Addendum 3

Ecological Assessment Report
for
Buc-ee's Travel Center
Palmer Lake Site
El Paso County, Colorado

July 11, 2025

Prepared for:

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Project Number: 2025-3-1

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LIST OF ACROYNMS AND ABBREVIATIONS

AMSL	Above Mean Sea Level
PBA	Programmatic Biological Assessment
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
CDA	Colorado Department of Agriculture
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
CNHP	Colorado Natural Heritage Program
CPW	Colorado Parks and Wildlife
CWA	Clean Water Act
DCOS	Douglas County Open Space
ECMC	Colorado Energy and Carbon Management Commission
ECOS	Ecosystem Services, LLC
EPC	El Paso County
EPCP	El Paso County Parks
ESA	Endangered Species Act
HPH	High Priority Habitat
JD	Jurisdictional Determination under the Clean Water Act
LEDPA	Least Environmentally Damaging and Practicable Alternative
MBTA	Migratory Bird Treaty Act
MP	Mile Post
Non-JD	Non- jurisdictional Determination under the Clean Water Act
NRCS	Natural Resource Conservation Service
NTCHS	Technical Committee for Hydric Soils
NWI	National Wetland Inventory
NWMP	Noxious Weed Management Plan
OHWM	Ordinary High Water Mark
PCA	CNHP Potential Conservation Area
PMJM	Preble's meadow jumping mouse
Project	Buc-ee’s Palmer Lake Project
Report	Ecological Assessment Report
Site	Buc-ee’s Project site
T&E Species	Threatened and Endangered species
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture

USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Vertex	Vertex Consulting Services
WOSOC	Waters of the State of Colorado
WOTUS	Waters of the Unites States
WQCD	Water Quality Control Division
WCV	Wildlife-Vehicle Collisions

1.0 INTRODUCTION

Ecosystem Services, LLC (ECOS) was retained by Vertex Consulting Services (Vertex) to perform an ecological assessment (EA) for the 24.77-acre Buc-ee's Palmer Lake Site (Site) development project (Project) and to prepare this Ecological Assessment Report (Report). ECOS professional qualifications are provided in Appendix G.

The contact information for the Vertex and ECOS representatives for this Report is provided below:

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1.1 Purpose

The purpose of the EA is to compare background information with present-day conditions, describe the physical/ecological characteristics and conditions of the Site, identify potential environmental opportunities and constraints associated with the Project, and determine the presence/absence and approximate extent of the following features:

- Topography / Natural Landforms;
- Vegetation Communities;
- Riparian Areas;
- Wetland Habitat and Waters Resources (i.e., lakes, ponds, streams)
- Wildlife Habitat:
    - Federal listed Threatened and endangered Species;
    - Migratory Birds and Raptors; and other
    - Significant wildlife.

1.2 Site Location

The Site is located on the northern margin of the Black Forest on Monument Hill due east of the Town of Palmer Lake, Colorado between I-25 and Beacon Lite Road to the east and west. Palmer Divide Road bounds the Site to the north. The Site is specifically located within the northwest quarter of Section 2, Township 11 South, Range 67 West of the 6th P.M., El Paso County, Colorado (El Paso County Parcel 222106819). The center of the Site is located at approximately Latitude 39.127687° north, Longitude -104.866275° west at an elevation of approximately 7,360 feet above mean sea level. Refer to Figure 1, USGS Site Location Map and Figure 2, Existing Conditions Aerial Photo.

1.3 Project Description

The Applicant is seeking concurrent approvals for annexation, sketch plan, and development plans (Plans) for a Buc-ee's commercial travel center. The Plans propose clearing and grading of the 24.77-acre Site to accommodate one building, fueling stations, parking, stormwater detention facilities and appurtenant utilities. Please refer to the Development Plans provided by the Applicant and the development application under separate cover for specific details and descriptions of the Project discussed herein.

Figure 1

USGS Site Location Map

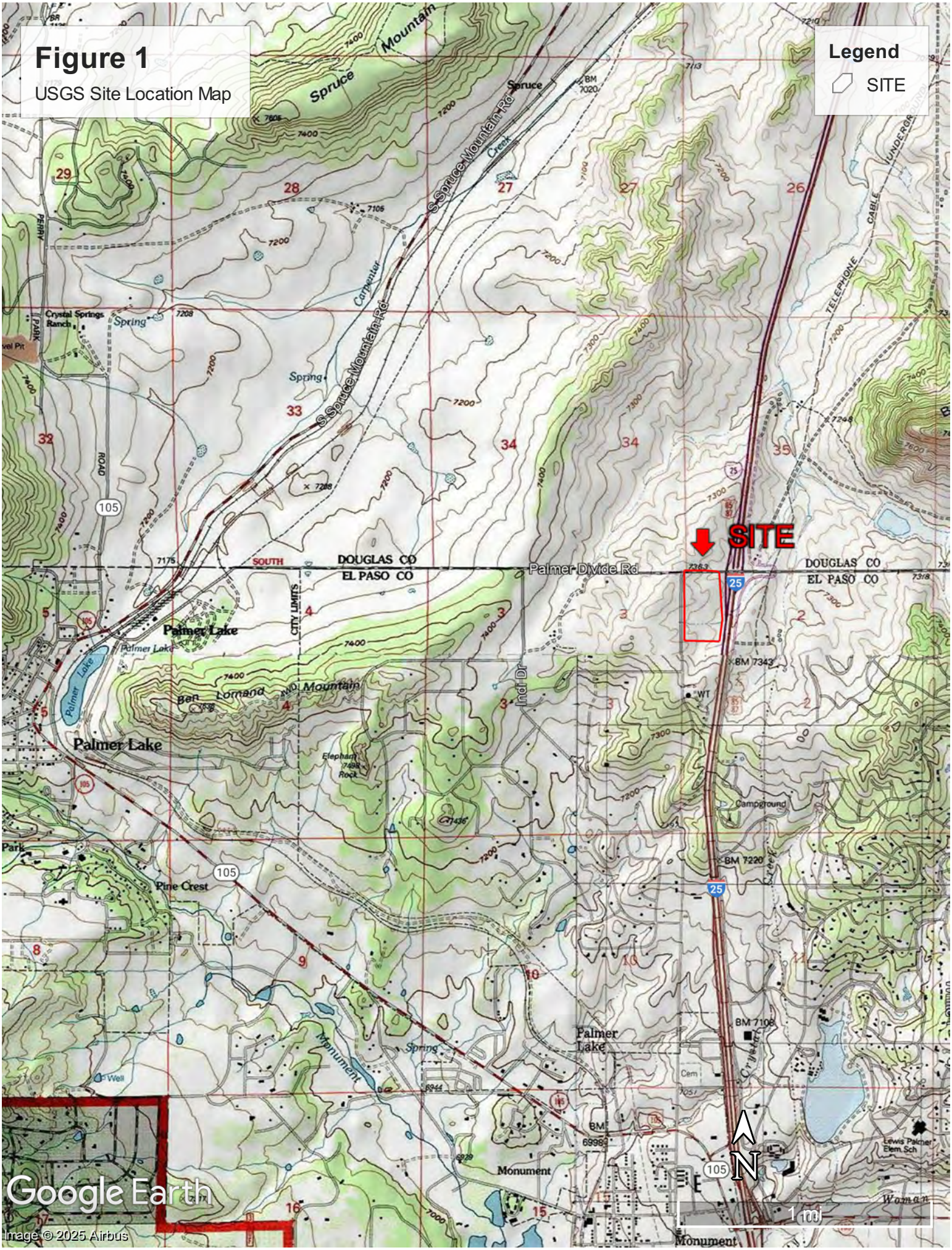
Figure 1
USGS Site Location Map
Legend
SITE
SITE
DOUGLAS CO
EL PASO CO
Palmer Divide Rd
Palmer Lake
S Spruce Mountain Rd
Spruce Mountain
Monument
Pine Crest
Campground
BM 7343
BM 7220
BM 7108
Google Earth
Image © 2025 Airbus
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Figure 2
Existing Conditions Aerial Photo

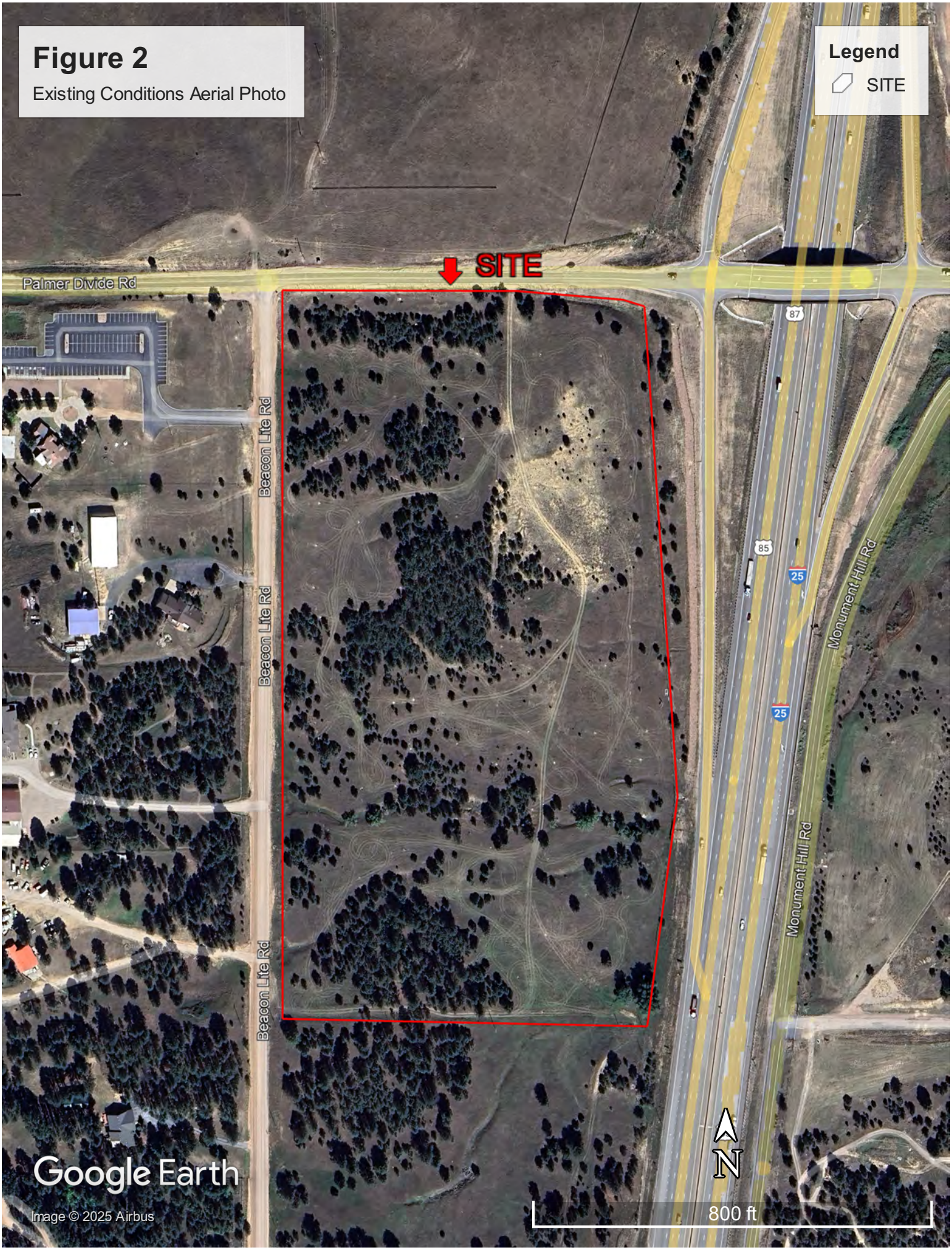


Figure 2
Existing Conditions Aerial Photo
Legend
SITE
SITE
Palmer Divide Rd
Beacon Lite Rd
Beacon Lite Rd
Beacon Lite Rd
87
85
25
25
Monument Hill Rd
Monument Hill Rd
N
800 ft
Google Earth
Image © 2025 Airbus

Figure 3

Ecoregion Map

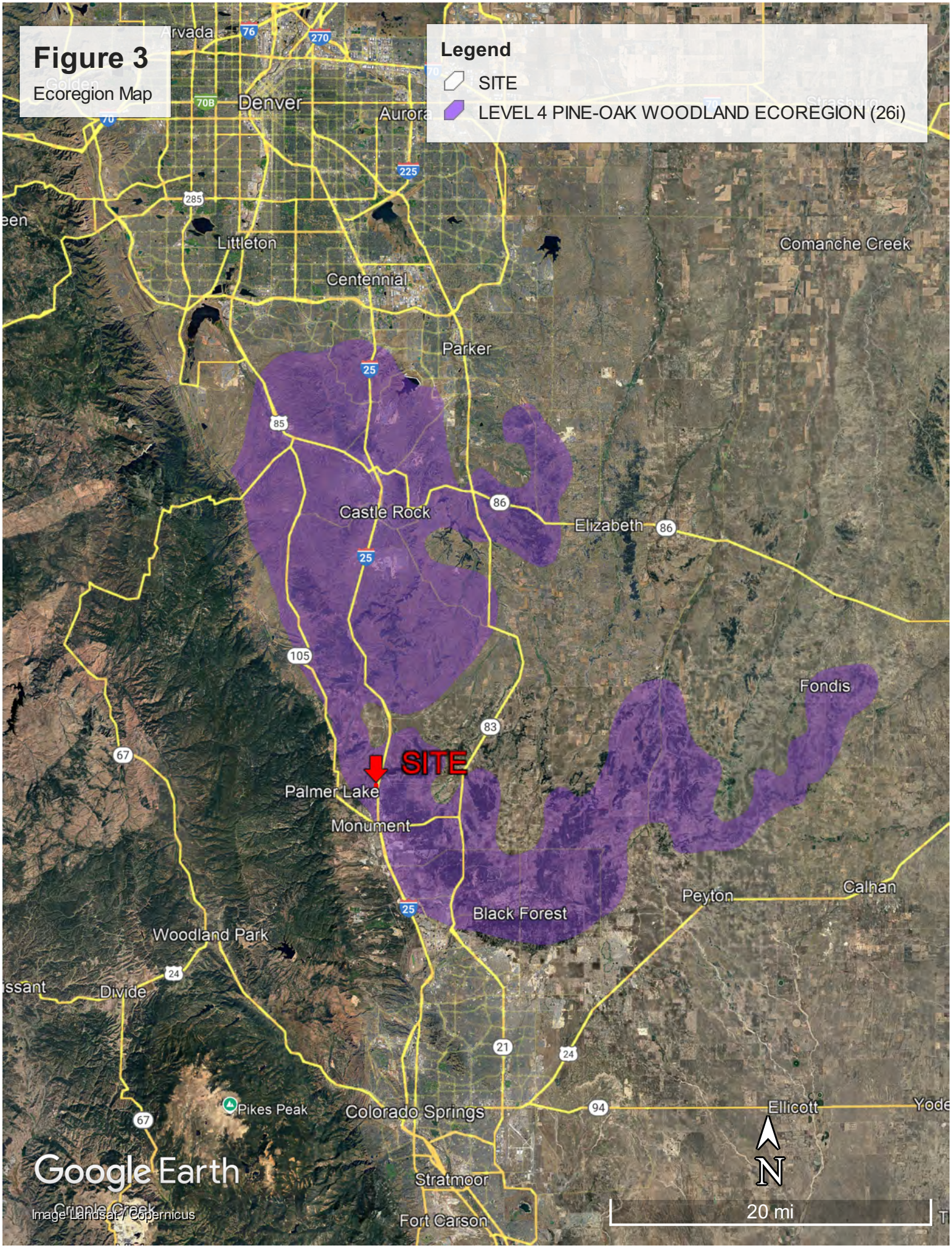


Figure 3
Ecoregion Map
Legend
SITE
LEVEL 4 PINE-OAK WOODLAND ECOREGION (26i)
Arvada
Denver
Aurora
Littleton
Centennial
Comanche Creek
Parker
Castle Rock
Elizabeth
Fondis
SITE
Palmer Lake
Monument
Black Forest
Peyton
Calhan
Woodland Park
Divide
Pikes Peak
Colorado Springs
Ellicott
Stratmoor
Fort Carson
Cripple Creek
Google Earth
Image Landsat / Copernicus
N
20 mi

