ERO

Consultants in Natural Resources and the Environment

DRAFT

City of Westminster
Westminster Hills Open Space
Conditions Report
Adams and Jefferson Counties, Colorado

Prepared for—

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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 and Wildlife Refuge 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 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.

Figure 1. Vicinity Map

Figure 2. Existing Conditions

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**~~**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.

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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**~~**Figure 3**~~). Sampling only occurs when the ditch is running or when surface water is present (typically May through September).

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Four sets of water samples have been collected thus far (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~~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 at WH-SW-2 and 35.5 MPN/100ml to greater than 2,419.6 MPN/100ml at WH-SW-3 (Table 1~~Table 1~~).

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*A*ccording 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~~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).

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All of the surface water samples collected from the Property contained *E. coli* concentrations that exceed the EPA Threshold Values (Table 1~~Table 1~~). ~~However~~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).

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

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
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.

Figure 3. Surface Water and Soil Sampling Locations

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~~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~~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~~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~~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~~Figure 4~~ and Figure 5~~Figure 5~~**)** and coincides with active prairie dog colony (Figure 6~~Figure 6~~). This

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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~~Figure 5~~ is not representative of entirely noxious weed communities.

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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~~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*).

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Emergent Marsh Wetlands

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

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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~~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*).

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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 2. Nonnative Grassland.

Photo 3. Noxious Weeds.

Photo 4. Riparian Woodland.

Photo 5. Emergent Marsh.

Photo 6. Herbaceous Mesic/Wet Meadow.

Figure 4. Vegetation Communities

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**~~**Figure 5**~~. The percent cover of discreet weed populations was assessed and categorized as shown in **Table 2**~~**Table 2**~~.

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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

Figure 5. State Listed Noxious Weeds

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 (Appendix B). 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 visits included black-tailed prairie dog,cottontail rabbit (*Sylvilagus* sp.), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsoni*), turkey vulture (*Cathartes aura*), American kestrel (*Falco sparverius*), red-winged black bird (*Agelaius phoeniceus*), great blue heron (*Ardea Herodias*), redhead duck (*Aythya americana*), cattle egret (*Bubulcus ibis*), killdeer (*Charadrius vociferus*), northern flicker (*Colaptes auratus*), American crow (*Corvus brachyrhynchos*), horned lark (*Eremophila alpestris*), Brewer's blackbird (*Euphagus cyanocephalus*), common yellowthroat (*Geothlypis trichas*),house finch (*Haemorhous mexicanus*), barn swallow (*Hirundo rustica*), ruddy duck (*Oxyura jamaicensis*), American white pelican (*Pelecanus erythrorhynchos*), double-crested cormorant (*Phalacrocorax auratus*), black-billed magpie (*Pica hudsonia*), vesper sparrow (*Pooecetes gramineus*), great-tailed grackle (*Quiscalus mexicanus*), common grackle (*Quiscalus quiscula*), Say's phoebe (*Sayornis saya*), western meadowlark (*Sturnella neglecta*), European starling (*Sturnus vulgaris*), American robin (*Turdus migratorius*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), and mourning dove (*Zenaida macroura*).

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Federally-Listed Wildlife Species

ERO assessed the Property for habitat for federally threatened, endangered, and candidate species under the ESA. 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~~Table 3~~) (U.S. Fish and Wildlife Service 2023).

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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, 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~~Table 3~~ below.

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

Common Name	Scientific Name	Status*	Habitat	Habitat Present or Potential to be Affected?
Mammals				
Gray wolf	*Canis lupus*	T	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*	T	Shrub riparian/wet meadows	Yes
Birds				
Piping plover**	*Charadrius melodus*	T	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*	C	Dependent on milkweeds (*Asclepiadoideae*) as host plants and forage on blooming flowers; a summer resident	Few milkweeds found; not likely to adversely affect
Plants				
Ute ladies'-tresses orchid (ULTO)	*Spiranthes diluvialis*	T	Moist to wet alluvial meadows, floodplains of perennial streams, and around springs and lakes below 7,800 feet in elevation	Yes
Western prairie fringed orchid**	*Platanthera praeclara*	T	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 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 take (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. Based on ERO's knowledge of the types of activities likely to be implemented on the Property, there would be no depletions to the South Platte River. If projects include activities that deplete water in the South Platte River, such as diverting water from a stream or developing new water supplies, these species could be affected and consultation with the Service may be required.

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 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

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 6**~~**Figure 6**~~). 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 (Colorado Parks and Wildlife 2021a). Management activities occurring from November 1 through March 14 would not require clearance surveys.

