with signage in known nesting areas during the nesting season.
- Cite visitors when dogs are off leash in the leash area.

• Designate the western grasslands as a "Protected Habitat Area" and prohibit dogs and off-trail usage for protection of ground nesting birds and consistency with U.S. Fish and Wildlife Service's (USFWS) property regulations to the west.

Habitat Protection – Grassland Nesting Birds

Existing Condition: The mixed grassland and nonnative grassland on the Property provide nesting habitat for grassland nesting birds like the western meadowlark.

Recommendations:

- Implement seasonal closures to grasslands with signage areas during the nesting season.
- Cite visitors when recreating within the closure areas.
- Implement a vegetation enhancement plan to improve native grasslands.

Habitat Protection – Raptor and Bald Eagle Nests

Existing Condition: Large cottonwoods on the Property and adjacent to the Property provide nesting habitat and hunting perches for raptors like great-horned owl, red-tailed hawk, and bald eagle.

Recommendations:

- Seasonally monitor the potential nesting habitats for nesting raptors and implement appropriate seasonal closures with signage in known nesting areas during the sensitive nesting season.
- Cite visitors when recreating within the closure areas.

Habitat Protection - Potential Threatened and Endangered Species Habitat

Existing Condition: Riparian woodland and mesic wet meadow habitats on the Property provide potential habitat Preble's and/or ULTO.

Recommendations:

Both Preble's and ULTO are species listed as threatened under the ESA and have potentially
suitable habitat on the Property. Should projects involve habitat-disturbing activities in these
areas, consultation with the Service would be required. If work is limited to outside of the
Preble's or ULTO habitat boundaries, ERO recommends submitting a habitat assessment to the
Service requesting confirmation that the project would have no adverse impacts on any federally
threatened or endangered species.

Visitor and Recreation Use Management

Trails

Existing Condition: Unplanned visitor access throughout the Property has resulted in vegetation trampling, social trail creation, and erosion.

Recommendations:

- Continue to monitor and inventory existing designated and social trails on the Property for maintenance needs.
- Review trail network to consolidate redundant trails and consider adopting or building trails to address missing links.
- Assess the viability of formally integrating specific social trails into the trail system where it makes sense.
 - For example, consider keeping appropriate access routes from neighborhoods and minimize connector social trails to provide visitors with sustainable options to enter and circulate the Property.
- Update and maintain trails following modern standards for trail grade, width, and drainage features to provide visitor access and circulation on the Property.
- Continue to actively monitor social trails and act quickly to close new undesignated trails.
- Install trail edge fencing to discourage off-trail use in sensitive areas.
- Institute on-trail requirements in sensitive habitat areas to protect wildlife.
- Implement a buffer zone for sensitive species and habitats which restricts recreational activity.

Property Access

Existing Condition: The Property is currently only formally accessible in two locations, as well as two neighborhood access points, which has caused concentrated use in these areas and denies visitation from the west and north sides of the Property.

Recommendations:

- Consider formalizing access to the Property in other areas where it is currently unavailable.
 - For example, consider a formalized access from the neighborhood on the northern boundary of the Property.

Dogs

Existing Condition: Dogs are generally congregating on the off-leash portion of the Property although many visitors are continuing to keep their dogs off-leash on the western, on-leash only portion of the Property which impacts restoration and sensitive wildlife habitats.

Recommendations:

- Improve habitat conditions at Westminster Hills by limiting dog access which may promote increased species presence of elk, deer, burrowing owls, and other ground nesting birds.
- Cite visitors with off-leash dogs beyond the permitted boundary.
- Increase signage of leash regulation change along fencing.
- Provide additional signage indicating reasons for on-leash regulations ("to reduce impacts to wildlife," "for safety of dogs and cyclists on the regional trail," etc.).

• Consider reducing impact from off-leash dogs by reducing the off-leash area and clearly delineating boundaries. Return the off-leash designation to its original intent of providing a local off-leash area, not a regional destination.