2.0 METHODOLOGY

ECOS performed an office-level assessment in which available databases, resources, literature and field guides on local flora and fauna were reviewed to gather background information on the environmental setting of the Site. We consulted several organizations, agencies, and their databases, including:

- Colorado Department of Transportation (CDOT) I-25 South Gap Environmental Assessment, including Programmatic Biological (PBA) and Wildlife Movement Technical Memorandum;
- CDOT I-25 South Gap Wildlife Monitoring Year 3 Progress Report
- Colorado Natural Heritage Program (CNHP) Wetland and Riparian Areas;
- Colorado Energy and Carbon Management Commission (ECMC) Online GIS;
- Colorado Parks and Wildlife (CPW);
- Google Earth current and historic aerial imagery;
- Survey of Critical Biological Resources, El Paso County, Colorado;
- Survey of Critical Wetlands and Riparian Areas in El Paso and Pueblo Counties, Colorado;
- U.S. Army Corps of Engineers (USACE) 1987 Corps of Engineers Wetlands Delineation Manual;
- USACE 2008 Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast;
- U.S. Department of Agriculture (USDA) PLANTS Database;
- U.S. Department of Agriculture, Natural Resources Conservation Service Soil Survey;
- U.S. Fish and Wildlife Service (USFWS) Region 6 data;
- USFWS Information, Planning, and Conservation (IPaC) database;
- USFWS National Wetland Inventory (NWI);
- U.S. Geological Survey (USGS); and
- Site-specific background data and plans provided by the Vertex and their consulting Team, including topographic base mapping, site development plans, and other data pertinent to the assessment.

Following the collection and review of existing data and background information, ECOS conducted a field assessment of the Site on March 25, 2025. The purpose of the assessment was to compare background information with present-day conditions and determine the presence/absence and approximate extent of the following features:

- Topography / Natural Landforms;
- Vegetation Communities;
- Riparian Areas;

- Wetlands and waters resources (i.e., lakes, ponds, streams) regulated under the Federal Clean Water Act (CWA) and State of Colorado Water Quality Control Act; and
- Wildlife habitat, including:
  - Federal listed Threatened and endangered Species habitat regulated under the Endangered Species Act;
  - Migratory birds and raptors regulated under the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BEGPA); and other
  - Significant habitat.

During the office and on-site assessment ECOS mapped the above features (if present) using a Global Positioning System (GPS) and Google Earth aerial imagery. ECOS utilized GPS in the field to document the boundaries/locations of significant natural features as deemed necessary. Representative photographs were taken to assist in describing and documenting Site conditions (Appendix C)

3.0 ENVIRONMENTAL SETTING

The Site is located in the Southwestern Tablelands Level 3 Ecological Region (26) which is primarily comprised of sub-humid grassland and semiarid rangeland (Chapman et al, 2006). More specifically, the Site is located within the Pine-Oak Woodlands Level 4 Ecological Sub-region (26i) which is a dissected plain with dense oakbrush and deciduous oak woodlands combined with ponderosa pine woodlands. The southern portion of the Ecoregion is known locally as the Black Forest. Although woodlands dominate, the region is a mosaic of woodlands and grasslands. It is somewhat more dissected than the surrounding Foothill Grasslands (26j) ecoregion. Soils are formed from weathered sandstone and shale with some outwash on uplands. Land use is woodland, wildlife habitat, rural residential, and some rangeland. Areas of the region are rapidly urbanizing. Refer to Figure 3, Ecoregion Map.

The Site is not located within a Colorado Natural Heritage Program (CNHP) Potential Conservation Area (PCA), nor has it been identified as Critical Wetland or Riparian Area according to the CNHP database (CNHP, 2025), or the Survey of Critical Wetlands and Riparian Areas in El Paso County (CNHP, 2001). The Black Forest is unique in that it is the only place in Colorado where montane forest grows east of the Front Range and foothills. On vegetation maps, satellite images, and even from the summit of Pikes Peak, this extension of forest into the plains is very conspicuous. The flora and structure of this forest resembles that of the Black Hills in South Dakota and contains many interesting disjunct species. Many of the plant species here are considered "woodland prairie relicts" which were once more common in Colorado and have diminished here due to climatic change. The Black Forest offers these species as refuge in which they can persist, widely disjunct from other populations of the same species. Long-term separation of populations of this sort can lead to allopatric speciation (the formation of new species via geographic isolation from parent populations), and for this and other reasons these disjunct populations are interesting and worthy

of conservation attention. The Richardson alum-root (Heucheria richardsonii), prairie goldenrod (Unamia alba), birdfoot violet (Viola pedatifida), and Selkirk's violet (V. selkirkii) found in this ecoregion are all common elsewhere but rare in Colorado. Although no occurrences are present in this site, the gay feather (Liatris ligulistylis) is another species that is found in the Black Forest that falls into this category. It prefers open meadows in the Black Forest and appears to have diminished greatly there due to fire suppression and ecosystem transformation.

The Site is located in the headwaters of the Bald Mountain (HUC 14) watershed, within the larger Carpenter Creek (HUC 12), East Plum Creek (HUC 10) and the Upper South Platte River (HUC 8) watersheds.

No Critical Habitat of T&E Species, Wildlife Refuges or Hatcheries are present in the vicinity of the Site according to the USFWS IPaC Trust Resources Report in Appendix A (USFWS, 2025a).

4.0 FINDINGS, IMPACTS & MITIGATION

4.1 Topography / Natural Landform

The topography/natural landform of the Site is gently rolling/hilly, trending from west to east toward I-25 with elevations ranging roughly between 7,368 and 7,312 feet AMSL. One (1) grass-lined ephemeral channel (Channel 1) drains from west to east through the southern portion of the Site. One short and one long grass-lined ephemeral swale (Swales 1 and 2) are confluent with Channel 1 at the eastern Site boundary where combined they enter a 24” culvert and flow under I-25 into an unnamed, headwater tributary to Carpenter Creek. The tributary downstream of the Site is a relatively permanent, intermittent channel with abutting wetlands.

4.2 Soils

ECOS utilized the USDA, Natural Resource Conservation Service (NRCS) Web Soil Survey (USDA, NRCS, 202) to determine the types of soils present and if hydric soils are present within the Site, as this data assists in informing the presence/absence of potential wetland habitat regulated under the Clean Water Act (CWA). Please refer to the Custom Soil Report for the Site in Appendix B.

Pursuant to the Custom Soil Resource Report, 83% of the Site is comprised of 69 – Peyton-Pring Complex sandy loam-gravelly sandy loams, 8 to 15 percent slopes. Seventeen (17%) of the Site along the western edge are comprised of 92 -Tomah-Crowfoot loamy sands, 3 to 8 percent slopes. These soils are well drained and the depth to water table is more than 80 inches. The frequency of flooding and ponding is none.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS, 1994) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Under natural conditions, these soils are either saturated or

inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in *Field Indicators of Hydric Soils in the United States* (USDA, NRCS, 2010). On a scale of 1-100% the Peyton-Pring and Tomah-Crowfoot soils have a rating of 1-5%. Neither of these soil types is rated as hydric.

4.3 Vegetation

4.3.1 Office Assessment Findings

NRCS Soil Survey Data associates soil types with ecological site descriptions of plant communities within Major Land Resources Areas (MLRA's). The Peyton-Pring soils on the Site are mostly closely associated with the Sandy Divide MLRA. NRCS indicates that the plant community reference condition is about 85-90% grasses, 10-15% forbs, and 5-10% shrubs. Mid and tall grasses dominate giving this site a rolling, continuous grassland cover. Tall grasses are scattered throughout the community. Mountain muhly, needle and thread, prairie sandreed, big bluestem, Indiangrass, little bluestem, tall and midgrass dominate the plant community and produce about 55% of the climax vegetation. There are no significant shrubs on this site. Plants such as blue grama, sun sedge, prairie junegrass, western wheatgrass, thickspike wheatgrass, hairy grama, bottlebrush squirreltail, sand dropseed, rose pussytoes, narrowleaf penstemon, Norwegian cinquefoil and woods rose occur in scattered amounts throughout the climax plant community. Minor forbs such as skyrocket gilia, wormwood, Nutall larkspur, Drummond milkvetch, sand lily, sand lupine, silvery lupine, and grassy death camas are also present in the plant community.

CDOT I-25 South Gap Biological Assessment and Wildlife Movement Technical Memorandum documents general habitat types that provide suitable food, water, cover and sanctuary for many different species of wildlife - habitat that were once contiguous before the construction of I-25. These habitat types are documented along the 21-mile swath of I-25 and adjacent lands (study area) between Mile Post (MP) 160 near Monument and MP181 near Castlerock) through Douglas and El Paso Counties known as the Gap. The Buc-ee's Site was included in this analysis as it is adjacent to the Gap, on the west side of I-25 between MP 163.15 and 163.45 (0.3-mile or 1.4% of the length of the west side of the Gap) just south of the El Paso - Douglas County line at Palmer Divide Road.

The major habitat types reported by CDOT include:

- Upland forest habitat is generally present in areas with more topographic relief, particularly near the town of Larkspur and on Monument Hill. Dominant trees include ponderosa pine (Pinus ponderosa) and Gambel oak (Quercus gambelii). Understory plants include smooth brome (Bromus inermis),

witchgrass (Panicum capillare), and crested wheatgrass (Agropyron cristatum).

- Upland grassland habitat is present in areas used for grazing as well as in open space and unmown areas within or near the ROW. The areas have most likely been seeded in the past with desirable pasture grasses. In less disturbed areas, and in areas of the ROW where it appears that plants have been reseeded, native grasses such as blue grama (Bouteloua gracilis), western wheatgrass (Pascopyrum smithii), sideoats grama (Bouteloua curtipendula), and little bluestem are common. However, most upland grassland habitat is dominated by smooth brome, crested wheatgrass, and western wheatgrass. Other herbaceous species such as kochia (Bassia scoparia), common mullein (Verbascum thapsus), knapweed (Centaurea spp.), horseweed (Conyza canadensis), ragweed (Ambrosia spp.), common vervain (Verbena bracteata), prickly lettuce (Lactuca serriola), and common sunflower (Helianthus annuus) are common throughout upland grassland habitat (CDOT, 2018).

CDOT does not show that the following habitats are present on the Site:

- Riparian habitat, including the ephemeral portion of the unnamed tributary to Carpenter Creek that extends into the Site; and
- Wet meadow habitat.

Colorado Natural Heritage Center (CNHP) Colorado Wetland Information Center – Wetlands Mapper (CNHP, 2025) includes the option for illustrating potential riparian habitat based on high altitude aerial photo interpretation mapping produced by Colorado Parks and Wildlife (CPW). CNHP Riparian Area mapping indicates that there are no riparian areas within the Site. Refer to Figure 5, Riparian Areas Map.

4.3.2 Field Assessment Findings

ECOS' onsite assessment is generally consistent with the NRCS and CDOT findings. The following are plant communities and homogeneous species composition actually found on Site:

4.3.2.1 Ponderosa Pine Forest

Approximately 8.9 acres (35%) of the 24.77-acre Site consists of multi-aged, mono-culture of ponderosa pine (*Pinus ponderosa*) forest with an understory mixture of mid-grass species and pine needle duff. No understory shrubs were observed. (See Midgrass prairie section below for species composition). Aerial imagery dating back to 1937 indicates that the site was treeless and used for livestock grazing and hay production. Ponderosa pine succession started in the 1980’s and has become more dense as a result of fire suppression. (See Appendix F)

4.3.2.2 Midgrass Prairie

Approximately 16.0 acres (65%) of the 24.77-acre site consists of midgrass prairie. Plant species composition is somewhat consistent with the USDA reference condition (noted above),but is dominated by a mono-culture of mountain brome (*Bromus montanus*) with scattered blue grama (*Bouteloua gracilis*), prairie junegrass (*Koeleria macrantha*), fringed sage (*Artemisia frigida*), and Wood's rose shrubs (*Rosa woodsii*). The dominance of mountain brome is likely due to agricultural practices to maximize hay forage for cattle. Grasslands are fairly low in diversity, but are in very good condition with only a few, non-problematic occurrences of knapweed (*Centaurea spp.*) and common mullein (*Verbascum Thapsus*), both listed noxious weeds.