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Western Burrowing Owl

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 6~~Figure 6~~). 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 ⅛ 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.

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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 6~~Figure 6~~), 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.

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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 6~~Figure 6~~), 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 (Colorado Parks and Wildlife 2020).

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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 (Colorado Parks and Wildlife 2023). 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~~Table 4~~. Important wildlife habitats are shown on Figure 6~~Figure 6~~, except for species activity maps covering the entirety of the Property, i.e. overall range, summer range, forage areas.

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Table 4. CPW-tracked wildlife species in the vicinity of the Property.

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

Source: (Colorado Parks and Wildlife 2021c; 2021b)

Photo 7. Black-tailed prairie dog colony

Photo 8. Bald Eagle Active Nest Site.

Figure 6. Wildlife Habitat

Recreation Impacts

Property Access

Designated Trails

The designated trails on the Property are generally in good condition. In areas of high congestion, trail widening and bare ground is common.

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**~~**Figure 2**~~ illustrates the number of social trails on the Property.

Fencing

Fencing has been utilized throughout the Property to indicate the boundary between the on and off-leash 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.

Commented [J3]: Disagree with this comment. Designated trails in this area have seen significant widening from the 10' original greenway trail and the 48" natural surface trails. While tread condition is good, the disturbance area of these trails is significantly greater than original design. There is significant research showing the impact of trails on wildlife species and grassland condition. All from the trail edge (i.e. the wider the trail the greater the disturnace) Can we please adjust this, and site literature to support disturbance *particularly as it applies to dogs off leash

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Photo 9. Smooth wire fencing.

Photo 10. Large split rail fencing.

Photo 11. Medium split rail fencing with signage.

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. The Rocky Mountain Greenway Trail also transects this portion of the Property making off-leash dogs a hazard to cyclists on the trail.

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~~Figure 2~~** and in **Photo 12~~Photo 12~~**) also causes congestion among user groups when the ditch is flowing. If multiple dogs and people are on the bridge

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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.

Feces

Dog feces were not notably present throughout the Property. The most concentrated area of feces was located at the park entrance off Simms Street. This is likely due to owners arriving at the park, letting their dog out of the car, and not seeing where the dog goes to relieve itself.

Commented [J4]: Also strongly disagree here. We have conducted a rough study, in 1 hour of effort (4 people for 15 minutes) more than 150 individual piles of excrement were flagged within a 100 yd radius of the south trailhead. While the volume of waste decreases as you move further west, dog waste is a significant issue. There is also literature available to

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 using 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.

2. 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**~~**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.

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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, please visit https://www.vvmta.org/respectthewild/.

City of Boulder OSMP – PLACEHOLDER

Other Leash Requirement Examples – PLACEHOLDER

Commented [J5]: Would like to see more references to impacts of off trail, and dog recreation on vegetation and wildlife.
NPS "plants grow by the inch die by the foot"

Commented [J6]: Here or at the beginning, some input from Cherry Creek. The OS Stewardship plan references their model and I understand that it has been largely unsuccessful in "rotating restoration"

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.

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.

Commented [J7]: Permanent signage on dog waste removal, post all bodies of water on the property as being potentially unsafe for recreational use,

Vegetation Management

Noxious Weeds

Existing Condition: Noxious weed infestations were found throughout the Property (Figure 5~~Figure 5~~).

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Recommendations:

Develop a noxious weed management plan for the Property and implement recommended weed mitigation measures.

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~~closures.
- Cite visitors when recreating inappropriately within the closure areas.

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.

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.

Commented [J8]: Identify areas of highest restoration potential and implement restoration plans

Commented [J9]: Review trail network to consolidate redundant trails, adopt or build trails to meet missing links

Commented [J10]: Continue active monitoring of social trails and act quickly to close new undesignated trails

Commented [J11]: Install trail edge fencing to discourage off trail use in sensitive areas

Commented [J12]: Institute on-trail requirements in Sensitive Habitat areas, 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 USFW property that will be connected to the west

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.
- 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.

Commented [J13]: See notes above

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.

Commented [J14]: I want to strength this section: The City code states dogs may be allowed off leash "if it does not impact the Open Space Purposes for which the land was acquired" Current off-leash activity and volume do not meet this standard: "Consider reducing impact of off-leash dogs by reducing the off-leash area and clearly delineating boundaries. Return the off-leash to the original intent of providing a local off-leash area, not a regional destination

Recommendations:

- 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.).

Signage

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

Commented [J15]: Create an site wide educational signage program that emphasizes the unique value of these Open Space Lands

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 smooth-wire 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.