Signage

Existing Condition: Existing signage throughout the Property is often inconsistent and/or nonexistent in critical wayfinding, policy change, and social trail closure areas.

Recommendations:

- Provide wayfinding opportunities throughout the Property by installing maps that indicate the visitor's location within the trail system.
 - Property maps with all designated trails should be located at each parking lot and large trail junctions with "You Are Here" icons on each map.
- Coordinate wayfinding with simple and humorous messaging to inform visitors of Property rules while also providing educational information regarding vegetation, wildlife habitat, and proper trail and dog etiquette.
- Install periodic and consistent signage indicating the change in leash policy along the smoothwire fencing boundary.
- Create and install consistent signage on social trail closures.
 - For example, instead of "Trail Closed" use language like "Restoration in Progress, Please Keep Off" as it will allow users to make more informed decisions as to why they should stay on designated trails.
- Create a sitewide educational signage program that emphasizes the unique value of these Open Space Lands.

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Appendix A Prevalent Plant Species Observed on the Property

Scientific Name	Common Name
Abutilon theophrasti	Velvetleaf
Achillea millefolium	Common yarrow
Aegilops cylindrica	Jointed goatgrass
Agropyron cristatum	Crested wheatgrass
Ambrosia artemisiifolia	Annual ragweed
Amorpha fruticosa	False-indigo bush
Apocynum cannabinum	Dogbane
Artemisia frigida	Prairie sagewort
Artemisia ludoviciana	White sagebrush
Astragalus spp.	Milkvetch
Bassia scoparia	Kochia
Bouteloua gracilis	Blue grama
Bouteloua dactyloides	Buffalograss
Bromus inermis	Smooth brome
Bromus japonicus	Japanese brome
Bromus tectorum	Cheatgrass
Carex spp.	Sedges
Carduus nutans	Musk thistle
Castilleja spp.	Indian paintbrush
Chenopodium album	White goosefoot
Convolvulus arvensis	Field bindweed
Dalea purpurea	Prairie purple clover
Descurainia sophia	Flixweed
Elaeagnus angustifolia	Russian olive
Ericameria nauseosa	Rubber rabbitbrush

Erigeron spp.	Fleabane
Erodium cicutarium	Redstem fillaree
Festuca spp.	Fescue
Grindelia squarrosa	Curlytop gumweed
Helianthus annuus	Common sunflower
Hesperostipa comata	Needle and thread grass
Heterotheca villosa	Hairy false golden aster
Hordeum brachyantherum	Meadow barley
Hordeum jubataum	Foxtail barley
Hypericum perforatum	Common St. John's-wort
Juncus spp.	Rushes
Koeleria macrantha	Jungrass
Lepidium densiflorum	Common pepperweed
Linaria dalmatica	Dalmatian toadflax
Linum lewisii	Lewis flax
Lithospermum occidentale	Western false gromwell
Medicago sativa	Alfalfa
Melilotus officinalis	Yellow sweetclover
Nassella viridula	Green needlegrass
Onopordum acanthium	Scotch thistle
Opuntia spp.	Prickly pear
Pascopyrum smithii	Western wheatgrass
Penstemon spp.	Penstemon
Phalaris arundinacea	Reed canarygrass
Populus deltoides spp. monilifera	Plains cottonwood
Potentilla recta	Sulfur cinquefoil
Ratibida columnifera	Prairie coneflower
Ribes aureum	Golden current
Rosa woodsii	Woods' rose

Rumex crispus	Curly dock
Salix amydaloides	Peachleaf willow
Salix exigua	Sandbar willow
Salsola tragus	Prickly Russian thistle
Schizachyrium scoparium	Little bluestem
Sphaeralcea coccinea	Scarlet globemallow
Taraxacum spp.	Dandelion
Thlaspi arvense	Field pennycress
Tradescantia occidentalis	Prairie spiderwort
Tragopogon dubius	Yellow salsify
Typha angustifolia	Narrowleaf cattail
Typha latifolia	Broadleaf cattail
Verbascum blattaria	Moth mullein
Verbascum Thapsus	Common mullein
Yucca glauca	Soapweed