4.3.2.3 Riparian Areas

During the field assessment ECOS found that the CNHP data is accurate. The Site and particularly Channel 1 contains only a few individual non-native crack willow (*Salix fragilis*). However, soil moisture levels within the channel bed and banks support only upland midgrass prairie and ponderosa pine species. Robust wetland herbs, shrubs, or trees that are indicative of wetland and riparian areas are absent.

4.3.2.4 Wetlands

No wetlands were found on the Site. Refer to Section 4.4 Wetland Habitat and Waters for more detail.

Figure 4

Vegetation Community Map

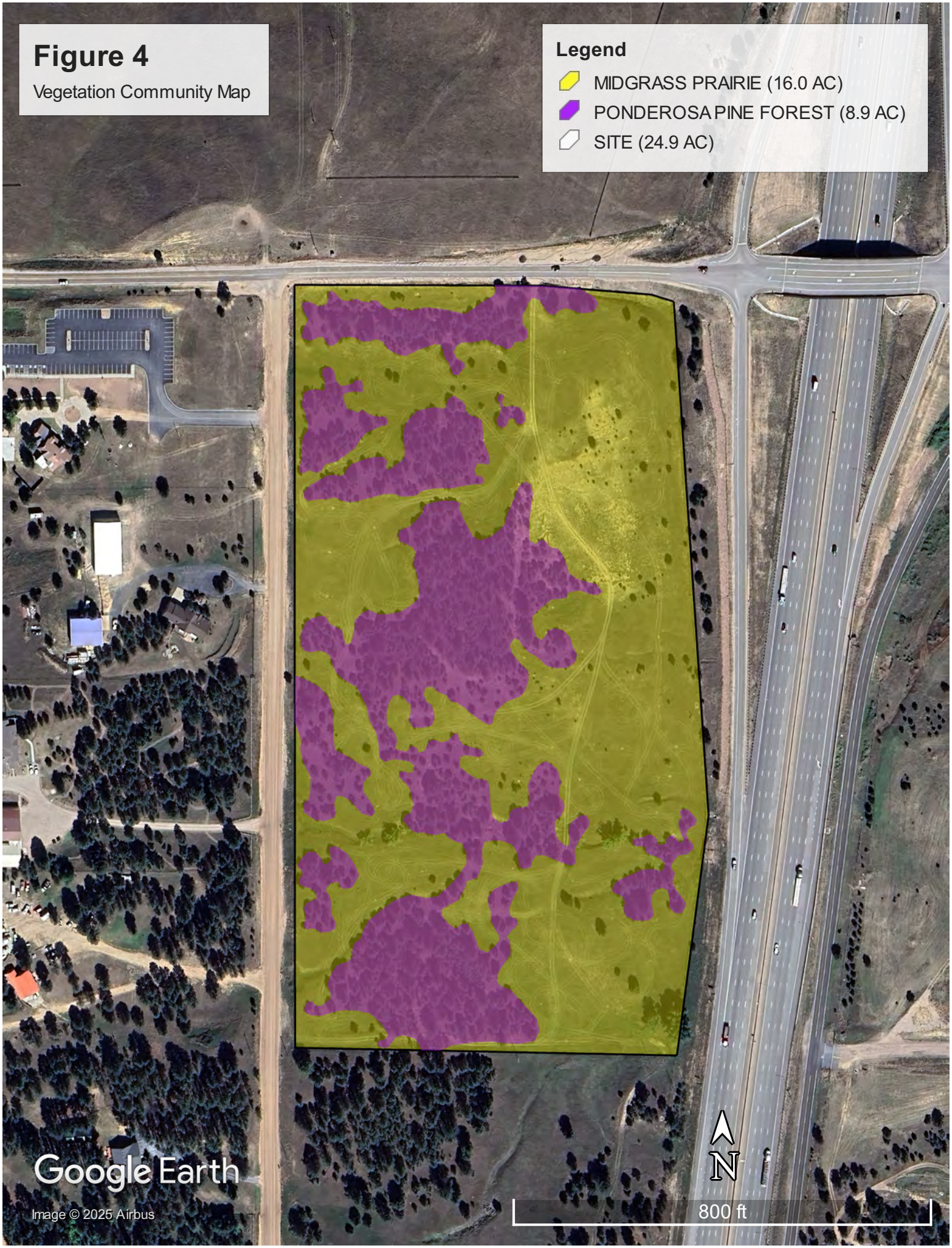
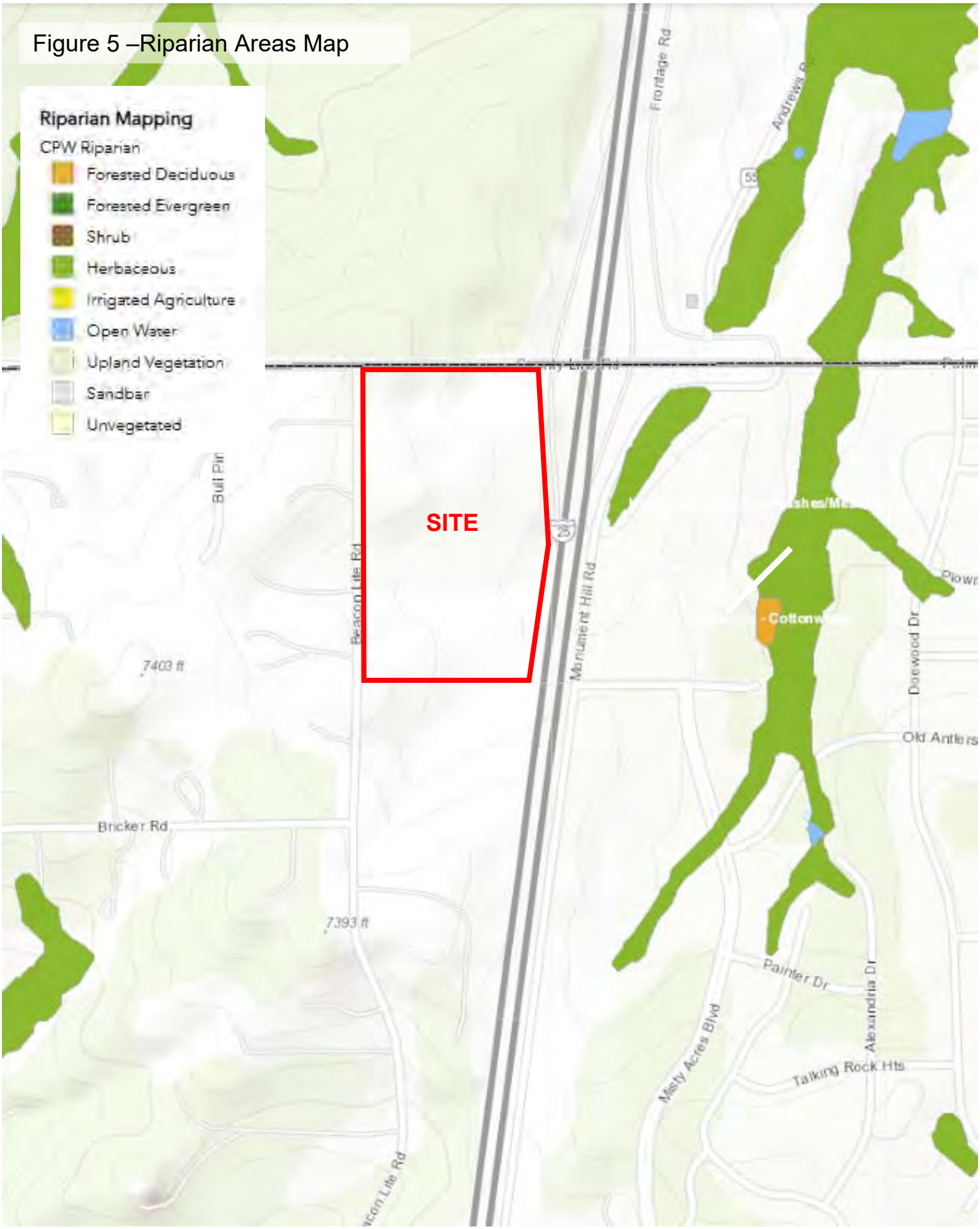


Figure 4
Vegetation Community Map
Legend
MIDGRASS PRAIRIE (16.0 AC)
PONDEROSA PINE FOREST (8.9 AC)
SITE (24.9 AC)
Google Earth
Image © 2025 Airbus
N
800 ft

Figure 5

Riparian Areas Map

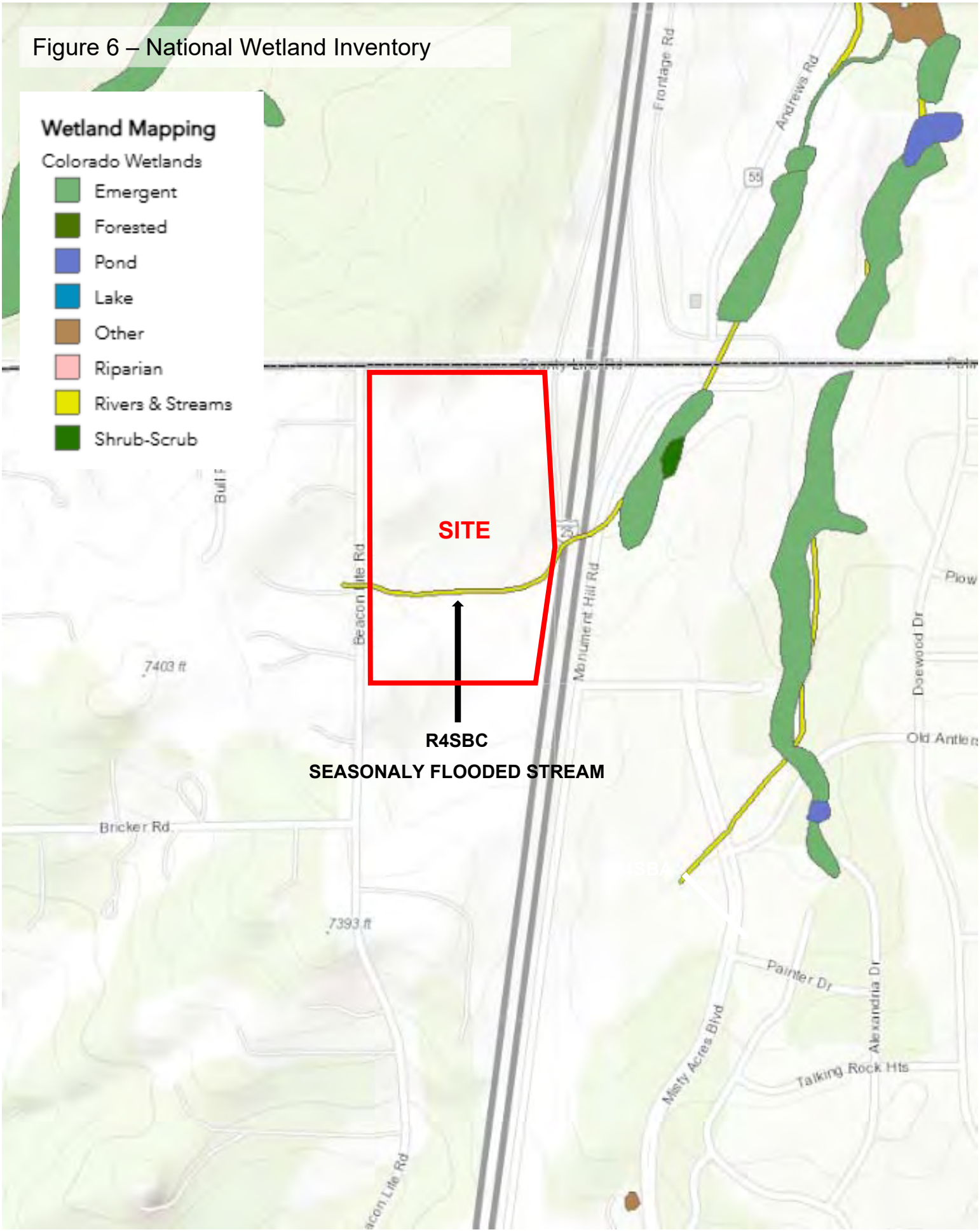
Figure 5 –Riparian Areas Map



Source: Colorado Natural Heritage Program (CNHP) Wetland Mapper

Figure 6
National Wetland Inventory Map

Figure 6 – National Wetland Inventory



Source: CNHP Wetland Mapper / USFWS National Wetland Inventory (NWI)

4.4 Wetland Habitat and Waters

4.4.1 Methodology

ECOS utilized USGS 7.5-minute topographic mapping, historic and current Google Earth aerial photography, and the CNHP National Wetland Inventory (NWI) Wetlands Mapper (CNHP, 2025) to preliminarily identify potential wetland habitat and Waters of the U.S. (WOTUS) and Waters of the State of Colorado (WOSOC) on the Site. Refer to Figure 6, National Wetland Inventory Map.

The mapping data above was proofed during the field assessment to determine the present or absence and reach of potentially jurisdictional WOTUS and WOSOC. Refer to Figure 7, Aquatic Resources Map.

If present, the USACE wetland delineation methodology was employed to document the three field indicators (parameters) of wetland habitat (i.e., wetland hydrology, hydric soils and a predominance of hydrophytic vegetation) as explained in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987) and supplemented by the *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys and Coast Region* (USACE, 2008). Indicators of an Ordinary High Water Mark (OHWM), if present, were assessed using the National Ordinary High Water Mark Field Delineation Manual for Rivers and Streams.

4.4.2 Office Assessment Findings

USGS Mapping: As referenced in Section 4.1 Topography / Natural Landform, the Site slopes and drains east toward I-25. USGS shows one channel, symbolized as an intermittent stream, running west to east across the southern portion of the Site down to an unnamed tributary to Carpenter Creek. The channel on the Site is herein referred to as Channel 1. Refer to Figure 1, USGS Site Location Map.