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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

Appendix B 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
Accipiter cooperii	Cooper's hawk	X	X	
Accipiter striatus	Sharp-shinned hawk	X	X	
Agelaius phoeniceus	Red-winged black bird		X	X
Ammodramus savannarum	Grasshopper sparrow	X		
Anas carolinensis	Green-winged teal			X
Anas platyrhynchos	Mallard	X		X
Archilochus alexandri	Black-chinned hummingbird	X	X	X
Ardea Herodias	Great blue heron		X	X
Aquila chrysaetos	Golden eagle	X	X	
Athene cunicularia	Burrowing owl	X		
Aythya americana	Redhead duck			X
Bubo virginianus	Great horned owl		X	
Bubulcus ibis	Cattle egret			X
Buteo jamaicensis	Red-tailed hawk	X	X	X
Buteo swainsoni	Swainson's hawk	X	X	
Canis latrans	Coyote	X	X	X
Carduelis tristis	American goldfinch	X	X	X
Cathartes aura	Turkey vulture	X	X	X
Cervus canadensis	Elk	X	X	X
Charadrius vociferus	Killdeer	X		
Chordeiles minor	Common nighthawk	X	X	
Chrysemys picta	Painted turtle			X
Circus hudsonius	Northern harrier	X		X
Colaptes auratus	Northern flicker		X	X
Coluber constrictor mormo	Yellow-bellied racer	X		
Corvus brachyrhynchos	American crow	X	X	X
Corynorhinus townsendii	Townsend's big-eared bat		X	
Cyanocitta cristata	Blue jay		X	
Cyanocitta stelleri	Steller's jay		X	
Cynomys ludovicianus	Black-tailed prairie dog	X		
Eptesicus fuscus	Big brown bat		X	
Eremophila alpestris	Horned lark	X		
Erethizon dorsatum	American porcupine		X	
Euphagus cyanocephalus	Brewer's blackbird	X	X	X
Falco columbarius	Merlin	X	X	X
Falco mexicanus	Prairie falcon	X	X	X
Falco sparverius	American kestrel	X	X	X
Geothlypis trichas	Common yellowthroat			X
Haemorhous mexicanus	House finch	X	X	
Haliaeetus leucocephalus	Bald eagle	X	X	X

Scientific Name	Common Name	Grassland (Mixed and Nonnative)	Riparian Woodland	Emergent Marsh/Wet Meadow/Open Water
Hirundo rustica	Barn swallow	X	X	X
Junco hyemalis	Dark-eyed junco	X	X	X
Lanius ludovicianus	Loggerhead shrike	X		
Lasionycteris noctivagans	Silver-haired bat		X	
Lasiurus borealis	Eastern red bat		X	
Lasiurus cinereus	Hoary bat		X	
Lepus californicus	Black-tailed jackrabbit	X		
Mareca spp.	Wideon			X
Mareca strepera	Gadwall			X
Meleagris gallopavo	Wild turkey	X	X	X
Mephitis mephitis	Striped skunk	X	X	X
Molothrus ater	Brown-headed cowbird	X	X	X
Mustela erminea	Short-tailed weasel	X	X	X
Myotis lucifungus	Little brown myotis		X	
Myotis thysanodes	Fringed myotis		X	
Neogale frenata	Long-tailed weasel	X	X	X
Odocoileus hemionus	Mule deer	X	X	X
Ondatra zibethicus	Muskrat			X
Oxyura jamaicensis	Ruddy duck			X
Pelecanus erythrorhynchos	American white pelican			X
Peromyscus maniculatus	Deer mouse	X	X	X
Peucaea cassinii	Cassin's sparrow	X		
Phalacrocorax auratus	Double-crested cormorant			X
Phrynosoma hernandesi	Short-horned lizard	X		
Pica hudsonia	Black-billed magpie	X	X	
Pipilo maculatus	Spotted towhee		X	X
Pituophis catenifer	Bull snake	X	X	X
Poecile atricapilla	Black-capped chickadee	X	X	X
Pooecetes gramineus	Vesper sparrow	X		
Procyon lotor	Raccoon	X	X	X
Quiscalus mexicanus	Great-tailed grackle		X	X
Quiscalus quiscula	Common grackle		X	X
Rana pipiens	Northern leopard frog		X	X
Sayornis saya	Say's phoebe	X		
Sceloporus undulatus	Fence lizard	X	X	
Selasphorus platycercus	Broad-tailed hummingbird		X	
Setophaga coronata	Yellow-rumped warbler		X	
Setophaga petechia	Yellow warbler		X	
Sialia mexicana	Western bluebird	X	X	X

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