Westminster Hills Open Space Management Plan

Open Space Boundary

State Listed Noxious Weeds

<u>Noxious Weeds</u> CG - Cheatgrass - List C CM - Common Mullein - List C CT - Canada Thistle - ListB DK - Diffuse Knapweed - List B DT - Dalmatian Toadflax - List B FB - Field Bindweed - List C HC - Hoary Cress - List B JG - Jointed Goatgrass - List B MM - Moth Mullien - List B

QG- Quack Grass – List C RO - Russian Olive - List B

- SJ Common St. Johnswort List C SE Siberian Elm List C ST- Scotch Thistle List B TE Common Teasel List B

<u>Noxious Weed Density</u> 1 = 10% or Less 2 = 11-20% 3 = 21-50 %

Appendix B State Listed Noxious Weeds

Scientific Name	Common Name	Grassland (Mixed and Nonnative)	Riparian Woodland	Emergent Marsh/Wet Meadow/Open Water	Observed During 2023 Site Visit
Accipiter cooperii	Cooper's hawk	Х	Х		
Accipiter striatus	Sharp-shinned hawk	Х	Х		
Agelaius phoeniceus	Red-winged black bird		Х	X	Х
Ammodramus savannarum	Grasshopper sparrow	Х			
Anas carolinensis	Green-winged teal			X	
Anas platyrhynchos	Mallard	Х		x	
Archilochus alexandri	Black-chinned hummingbird	Х	Х	X	
Ardea Herodias	Great blue heron		Х	X	Х
Aquila chrysaetos	Golden eagle	Х	Х		
Athene cunicularia	Burrowing owl	Х			
Aythya americana	Redhead duck			x	Х
Bubo virginianus	Great horned owl		Х		
Bubulcus ibis	Cattle egret			х	Х
Buteo jamaicensis	Red-tailed hawk	Х	Х	x	Х
Buteo swainsoni	Swainson's hawk	Х	Х		Х
Canis latrans	Coyote	Х	Х	x	
Carduelis tristis	American goldfinch	Х	Х	X	
Cathartes aura	Turkey vulture	Х	Х	х	x
Cervus canadensis	Elk	Х	Х	х	
Charadrius vociferus	Killdeer	х			х

Appendix C. Wildlife Commonly Found in the Vegetation Communities on the Property

Scientific Name	Common Name	Grassland (Mixed and Nonnative)	Riparian Woodland	Emergent Marsh/Wet Meadow/Open Water	Observed During 2023 Site Visit
Chordeiles minor	Common nighthawk	Х	Х		
Chrysemys picta	Painted turtle			Х	
Circus hudsonius	Northern harrier	Х		Х	
Colaptes auratus	Northern flicker		Х	Х	Х
Coluber constrictor mormo	Yellow-bellied racer	Х			
Corvus brachyrhynchos	American crow	Х	Х	Х	Х
Corynorhinus townsendii	Townsend's big-eared bat		Х		
Cyanocitta cristata	Blue jay		Х		
Cyanocitta stelleri	Steller's jay		Х		
Cynomys ludovicianus	Black-tailed prairie dog	Х			Х
Eptesicus fuscus	Big brown bat		Х		
Eremophila alpestris	Horned lark	Х			Х
Erethizon dorsatum	American porcupine		Х		
Euphagus cyanocephalus	Brewer's blackbird	Х	Х	Х	Х
Falco columbarius	Merlin	Х	Х	Х	
Falco mexicanus	Prairie falcon	Х	Х	Х	
Falco sparverius	American kestrel	Х	Х	Х	Х
Geothlypis trichas	Common yellowthroat			Х	Х
Haemorhous mexicanus	House finch	Х	Х		Х