Google Earth aerial imagery review: ECOS reviewed the Site using the time-lapse function in Google Earth (GE) to get a look back in time. In 1937, prior to the existence of I-25, three multi-fork channels and tributary swales existed on the Site running through the north, south-central, and southern portions of the Site, all draining to wetlands abutting an unnamed tributary to Carpenter Creek. Channel 1 is the main tributary to the unnamed tributary. In 1955 (about the time of the construction of I-25), all three of the channels on the Site collect in a swale along the west edge of I-25 that were then piped under I-25 to the downstream unnamed tributary to Carpenter Creek. By 1993 the northern and southern-most channels and tributary swales are notably absent, indicating they had been manipulated, dried up, and converted to pasture land. Channel 1, the south-central channel, and two upland swales tributary to Channel 1 (i.e., Swales 1 and 2) remain as of the date of this report. Refer to Figure 2, Existing Conditions Aerial Photo and Figure 7, Aquatic Resources Map and Appendix F, Historic Aerial Imagery.

CNHP National Wetland Inventory (NWI) Wetland Mapper: The NWI Wetland Mapper provides high altitude, planning-scale identification of potential waters and wetlands (WOTUS and WOSOC), and indicates that:

- Channel 1 is a Riverine Seasonally Flooded Stream (R4SBC); and
- No wetlands are present on the Site.

Refer to Figure 6, National Wetland Inventory Map.

USDA NRCS Web Soil Survey: The custom soil report generated for the Site via the NRCS Web Soil Survey (USDA NRCS, 2025) does not rate any of the soils present on the Site as hydric (wetland) soil.

State of Colorado CDPHE WQCD House Bill 24-1379 (HB24-1379): Definitions under HB24-2379 exclude certain types of State Waters.

"Not withstanding the definition of "state waters" in section 25-8-103 (19), an authorization is not required for the discharge of dredged or fill material into the following types of waters, and such a discharge is not otherwise prohibited or regulated under this section:

(IX) Swales and erosional features, such as gullies, small washes, and rills, that do not contain wetlands or an ordinary high watermark (OHWM);

Federal and State Definitions of an Ordinary high watermark*" means that line on the shore established by the fluctuations of water and indicated by physical characteristics, such as:*

(i) a clear, natural line impressed on the bank;
(ii) shelving;
(iii) changes in the character of soil;
(iv) destruction of terrestrial vegetation;
(v) the presence of litter and debris; or
(vi) other appropriate means that consider the characteristics of the surrounding area.

4.4.3 Field Assessment Findings

The field assessment followed the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory, 1987), *Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys and Coast Region* (USACE, 2008), and the *Ordinary High Water Mark Identification Regulatory Guidance Letter* (USACE, 2005) for federal WOTUS; and Colorado House Bill 24-1379 (HB 24-1379) guidance for Waters of the State of Colorado (WOSC).

The field assessment revealed that Channel 1 and tributary Swales **do not** exhibit the following characteristics:

- a clear, natural line impressed on the bank;
- shelving;
- changes in the character of soil;
- destruction of terrestrial vegetation; or
- the presence of litter and debris; or

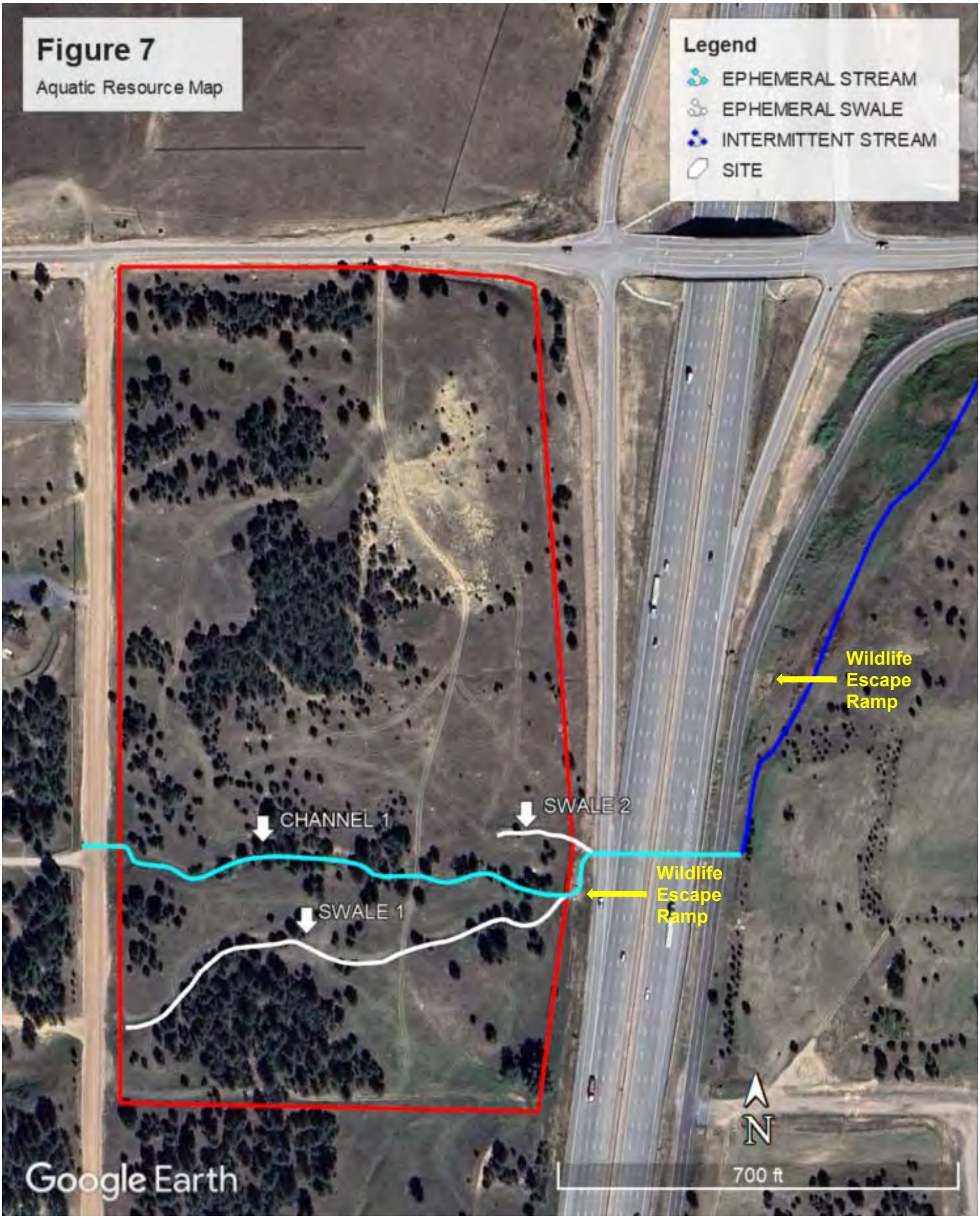
Channel 1 and tributary Swales **do** exhibit the following characteristics:

- a completely grass-lined bed and bank similar to the surrounding area;
- is an ephemeral stream that only flows during and immediately after discrete precipitation events;
- does not meet the Relatively Permanent Standard (RPS) established by the USACE; but
- a surface connection to an intermittent and perennial downstream tributaries via a culvert under I-25.

Based on the characteristic outline above and Federal and State of Colorado rules, definitions, and field guides pertaining to WOTUS and WOSOC as outlined in HB 24-1379, Channel 1 and tributary swales are not federally or state jurisdictional. No wetlands are present on the Site, including within Channel 1 or its tributary swales.

Refer to Figure 7, Aquatic Resources Map below.

FIGURE 7
Aquatic Resources Map



Source: Google Earth Aerial Imagery, 9/17/2024. Ecosystem Services, LLC Field Assessment, 3/24/2025

4.5 Common Wildlife

The purpose of this section is to document potential presence and usage of the site for common wildlife and to ensure that proposed development is reviewed with consideration of the impacts to their habitat.

4.5.1 Office Assessment Findings

4.5.1.1 Landscape Context

The Site is situated at an existing interchange along the I-25 corridor, a high traffic area. Beacon Lite Road, Palmer Divide Road, and I-25 directly abut the Site on three sides. Portions of the existing I-25 corridor are currently lit from MP 161 to 164.3, including the portion adjacent to the Site (MP 163.15 to MP 163.45). The three adjacent roads, and their associated traffic noise and light pollution isolate it from the surrounding landscape and impair its functional value for a broad spectrum of wildlife. Within a regional or landscape context, comparing Douglas County and El Paso County open space distribution and values and CPW wildlife usage patterns against this Site with a high CNHP LDI, it is ECOS opinion that the Site is impaired and has relatively low habitat value except for transient wildlife escaping I-25 as described further below.

Douglas County Open Space, bordering the Site to the North, has fee title or conservations easements on the Greenland, Eagle Mountain, and Spruce Meadows Open Space and has proactively planned for the conservation of a vast amount of open space on the west and east sides of I-25. These planned conservation areas, provide highly suitable, functional, and contiguous open space for wildlife, especially deer and elk (DCOS, 2011) as illustrated on CPW Wildlife Species Mapping (CPW, 2025). These areas have been mapped by Douglas County as the Greenland Habitat Conservation Area, including overland connections and wildlife migration corridors along Carpenter, Cook, and Stone Canyon Creeks. No migrations corridors have been mapped on the Site. The open space immediately north of the Site across Palmer Divide Road, containing open grassland and a perennial creek leading to a Dogleg Wildlife Underpass under I-25 is rated as having moderate and high habitat value, respectively (DCOS, 2012). Refer to Figure 9, Douglas County Wildlife Resources.

Given a lack of previous conservation planning in El Paso County, the moderate to high habitat values present in Douglas County (north of the Site) cannot be extrapolated to open land located south of Palmer Divide Road, nor can the Douglas County conservation goals and directives supplant those in El Paso County's master planning documents described below.

The El Paso County Parks Master Plan includes an Open Space Composite Analysis and a rating of potential open space values such as ecology and wildlife habitat, wildfire hazard, and surface water to name a few. The El Paso County Open Space Composite Analysis shows that the Site and immediate vicinity around the Site is rated as having Lower Attribute Value (EPCP, 2013). Refer to Figure 10, El Paso Open Space Composite Analysis.

CNHP collaborated with the Nature Conservancy to develop a prototype analysis of the status of Colorado's biodiversity, using a scorecard approach. The scorecard evaluated the status of ecological systems, animals, and rare plants under three broad categories: biodiversity status (size, quality and landscape integrity); threat status (both current and potential future impacts); and protection status. The Landscape Disturbance Index (LDI) developed as part of this project to model ecological integrity against the negative effect of anthropogenic disturbance on the quality of habitats for species viability and conservation efforts. The model tests both distance-based and disturbance-density models in relation to ecological indicators. The model included roads, residential and commercial development, agricultural land use, mining, energy development infrastructure, and transmission structures as disturbance sources (CNHP, 2025c).

The LDI for the Site and surrounding lands in El Paso County, particularly the I-25 corridor, is rated as high (CNHP, 2025b). The high LDI rating that overlaps the Site means it is already compromised or impaired and not a candidate or priority for conservation. Refer to Figure 11, CNHP Landscape Disturbance Index Map. This high LDI is due to low biodiversity; high threat status due to the presence of roads, a major highway (I-25), residential development and other current/future anthropogenic impacts; and the lack of protection (e.g., conservation/Open Space).

4.5.1.2 Common Wildlife

Colorado Parks and Wildlife (CPW) Wildlife Mapping shows the following wildlife that potentially use the Site (CPW, 2025a):

Amphibians:

- None

Rodent Overall Range:

- Abert's squirrel
- White-tailed jackrabbit
- Preble's meadow jumping mouse (PMJM)

Bat Overall Range:

- Big brown bat
- Fringed myotis
- Hoary bat
- Little brown bat
- Long-eared myotis
- Long-legged myotis
- Red bat
- Silver-haired bat
- Townsends big-eared bat
- Wester small-footed myotis

Ungulates:

- Elk overall range and highway crossings (migration corridors are located to the north in Douglas County, and summer and winter range located to the west of the Site)
- Mule deer overall range, highway crossings, concentration area, summer range and resident population on the Site.
- White-tailed deer overall range

Refer to Appendix D – Elk and Mule Deer Habitat Maps and Appendix E – CPW High Priority Habitat

Cats:

- Mountain lion overall range and human conflict area

Birds:

- Wild turkey overall and winter range

Reptile Overall Range:

- Bullsnake
- Hernande's short-horned lizard
- Milksnake
- Plains garternsnake
- Prairie lizard
- Plateau fence lizard
- Prairie rattlesnake
- Western rattlesnake
- Six-lined racerunner
- Smooth greensnake
- Terrestrial garternsnake

CPW High Priority Habitat (HPH) Web Mapping and Species of Greatest Conservation Need (SGCN) in the Colorado State Wildlife Action Plan (SWAP) show sensitive habitat and wildlife experiencing population declines, habitat threats, or ecological vulnerabilities. CPW does not show or list any HPH or SGCN on the Site for those species listed for El Paso County, including elk, deer, pronghorn, bats, American bittern, bald eagle, dabbling ducks, least tern, Lewis's woodpecker, long-billed curlew, sandhill crane, short-eared owl, Preble's meadow jumping mouse, Arkansas darter, northern redbelly dace, northern leopard frog, leopard frog, or red-side garter snake (CPW, 2015 and 2025b).

CPW Migration Corridor Study developed for the purpose of collecting migration patterns of large ungulates (i.e., hoofed wildlife like mule deer, elk, bighorn sheep, and pronghorn) to inform development planning and conservation does not have GPS wildlife tracking data for the eastern part of Colorado. CPW reconfirms CDOT studies that state ungulates (as with other large and small fauna) tend to use riparian areas (stream corridors) where cover and water are present when moving between seasonal summer and winter ranges (CPW, 2020 and 2024). No riparian corridors fitting this definition exist on the Site.

Colorado Department of Transportation I-25 South Gap Wildlife Movement Technical Memorandum, Programmatic Biological Assessment (PBA), Wildlife Study - Year 3 Progress Report (CDOT Studies) documents wildlife movement and patterns for the 3 years following construction, along the 21-mile swath of I-25 and adjacent lands between Mile Post (MP) 160 near Monument and MP181 near Castlerock) through Douglas and El Paso Counties known as the Gap. The Buc-ee's Site was included in this analysis as it is adjacent to the Gap, on the west side of I-25 between MP 163.15 and 163.45 (0.30-mile or 1.4% of the length of the west side of the Gap) just south of the El Paso - Douglas County line at Palmer Divide Road. The CDOT Studies that comprise the Year 3 Progress Report provide wildlife movement, migration corridor, overland connection data, but no specific global position system (GPS) or telemetry tracking data in El Paso County to determine movement patterns on or through the Site with any certainty (CDOT, 2018 and 2025a).

CDOT Studies do not identify High Priority Habitat (HPH) in El Paso County that has significant ecological or conservation value, but do generally report that ungulates and other large mammals are known to occur throughout the Gap, including Rocky Mountain bighorn sheep (Ovis canadensis), Rocky Mountain elk (Cervus canadensis), pronghorn (Antilocapra americana), mule deer (Odocoileus hemionus), white-tailed deer (Odocoileus virginianus), black bears (Ursus americanus), and mountain lions (Puma concolor). Moose (Alces alces) have been known to venture into the I-25 corridor although they do not typically reside in this area. Other mammals known to occur throughout the area include coyotes (Canis latrans), red foxes (Vulpes vulpes), raccoons (Procyon lotor), North American beavers (Castor canadensis), and the Preble's meadow jumping mouse (Zapus hudsonius preblei) (CDOT, 2018).

Most of the large mammal species known to occur within the corridor are believed to be local populations. Wildlife movements occur throughout the corridor and across I-25. Factors that drive wildlife to cross I-25 are likely diversity in habitats (i.e., other sources of sanctuary, food, and water) and for mating and/or rearing purposes (CDOT, 2018).

Most species that reside along the corridor typically concentrate their movements along drainage systems and/or forested habitats. These areas typically provide wildlife with food and/or water, as well as better cover and sanctuary from predators. These species typically are more active during twilight (i.e., dawn and dusk) and nighttime hours making it difficult for drivers, traveling at high speeds, to see wildlife on or near the roadway (CDOT, 2018).

Smaller concrete box culverts (i.e., CBCs) within the corridor may provide passage for bears and medium-to-small sized mammals (e.g., coyotes, rabbits, mice). Although bears are large mammals, they are known to use smaller structures for passage, as they are accustomed to using small, tight spaces during hibernation. Without an effective system that combines the use of functional crossing structures with wildlife fencing, these CBCs, and crossing structures in general, will not be as effective as they could be with the use of wildlife fencing (CDOT, 2018).

CDOT has collected valuable data on Wildlife Vehicle Collision (WVC) and monitoring cameras of wildlife underpasses and overpasses that more specifically document species that may utilize the Site on a transient basis (CDOT, 2018).

Wildlife underpass cameras monitored by CDOT after completion of the Gap Project detected large fauna, including mule deer, elk, moose, white-tailed deer, black bear, bobcat, coyote, and fox; Small fauna included badger, beaver, porcupine, racoon, cottontail rabbit, striped skunk, ground squirrel, squirrel (fox), pocket gopher, mink, weasel, vole, shrew species, woodrat, deer mouse, other mouse species, turkey, mallard ducks, bull frog, bull snake, and lizard species. The following specific wildlife camera monitoring data document what species are present and where:

- Between MP 164.1 and 167.7 near the Dog-leg Culvert Underpass (MP 164.1) fewer numbers of the following species were detected north of the Site within Douglas County Open Space: Deer (22); Elk (13); Coyote (2); Racoon (3); and Unknown species (2).
- At Mile Post (MP) 163.1, a camera closest to the Site the following species of wildlife were detected: Deer (56); Elk (1); Coyote (20); and Racoon (2).
- Between MP 162.6 and 160.6 near the Monument Hill Underpass (MP 162.5): greater numbers of the following species were reported to the south of the Site: Deer (108); Elk (1); Bear (3); Coyote (2); Racoon (46); Rabbit (1); and Squirrel (1) (CDOT, 2018).

The camera monitoring data at MP 163.1 nearest to the Site indicates that mule deer and coyote are the primary large fauna species using the Site with occasional visitation by elk and racoon. The north-south wildlife dispersal and travel patterns in the space between the Dog-leg and Monument Hill Underpasses are unknown, but the data indicates that east to west wildlife movement under I-25 decreases in a northerly direction at the Dog-leg Underpass and increases in a southerly direction where a major riparian travel corridor is present at the Monument Hill Underpass (CDOT, 2018).

CDOT’s WVC pre-mitigation data shows that one of the highest incidents of WVC's occurred at MP 162 prior to the GAP Project (CPW, 2020). To reduce WVCs and roadkill, CDOT successfully implemented a number of wildlife impact minimization and mitigation measures, including the installation of wildlife underpasses and overpasses (crossings), wildlife exclusion fences, escape ramps/jump-outs, and deer guards at strategic locations to facilitate and funnel the safe passage of wildlife under and/or over I-25.

The following describe the mitigation measures implemented by CDOT that have relevance to the proposed Project Site:

Wildlife Underpasses and Overpasses

CDOT 3-year monitoring results indicate a renewed ability for wildlife both large and small to safely traverse I-25. Additionally, the restoration of safe wildlife movements across the interstate corresponded with a 78% decrease in wildlife WVCs. Mule deer use of the crossing structures varied by location, but the total number of successful mule deer passages increased at three of the five new crossing structures. Success rates for mule deer crossing in 2023 was 86% or greater at each crossing location, for a combined success rate of 92% (CDOT, 2025a).

The following underpasses and overpasses located immediately north and south of the Site at riparian travel corridors contribute to the success of CDOT's mitigation efforts and relieve wildlife crossing pressure at the proposed Project Site (located between MP 163.15 and 163.45) where pre- and post-construction WVC crash counts went from 1.5 to 0 (CDOT, 2025a):

- MP 162.5 (Monument Hill Underpass)
- MP 164.1 (Dog-leg Culvert Underpass);

Wildlife Exclusion Fences

In addition to wildlife underpasses and overpasses, CDOT has installed 8-foot-high wildlife exclusion fencing on both the east and west sides of I-25 extending from the southern end of the I-25 South Gap Project near MP 161 to approximately 1 mile north of MP 174. This type of fencing serves to guide/funnel wildlife to stream corridors, large culverts, wildlife underpasses and overpasses built elsewhere along I-25 to minimize WVC's, mitigate habitat fragmentation, and facilitate east-west migration of wildlife, especially large game moving between their summer and winter, concentration, and birthing areas. The CDOT Studies indicate that WVC's and mortalities have been mitigated but not completely eliminated for wildlife that get trapped on I-25 between the wildlife fencing (CDOT, 2025). Please refer to Figure 8, CDOT Wildlife Conflict Mitigation Areas for locations of existing wildlife underpasses, culverts, and fences relative to the Site.

Wildlife Friendly Fences

Wildlife friendly fencing, as discussed in Fencing with Wildlife in Mind (CWP, 2021) is recommended where applicable, to inhibit cattle from entering wildlife underpasses but allow wildlife to access underpasses and overpasses to travel and migrate within their range. Wildlife friendly fences consist of the following elements:

- Fencing wire placed on the side of the fence posts where the domestic animals are located;
- Smooth wire or rounded rail for the top, smooth wire on the bottom;
- Height of top rail or wire should be 42" or less;
- At least 12" between the top two wires;
- At least 16" between the bottom wire or rail and the ground;
- Posts at minimum 16â€™ intervals;

- Gates, drop-downs, removable fence sections or other passages where animals concentrate and cross;
- Using a rail, high-visibility wire, flagging or other visual markers for the top (CPW, 2021).

Escape Ramps (Jump-outs)

The CDOT PBA recommends wildlife escape ramps or jump-outs approximately every 0.25 mile within the CDOT right of way (ROW) where wildlife fencing is used (CDOT, 2018). An interview with CDOT indicates 3 jump-outs per mile is a general rule of thumb based on site characteristics, topography, presence or absence of riparian areas, and adjacent land use (CDOT, 2025b).

Deer Guards

Deer guards (similar to cattle guards) have also been installed by CDOT in many locations along I-25 where there are unavoidable gaps in the wildlife exclusion fence. Deer guards are intended to discourage wildlife from entering the non-habitat side of the wildlife fence into interstate and/or interstate frontage roads. These gaps also include emergency access points, on-ramps and other roads where applicable.

4.5.2 Field Assessment Findings

4.5.2.1 Common Wildlife Habitat and Impact Mitigation

Two common vegetation/habitat types occur within the Site: ponderosa pine forest and midgrass prairie. Both of these habitats are homogenous and lacking in plant diversity. The Site does not support perennial aquatic, wetland or riparian habitat.

The Ponderosa pine forest provides cover for migratory birds, small mammals, and larger mammals that may occasionally utilize or travel through the site. Seasonal, transient birds such as Magpie, Stellar's jay, mountain chickadees, and flickers observed, but no nests were found in forested areas during the field assessment. No cracks, crevices, caves, or tree-roosting habitat were observed that may provide habitat for bats. No raptors or raptor nests were observed on the Site or within the vicinity of the Site. Shrubs that provide food and cover for wildlife are absent from the forested understory.

Midgrass prairie on the Site provides good habitat for small rodents such as voles and mice, and ground nesting birds that may seasonally nest and feed on seeds and insects. Grasslands provides grazing and foraging habitat for large wildlife such as deer and elk as well as hunting habitat for predators such as coyote, fox, mountain lion, and numerous reptiles. However, only small burrows for rodents such as vole and ground squirrel were observed. No large burrows were observed that may be utilized by badgers, fox or coyote. No bear or bear scat was observed. Elk and/or deer scat was observed periodically in the drainage swales, but no persistent or worn game trails were observed.

Aquatic, wetland, and riparian is not present on the Site that provide a critical source of water, food, and travel corridors needed by all types of wildlife,

including requisite habitat for amphibians, beaver, muskrat, mink, etc. The drainages/swales on site are dry and ephemeral.

Beacon Lite Road, Palmer Divide Road, and I-25 are directly abutting the Site on three sides. These roads isolate it from the surrounding landscape and impair its functional value for a broad spectrum of wildlife (as noted above). No State-listed species of special concern (i.e., significant wildlife) have been documented to exist or were observed during the field assessment.

In the absence of CPW wildlife tracking data or long-term surveys for ungulates, it is ECOS opinion that the Site supports few resident wildlife because of existing adjacent rural residential development, chronic traffic, noise, and light (overhead and headlights) generated from I-25 and adjacent development that disturb and interrupt both daytime and nocturnal behavior; and that the Site is primarily used by transient wildlife moving through the Site in pursuit of more suitable open space and habitat to the north or south (as documented by CPW and CDOT below).

4.5.2.2 Vegetation, Site Reclamation, and Invasive Species Control

The nativity of the Site and existing ponderosa pine forest and grassland plant community have inherent value as does every site before it is developed into a home, park, or commercial area. However, the Site is lacking in both animal and plant diversity. Past ground clearance and disturbance activities have rendered a homogeneous vegetation community consisting of a monoculture of ponderosa pine, smooth brome, blue grama and a few ruderal weeds.

While the habitat on the Site is suitable for some common wildlife species, the plant and animal community are not particularly significant. The Site does not support threatened, endangered, or rare species of special concern and therefore it is not considered significant relative to other habitat types such as streams, wetlands, riparian, or pristine areas of the Black Forest. Elk, deer, moose, bear, mountain lion, and many other game and non-game species managed by CPW are important but are common wildlife that are not imperiled and can be hunted and sometimes exterminated without concern for extinction or significance.

The Town Community Master Plan shows the Buc-ee's Site has been planned for retail/commercial use due to its location and ideal access to existing major roads and the interstate highway and its adjacency to existing residential land. Retail development, like residential development is inherently not sensitive to the surrounding landscape and results in complete conversion or alteration of natural vegetation within a site. The retail site development requirements of a Buc-ee's Travel Center is no different and will require that the entire site must be cleared for grading and earthwork operations and therefore, no existing vegetation will be preserved.

The timing, storage logistics, cost, and likelihood of successfully harvesting and transplanting existing ponderosa pine, especially mature pine, make vegetation salvage implausible. Buc-ee's has committed to purchase, install, and seed

waterwise, nursery grown native trees, shrubs and grasses in landscape areas in respect to the nativity and character of the region to provide habitat for bird life to mitigate for some of the loss of forested areas. Wetland species will be incorporated into the seed mix in the bottoms of the proposed stormwater quality detention ponds as a secondary natural passive treatment system to filtrate and improve water quality before discharge into downstream waters. Wetland vegetation will work in combination with the installation of Stormceptors, hydrodynamic separators used and maintained as primary treatment systems to remove pollutants from stormwater and snowmelt runoff to protect downstream waterways from hazardous material spills and stormwater pollution, including suspended sediment, free oils, and other pollutants that attach to particles.

Soil disturbance during construction can introduce invasive species, degrade habitat quality, reduce forage availability for wildlife, and increase fire risk. Effective reclamation is essential for both soil stabilization and long-term ecological recovery (CPW, 2025c). CPW recommends and Buc-ee's has agreed to:

- Minimize the area disturbed at any one time and implement phased reclamation, as feasible, so that temporary disturbance areas are restored as work is completed.
- Develop and implement a site-specific landscape and reclamation plan.
- Prioritize seeding and planting of native vegetation to the extent feasible.
- Seed all topsoil stockpiles that will be exposed for more than 45 days to reduce erosion and prevent colonization by invasive or state-listed noxious weeds.
- Implement a Weed Management Plan to monitor and control invasive species throughout the construction and reclamation phases (CPW, 2025c).

Native, organic topsoil on the site will be stripped, stockpiled and reused in landscape and native revegetation areas to reclaim natural soil micro-biota and restore native grassland habitat where feasible.

4.5.2.3 Wildlife Movement and Impact Mitigation

Notwithstanding the inherent value of the existing Site to transient wildlife that may travel along the I-25 corridor, the Project will attract additional traffic and produce light and noise that can disrupt wildlife movement and behavior in the local area. However, these impacts cannot be viewed in isolation, as the existing anthropogenic impacts at this Site caused by I-25 and adjacent residential development are already high, particularly as compared to the Open Space and Conservation lands to the north in Douglas County. As such, Buc-ee's will implement mitigation measures to avoid, minimize, and mitigate wildlife conflicts associated with impacts that already exist at the I-25/Palmer Divide Road interchange as well as those that may result from site development. The following describes key concerns and mitigation of said impacts.