Scientific Name	Common Name	Grassland (Mixed and Nonnative)	Riparian Woodland	Emergent Marsh/Wet Meadow/Open Water	Observed During 2023 Site Visit
Haliaeetus leucocephalus	Bald eagle	Х	Х	Х	
Hirundo rustica	Barn swallow	Х	Х	Х	Х
Junco hyemalis	Dark-eyed junco	Х	Х	Х	
Lanius ludovicianus	Loggerhead shrike	Х			
Lasionycteris noctivagans	Silver-haired bat		Х		
Lasiurus borealis	Eastern red bat		Х		
Lasiurus cinereus	Hoary bat		Х		
Lepus californicus	Black-tailed jackrabbit	Х			
Mareca spp.	Wideon			Х	
Mareca strepera	Gadwall			Х	
Meleagris gallopavo	Wild turkey	Х	Х	х	
Mephitis mephitis	Striped skunk	Х	Х	Х	
Molothrus ater	Brown-headed cowbird	Х	Х	Х	
Mustela erminea	Short-tailed weasel	Х	Х	Х	
Myotis lucifungus	Little brown myotis		Х		
Myotis thysanodes	Fringed myotis		Х		
Neogale frenata	Long-tailed weasel	Х	Х	Х	
Odocoileus hemionus	Mule deer	Х	Х	х	
Ondatra zibethicus	Muskrat			х	
Oxyura jamaicensis	Ruddy duck			Х	Х

Scientific Name	Common Name	Grassland (Mixed and Nonnative)	Riparian Woodland	Emergent Marsh/Wet Meadow/Open Water	Observed During 2023 Site Visit
Pelecanus erythrorhynchos	American white pelican			Х	Х
Peromyscus maniculatus	Deer mouse	Х	Х	Х	
Peucaea cassinii	Cassin's sparrow	Х			
Phalacrocorax auratus	Double- crested cormorant			X	Х
Phrynosoma hernandesi	Short-horned lizard	Х			
Pica hudsonia	Black-billed magpie	Х	Х		Х
Pipilo maculatus	Spotted towhee		Х	Х	
Pituophis catenifer	Bull snake	Х	Х	Х	
Poecile atricapilla	Black-capped chickadee	Х	Х	Х	
Pooecetes gramineus	Vesper sparrow	Х			Х
Procyon lotor	Raccoon	Х	Х	х	
Quiscalus mexicanus	Great-tailed grackle		Х	Х	Х
Quiscalus quiscula	Common grackle		Х	Х	Х
Rana pipiens	Northern leopard frog		Х	Х	
Sayornis saya	Say's phoebe	х			Х
Sceloporus undulatus	Fence lizard	Х	Х		
Selasphorus platycercus	Broad-tailed hummingbird		Х		

Scientific Name	Common Name	Grassland (Mixed and Nonnative)	Riparian Woodland	Emergent Marsh/Wet Meadow/Open Water	Observed During 2023 Site Visit
Setophaga coronata	Yellow- rumped warbler		x		
Setophaga petechia	Yellow warbler		Х		
Sialia mexicana	Western bluebird	Х	Х	Х	
Sitta carolinensis	White- breasted nuthatch		х	X	
Sitta pygmaea	Pygmy nuthatch		Х		
Spizella passerina	Chipping sparrow	Х	Х	Х	
Sturnella neglecta	Western meadowlark	Х			Х
Sturnus vulgaris	European starling	Х	Х	Х	Х
Sylvilagus sp.	Cottontail rabbit	Х	Х		Х
Turdus migratorius	American robin	Х	Х	Х	Х
Ursus americanus	American black bear		Х		
Vermivora virginiae	Virginia warbler		Х	Х	
Vulpes vulpes	Red fox	Х	Х	Х	
Xanthocephalus xanthocephalus	Yellow-headed blackbird			Х	X
Zenaida macroura	Mourning dove	Х	Х	Х	Х