Wildlife movement through the Site are important concerns to CDOT, CPW and the public. CPW reports that forested patches and open grassland on the Site

provide random/dispersed overland north-south travel connections (not defined travel corridors) through Site parallel to I-25 for large transient fauna such as those documented in the CDOT Studies (primarily mule deer, bear, and coyote with occasional visitation by elk). Although not specifically documented on the Site, small fauna including badger, cottontail rabbit, porcupine, raccoon, squirrel, turkey, striped skunk; and smaller fauna including deer mouse, other mouse species, ground squirrel, lizard, mink, pocket gopher, shrew species, vole and vole species, weasel, and woodrat may also utilize forested habitat and grassland for foraging and cover (CDOT, 2018 and 2025a). The portion of Ponderosa pine forest that follows the east-west ephemeral channels on the Site from Beacon Lite Road to the I-25 roadside ditch and 24-inch culvert is likely used by large and small fauna alike for travel cover. These species have been documented by CDOT in the area and are known to utilize the Dogleg and Monument Hill wildlife underpasses at known “pinch points” located approximately 0.70-miles north and 0.60-miles south of the Site, respectively (CDOT, 2018 and 2025a).

Wildlife exclusion fences, wildlife friendly fences, escape ramps (jump-outs), and wildlife guards are important mitigation measures recommended by CDOT and CPW to protect wildlife and the public from WVC’s and negative encounters. The following describes existing wildlife mitigation measures that are currently in place and those that Buc-ee’s has committed to install. Please refer Figure 8, CDOT Wildlife Conflict Mitigation Areas for locations of existing wildlife, underpasses, escape ramps (jump-outs), culverts, guard and fences relative to the Site; and the proposed Site Plans for the location and configuration of existing and the following proposed wildlife mitigation measures.

Wildlife Exclusion Fences: Wildlife exclusion fence is present along the east boundary of the Site. This segment of fence should be protected and retained. Additional wildlife exclusion fencing is recommended on the northern and southern boundary of the Site to completely exclude and prevent large game wildlife conflicts on the Buc-ee's Site and encourage them to utilize alternative overland and riparian travel corridors and habitat further to the west to access Douglas County and El Paso County Open Space and utilize established underpasses to the north and south. No wildlife exclusion fencing has been installed along the southern boundary of Douglas County Open Space to the north of Palmer Divide Road, but it would be advisable to do so in order to make the whole mitigation system of fences and deer guards more effective and decrease WVCs.

Natural and historic east to west travel through the Site that may have existed along Channel 1 prior to the construction of I-25 were severed in 1955 for all wildlife except for the smallest that are capable of squeezing through the wildlife exclusion fence and using the small culvert. Post construction of the Site, small fauna moving along the exclusion fence (on the habitat side or interstate side) will still have functional access to the existing 24-inch culvert under I-25 as a mini-wildlife underpass.

Wildlife Friendly Fences: Barbed-wire fence is present along the north, south and western edges of the Site, likely installed to contain cattle on the property during previous ownership. It is recommended that wildlife friendly fencing be installed to facilitate safe wildlife passage, and wildlife friendly gates where necessary to allow CPW and/or CDOT to access the adjacent wildlife escape ramp.

Escape Ramps (Jump-outs: An existing wildlife jump-out for large game is located on the west side of I-25 along the eastern boundary of the Site (at MP 163.2) near the intersection of Channel 1 and I-25 at the 24-inch culvert. A corresponding jump-out is located on the west side of I-25 (at MP 163.2). Both jump-outs correspond and are roughly in line with the tributary to Carpenter Creek, a riparian travel corridor likely utilized by wildlife as a visual cue to escape the highway. Jump-outs are intended to allow wildlife trapped between the fences within the Interstate corridor with a means to escape traffic. Wildlife ramps are designed to discourage wildlife from entering the highway corridor into traffic and are not intended as a means for travel and migration across the interstate. Please refer to the Site Plans, Figure 7, Aquatic Resources Map, and Figure 8, CDOT Wildlife Conflict Mitigation Areas for locations of existing wildlife escape ramps (jump-outs) relative to the Site and note that the jump-outs near the Site in El Paso County were not identified in the CDOT I-25 South Gap Wildlife Study. It is recommended that this jump-out should be protected and retained and integrated with a southern wildlife exclusion fence to guide wildlife to the south around the Site to more hospitable overland travel/connection corridors to the west.

Wildlife Guards: Wildlife or deer guards or grates (like cattle guards) are a mitigation measure typically installed in roadways/driveways where there is a gap in wildlife fencing to discourage movement beyond the fence line into traffic. A deer guard has been installed in-line with the wildlife exclusion fence on Palmer Divide Road east of I-25 just east of Andrews/Monument Hill Road. A deer guard has not been installed on Palmer Divide Road on the west side of I-25. A deer grate will be installed here as well as at the Buc-ee's north exit onto Palmer Divide Road to prevent or minimize wildlife from entering the Site.

The physical wildlife movement mitigation measures described above are illustrated in Figure 12 - Wildlife Mitigation Plan.

4.5.2.3 Noise, Light, and Food Waste Impact and Mitigation

Buc-ee's acknowledges that additional noise and light will occur as a result of Site development, but it must be acknowledged that this is not a pristine Site and the baseline levels of noise and light are already significant given the adjacency to I-25, Beacon Light Road and County Line Road (refer to Section 4.5.11 Landscape Context above). In addition, post-construction avoidance of the Site by transient wildlife due to noise and light may assist in the avoidance of negative wildlife interactions with humans, including WVCs and those associated with food waste. Modifications to Site lighting are proposed to address the potential effects upon the use of the existing wildlife escape ramp. Regardless, Buc-ee's is committed to implementing mitigation measures as recommended by CPW to

minimize impacts to wildlife to the extent feasible and encourage their use of more suitable habitat away from the Site and I-25.

CPW recommends the following measures intended to minimize habitat fragmentation, reduce disruption to wildlife behavior, and support long-term ecosystem function throughout the project lifecycle (CPW, 2025c).

Noise:

Noise associated with large commercial development poses significant potential for wildlife disturbance throughout both construction and operational phases. Elevated and continuous sound levels can displace wildlife from critical habitats, alter behavioral patterns, and contribute to long-term functional habitat loss. These impacts are particularly concerning in winter ranges, parturition areas, and movement corridors (CPW, 2025c).

As a high traffic volume development, the proposed project will inherently generate noise from increased vehicular traffic, engine idling, fueling activities, and the operation of mechanical systems, including refrigeration, ventilation, and air conditioning units. Such chronic anthropogenic noise has been documented to adversely affect wildlife by disrupting behavior, increasing stress, and causing displacement from critical habitat. Specifically, for big game species, continuous noise can fragment habitats and alter established movement corridors, potentially impacting seasonal migrations and critical wintering or calving grounds. Raptors and migratory birds are similarly vulnerable, as consistent noise can mask critical auditory cues required for communication, navigation, and effective foraging, resulting in decreased nesting success and habitat avoidance. Additionally, bats, which are highly sensitive to both noise and associated artificial lighting, may experience disruptions in roosting and feeding patterns, further diminishing local biodiversity values (CWP, 2025c).

CPW recommends the following noise mitigation measures:

- Time high-noise construction activities outside of critical winter and breeding seasons.
- Incorporate sound-dampening design features into facilities, including acoustic shielding, mufflers on equipment, and vegetation buffers where feasible.
- Install perimeter sound walls or acoustic barriers along property boundaries to reduce noise propagation into adjacent wildlife habitats. Northern and Southern development perimeters are strongly advised, as identified in the Big Game section above, to limit disruption of wildlife use of wildlife crossing structures along I-25.
- Use of vegetated earthen berms as natural acoustic buffers, providing dual benefits of noise attenuation and visual screening through the establishment of native vegetation.
- Incorporate native evergreen and dense shrub plantings within landscaped buffer zones to enhance year-round acoustic and habitat benefits.

- To the extent feasible, limit operational noise during nighttime hours, such as reducing delivery activities, vehicle idling, and mechanical equipment operations when wildlife activity is typically heightened (CPW, 2025c).

CDOT I-25 South Gap Noise Report Technical Memorandum states that 2017 existing noise levels of cars, medium trucks, and heavy trucks travelling at 75 miles per hour (mph) on I-25 range from 58 to 77 decibels (dBA). A study of decibel levels at the Buc-ee's I-25 Johnstown site, Colorado is being conducted to compare noise generated from a Bucee's site with ambient and interstate traffic noise so that pre- and post-construction noise may be clearly understood. The noise level generated from the Site is expected to be lower and not impact wildlife or residences any more than what is already occurring along I-25. Regardless of the noise study results, Buc-ee's is prepared to implement all of the above recommendations, including the planting of dense, evergreen landscaping to minimize noise from escaping into adjacent habitat.

There are no known seasonal migration corridors, critical wintering, calving, or breeding grounds, or nesting raptors known to occur on the Site. It is recommended and Buc-ee's has committed to:

- Develop a construction schedule that avoids or minimizes high-noise construction activities outside of critical breeding and nesting season for resident species that may be present on the Site at the time of construction.
- Incorporate, native trees, shrubs, and grasses within landscape buffers and stormwater quality ponds along the periphery of the Site (especially the north and south perimeters) to dampen sound and reduce noise propagation into adjacent wildlife habitats. Native evergreens with dense sound absorbing needles will be a staple of the landscape plans to attenuate noise and provide a visual screen that forms an acoustic buffer. Vegetated berms will be incorporated where feasible.

Light:

CDOT I-25 South Gap Visual Impact Assessment Technical Memorandum states that existing tall highway lighting will be replaced with energy-efficient LEDs with a spectrum set to 4000 Kelvin from the southern terminus through the top Monument Hill just past County Line Road north of the proposed Buc-ee's Site. This segment of the interstate is in fact lined on both sides by 60-foot tall, evenly spaced lights (every 240 feet) with shielded light fixtures that are directed down at the roadway. This lighting extends approximately 0.30 miles north of the Buc-ee's Site to 1.2 miles south of the Site and beyond, including additional lighting at the County Line Road / I-25 interchange.

Large commercial developments of this nature typically employ extensive lighting to ensure operational safety, visibility, and security. Such lighting can significantly disrupt nocturnal wildlife activity, alter animal behavior, and negatively impact habitat utilization patterns. Artificial lighting at night has been documented to adversely affect migratory birds, raptors, bats, and other nocturnal species,

potentially causing disorientation, collisions, habitat avoidance, and increased predation risk (CPW, 2025c).

Furthermore, visual disturbances from expansive built structures and extensive paved surfaces can result in avoidance behaviors by wildlife, further fragmenting available habitat and disrupting critical movement corridors (CPW, 2025c).

To address and mitigate these potential light and visual impacts on wildlife, CPW recommends the following strategies:

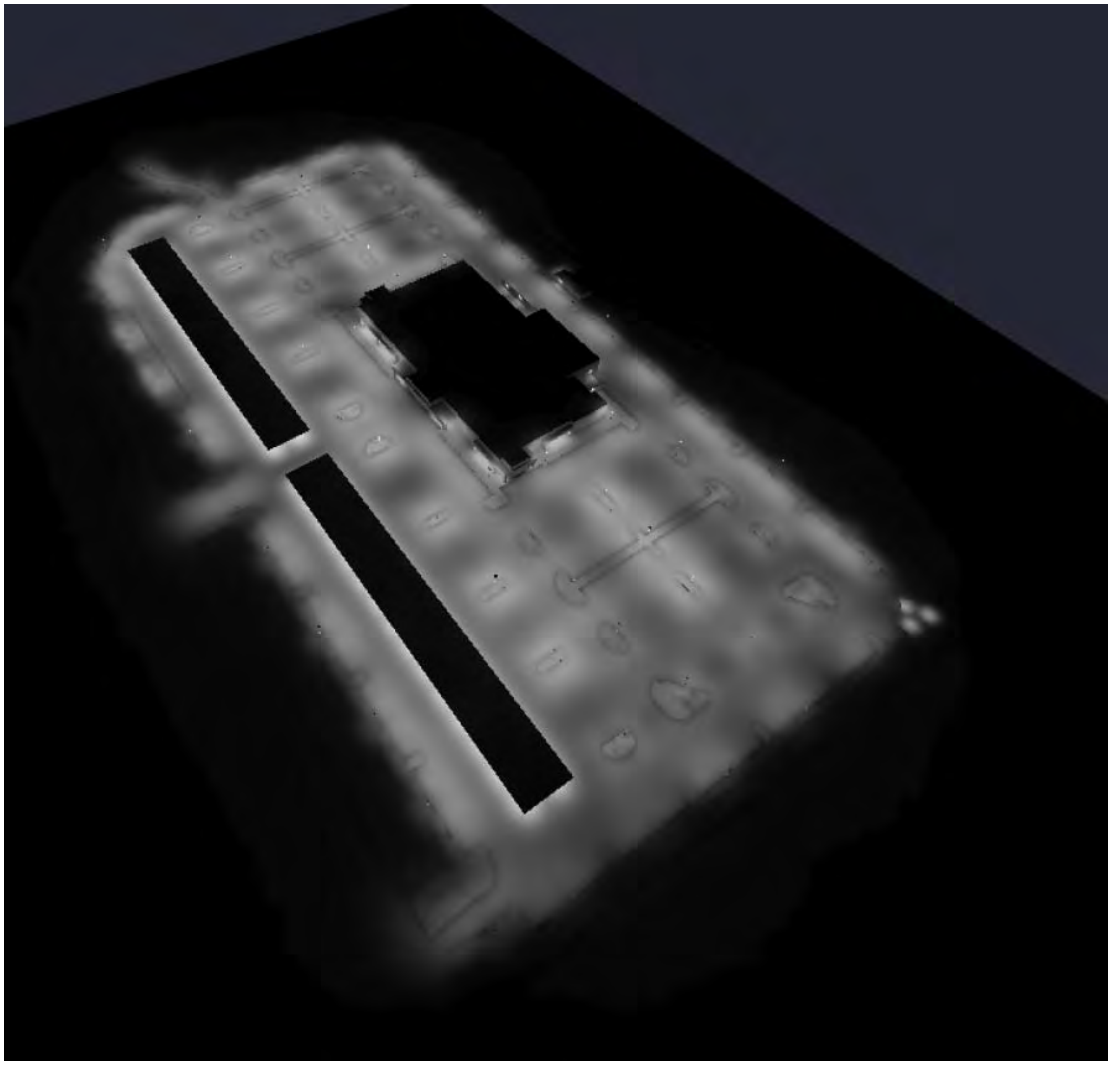
- Install down-shielded fixtures to focus light downward and minimize horizontal light spill.
- Use warm-colored lighting (2200 to 2700 Kelvin) with longer wavelengths, which reduce disruption to wildlife sensory systems. These guidelines are supported by the U.S. Fish and Wildlife Service and the American Bird Conservancy.
- Dim or deactivate lighting when not in use, particularly during nighttime hours and outside of operational periods.
- Implement motion-sensing lighting systems to minimize continuous illumination, thus reducing prolonged disturbances to wildlife (CPW, 2025c).

Buc-ee's safety protocols and liability obligations require exterior lighting that maximize customer safety at all times. Buc-ee's has committed to utilize their existing wildlife friendly specifications to mitigate light disturbances, including:

- installation of fixtures specified in the lighting plan that are fully shielded, full cut-off, downward directed, mounted as low as practical, and produce no more than 0.04 foot-candles at the property line;
- warm-colored (yellow) lighting (3,000 Kelvin) that produces longer wavelengths (>560nm) to minimize the possible effects of skyglow and reduce disruption to wildlife sensory systems; and
- down-lighting that will not escape the Site boundary. Refer to lighting model shown below.

The noise and light wildlife mitigation measures described above are illustrated in Figure 12 - Wildlife Mitigation Plan.

Buc-ee's Downlighting Model



Trash and Food Waste: CPW reports that black bears are known to inhabit the project site and adjacent properties as evidenced by CPW and CDOT observations regarding human-bear conflicts and roadkill data. The proposed development raises specific considerations regarding potential impacts on bears, particularly related to waste management and food attractants. Improperly managed trash receptacles, bins, and storage areas at such high-traffic commercial facilities can become strong attractants for bears, leading to increased bear-human conflicts, habituation, and potential threats to both human safety and wildlife health. Bears attracted to readily available food sources, including garbage, frequently become habituated to human presence, increasing risks of property damage, vehicle collisions, and management actions, including lethal removal of problem bears (CPW, 2025c).

To proactively address and mitigate these potential impacts on bears, CPW recommends and Buc-ee's has committed to the following strategies during construction and general operation of the development:

- Install bear-resistant trash receptacles throughout the facility, particularly in parking areas, fueling zones, and near food service locations.
- Ensure regular trash removal schedules to prevent accumulation and potential attraction.
- Secure storage for waste bins and dumpsters in bear-resistant enclosures or fenced areas.
- Deploy signage and visitor education programs to inform customers and employees about proper waste disposal practices and bear awareness.
- Ensure waste storage and food-related operations are located in centralized portions of the development, away from habitat edges, to minimize bear attractants near natural habitats (CPW, 2025c).

It is recommended that Buc-ee's implement all of the above recommendations.

4.5.2.4 Native Bats and Impact Mitigation

In Colorado, native bat species use buildings, caves, mines, trees, concrete culverts, and other structures for maternity roosts, night roosts, and hibernacula as well as for transition roosts. They may also utilize existing swallow nests for these purposes. Roosting bats are sensitive to disturbance and could leave roost sites following human visitation. Protection of roosting bats from human disturbance, especially at significant winter hibernation sites and summer maternity sites, is important for the conservation of native bat species (CPW, 2025c).

To avoid or minimize impacts to native bat species, CPW recommends and Buc-ee's has committed to the following:

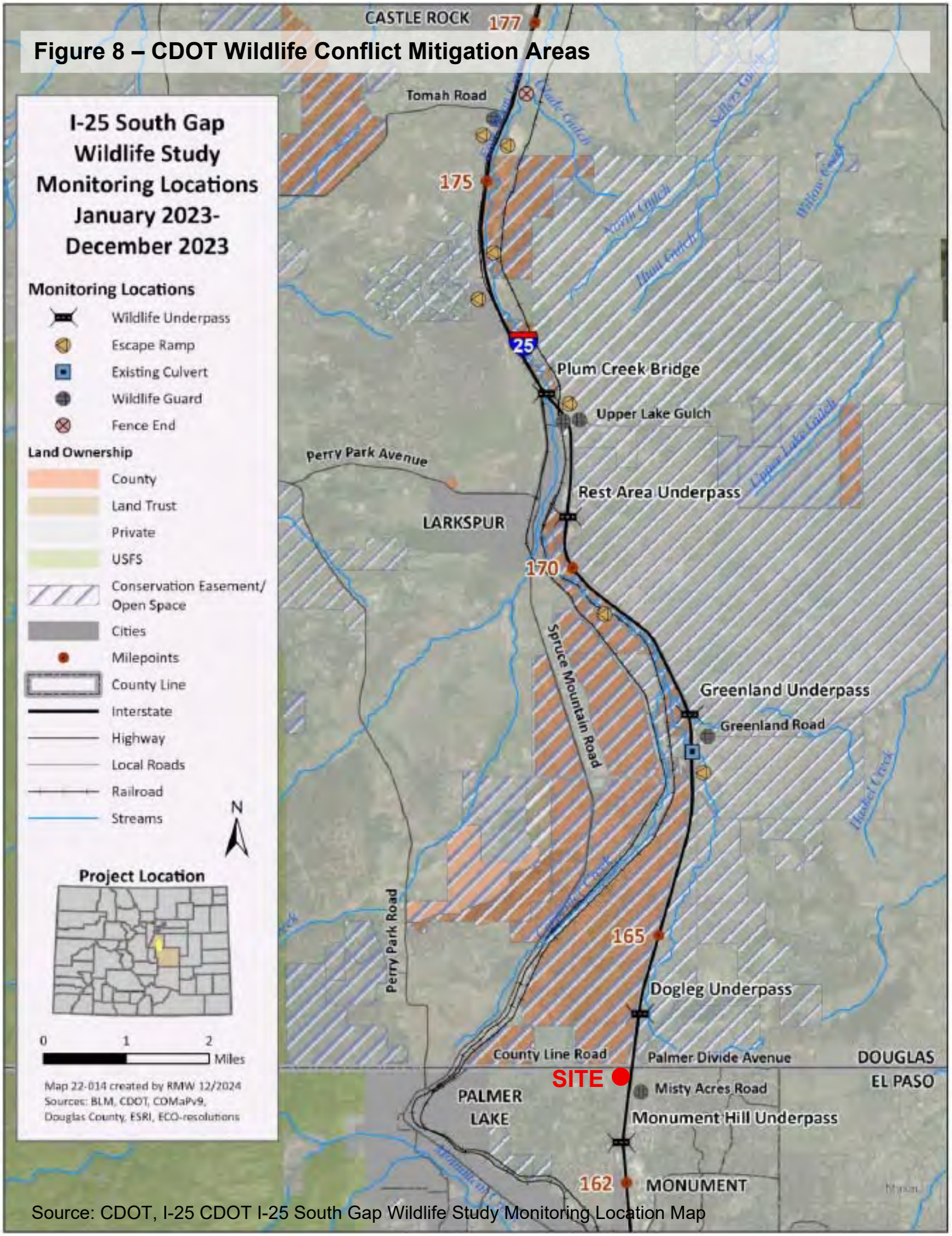
- Conduct a visual bat survey in crevices, cracks, and seams of any existing structures or natural features approximately 3 feet tall or wide before performing maintenance. CPW is happy to provide additional information regarding completion of visual bat surveys in the event that maintenance will be performed on existing structures or natural features where bat use is suspected.
- Because bats may also roost in old swallow nests, it's important to check for bats before washing off any nests from existing structures or natural features. CPW recommends completing the visual bat surveys before washing off nests from existing structures or natural features or leaving swallow nests in place.

Bats and bat habitat were not observed on the Site. However, post-development, bats may develop habitat in cracks, crevices, and seams in and around built structures. The above CPW recommendations are intended as mitigation measures after construction (CPW, 2025d). It is recommended and Buc-ee's has committed to implement all of the above recommendations.

FIGURE 8

CDOT Wildlife Conflict Mitigation Areas

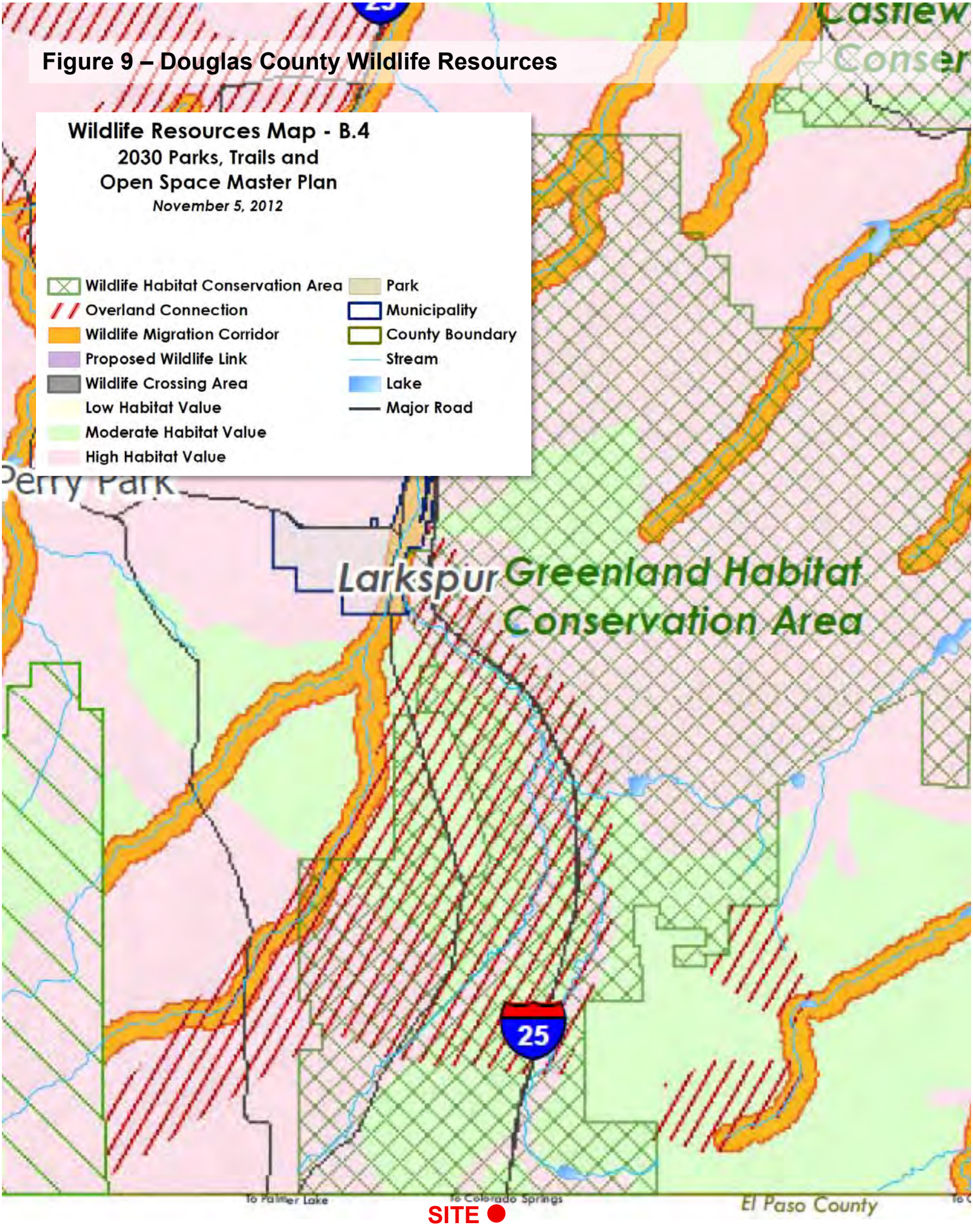
Figure 8 – CDOT Wildlife Conflict Mitigation Areas



Source: CDOT, I-25 CDOT I-25 South Gap Wildlife Study Monitoring Location Map

FIGURE 9
Douglas County Wildlife Resources

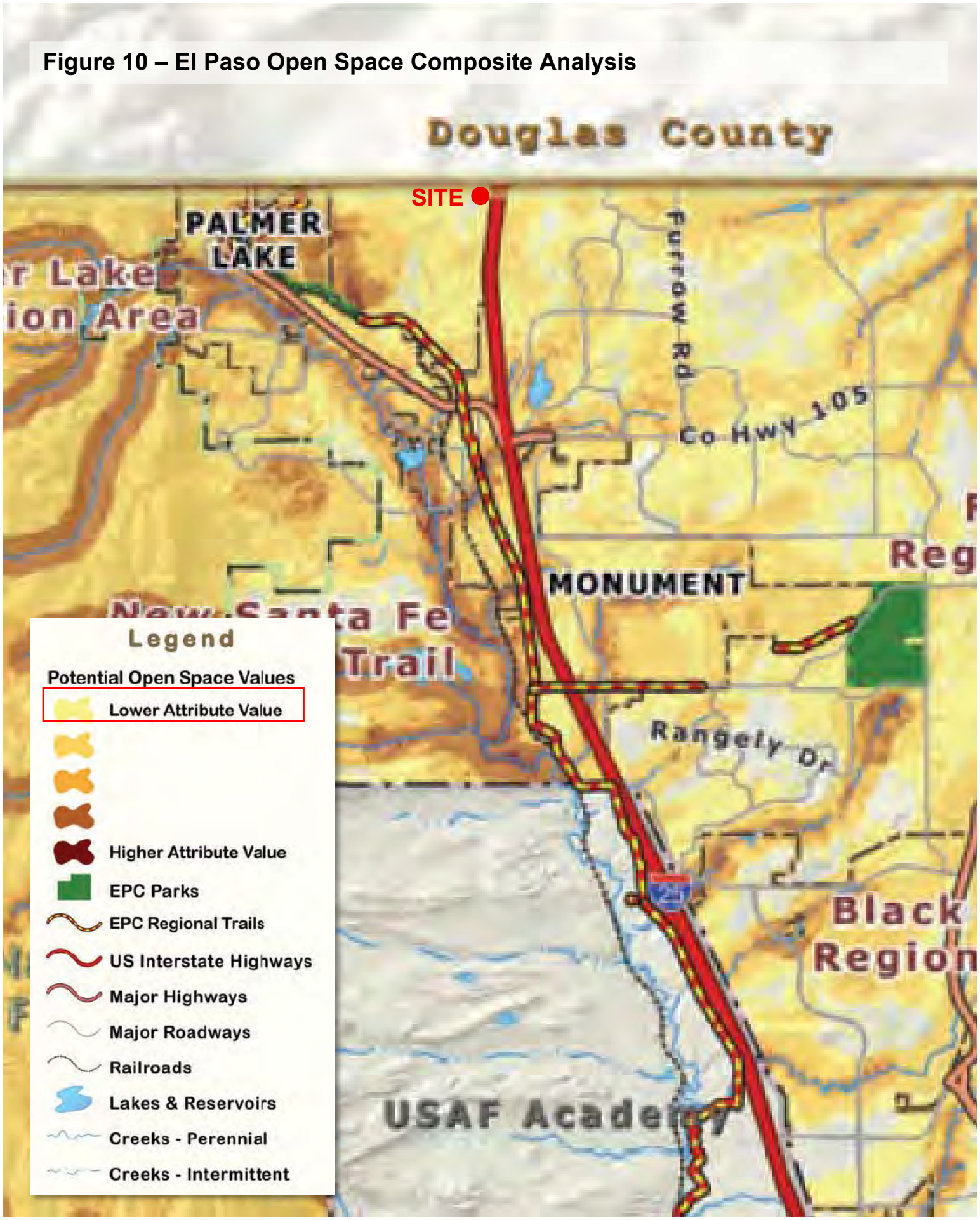
Figure 9 – Douglas County Wildlife Resources



Source: Douglas Cunty 2030 Parks, Trails and Open Space Master Plan, 2012

FIGURE 10
El Paso Open Space Composite Analysis

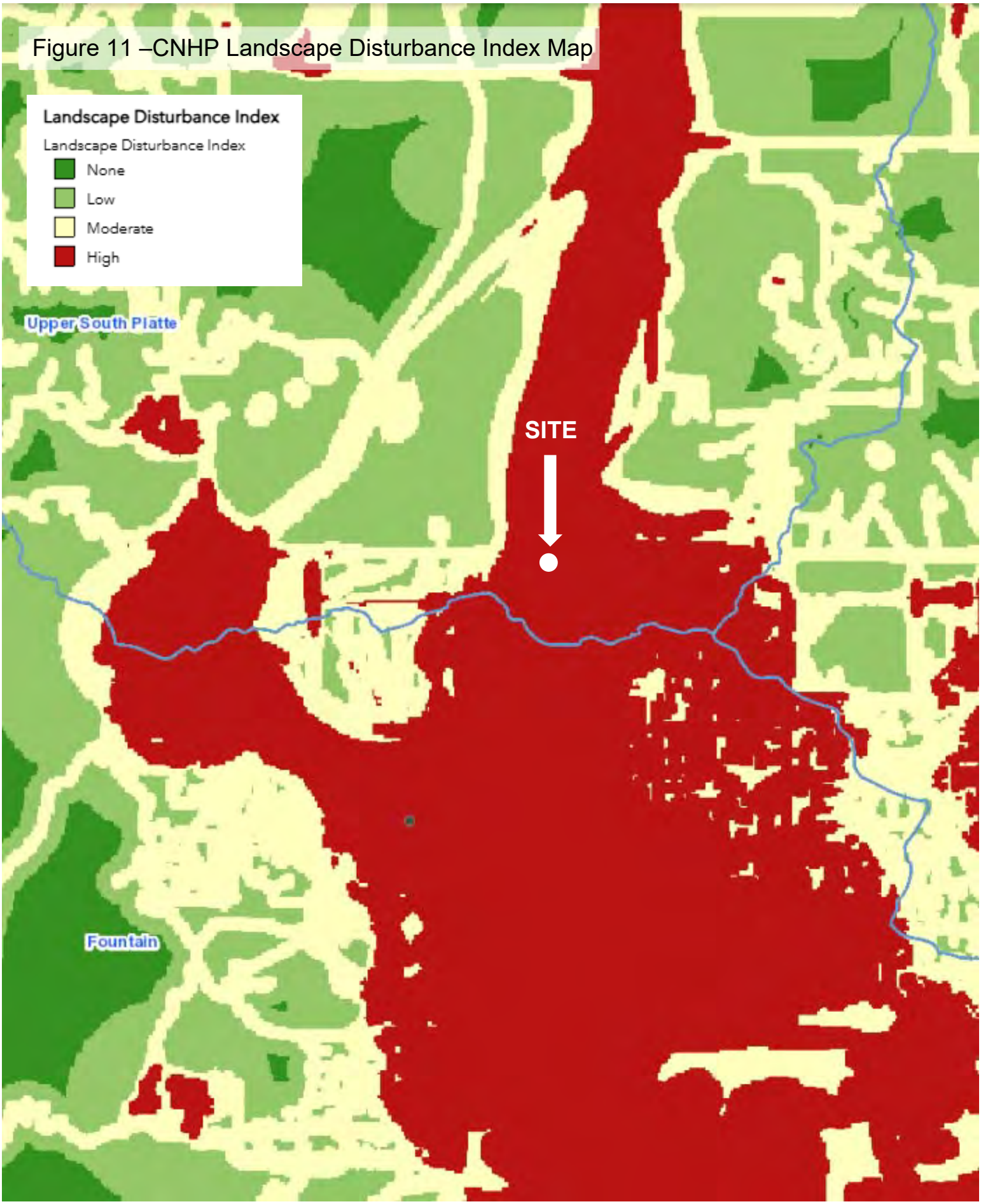
Figure 10 – El Paso Open Space Composite Analysis



Source: El Paso County Parks Master Plan, 2013

FIGURE 11
CNHP Landscape Disturbance Index Map

Figure 11 –CNHP Landscape Disturbance Index Map

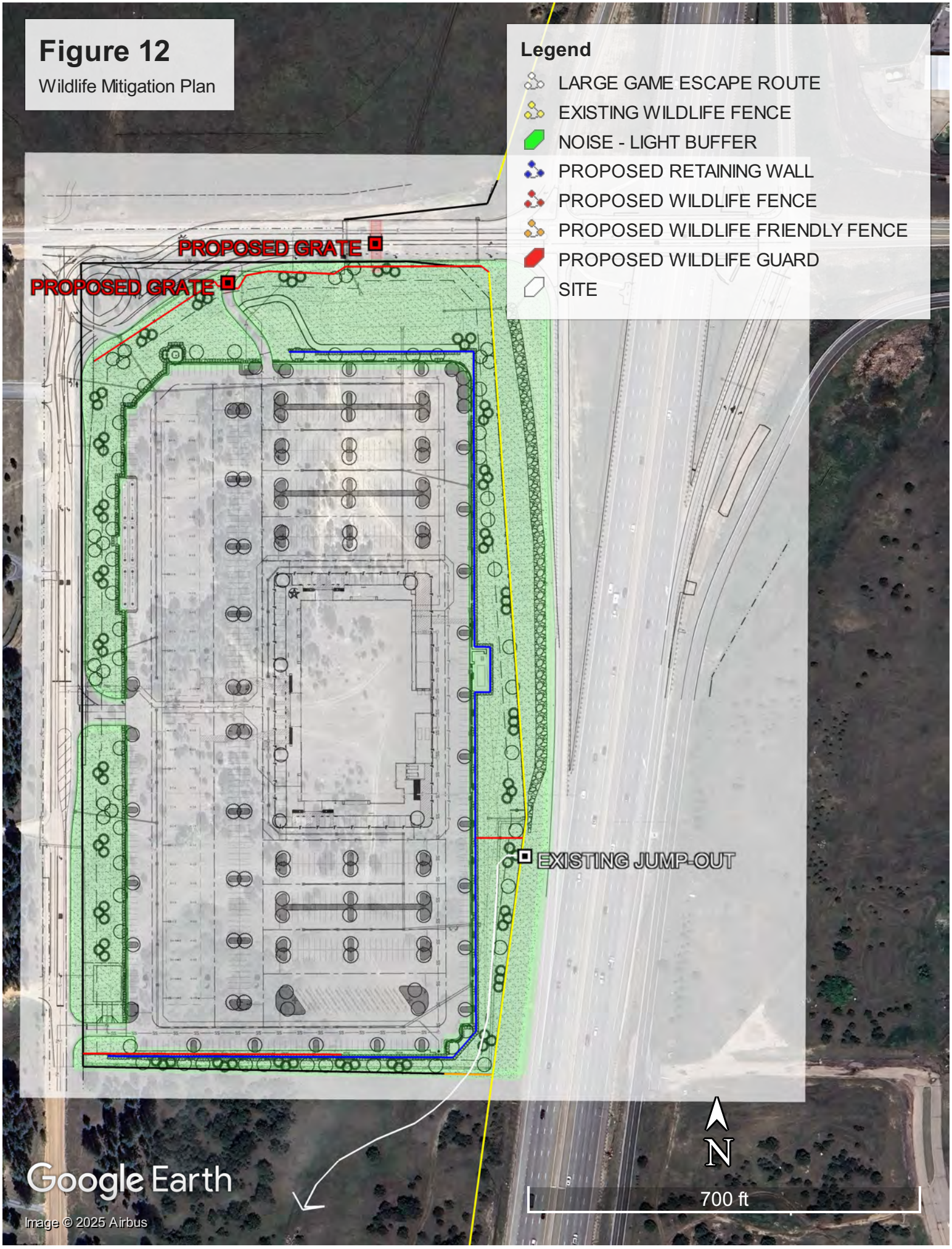


Source: CNHP Landscape Disturbance Index

FIGURE 12
Wildlife Mitigation Plan

Figure 12

Wildlife Mitigation Plan



4.6 Threatened and Endangered Species

The purpose of this section is to document potential presence and usage of the site for Threatened and Endangered Species (T&E Species) and to ensure that proposed development is reviewed with consideration of the impacts to their habitat.

A number of species that occur in El Paso County are listed as T&E Species by the USFWS under the Endangered Species Act (ESA). ECOS compiled the data regarding T&E Species for the Site in Table 1 below based on the Site-specific, USFWS IPaC Trust Resources Report (USFWS, 2025a) that we ran for the Project (Appendix A) and our onsite assessment. ECOS has provided our professional opinion regarding the probability that these species may occur within the Site and their probability of being impacted by the Project.

The likelihood that the Project would impact any of the species listed below is none. Most do not or are not expected to occur in the project area and no downstream impacts are expected. The USFWS IPaC Trust resource Report (Appendix A) states that The Site contains no Critical Habitat for T&E Species, Wildlife Refuges or Hatcheries according to the USFWS IPaC (USFWS, 2025a)

.

TABLE 1 - FEDERAL LISTED SPECIES POTENTIALLY IMPACTED BY THE PROJECT

Species	Status	Habitat Requirements and Presence	Probability of Impact by Project
MAMMALS			
Preble's meadow jumping mouse (*Zapus hudsonius preblei*)	Threatened	Inhabits well-developed riparian habitat with adjacent, relatively undisturbed grassland communities, and a nearby water source. Well-developed riparian habitat includes a dense combination of grasses, forbs and shrubs; a taller shrub and tree canopy may be present. Has been found to regularly use uplands with grasses and shrubs at least as far out as 100 meters beyond the 100-year floodplain.	None. 1) the site does not contain wetland/riparian habitat or a nearby water source, or hibernaculum within side drainages and ponderosa pine in adjacent uplands; 2) nearest trapped-found site is 1.7 miles away in a different drainage system; and 3) nearest USFWS Critical Habitat is 2.25-miles south in a different drainage system.
BIRDS			

TABLE 1 - FEDERAL LISTED SPECIES POTENTIALLY IMPACTED BY THE PROJECT			
Species	**Status**	**Habitat Requirements and Presence**	**Probability of Impact by Project**
Eastern Black Rail (*Laterallus jamaicensis ssp. Jamaicensis*)	Threatened	Habitat includes tidally or non-tidally influenced marshes which range in salinity from salt to brackish to fresh. It requires dense overhead perennial herbaceous cover with underlying soils that are moist to saturated (occasionally dry) interspersed with or adjacent to very shallow water (typically ≤ 3 cm). Eastern black rails depend on this dense cover throughout their life cycle and is their primary strategy to avoid predation.	None. No wetland habitat is present.
Piping plover (*Charadrius melodus*)	Threatened	Water-related activities/use in the N. Platte, S. Platte and Laramie River Basins may affect listed species in Nebraska.	None. The proposed project will not affect any of the listed river basins.
Whooping crane (*Grus americana)*	Endangered	Water-related activities/use in the N. Platte, S. Platte and Laramie River Basins may affect listed species in Nebraska.	None. The proposed project will not affect any of the listed river basins.
FISH			
Pallid sturgeon (*Scaphirhynchus albus*)	Endangered	Water-related activities/use in the N. Platte, S. Platte and Laramie River Basins may affect listed species in Nebraska.	None. The proposed project will not affect any of the listed river basins.
INSECTS			

TABLE 1 - FEDERAL LISTED SPECIES POTENTIALLY IMPACTED BY THE PROJECT			
Species	**Status**	**Habitat Requirements and Presence**	**Probability of Impact by Project**
Monarch butterfly (*Danaus plexippus*)	Proposed Threatened	Multigenerational migrant that breeds throughout North America and overwinters in dense congregations in Mexican montane fir forests. The larval hostplant is milkweed (*Asclepias* spp.). Habitat includes areas with nectar for feeding and/or milkweed for laying eggs, especially grasslands and wetlands. Breeding habitat threats are widespread native grassland loss and herbicide use. In Colorado, they are present in low numbers from May to September.	None. Riparian habitat and milkweed is not present.
Suckley's Cuckoo Bumble Bee (Bombus suckleyi)	Proposed Threatened	Multigenerational migrant that breeds throughout North America and overwinters in dense congregations in Mexican montane fir forests. The larval hostplant is milkweed (*Asclepias* spp.). Habitat includes areas with nectar for feeding and/or milkweed for laying eggs, especially grasslands and wetlands. Breeding habitat threats are widespread native grassland loss and herbicide use. In Colorado, they are present in low numbers from May to September.	None. Riparian habitat and milkweed is not present.
PLANTS			

TABLE 1 - FEDERAL LISTED SPECIES POTENTIALLY IMPACTED BY THE PROJECT			
Species	**Status**	**Habitat Requirements and Presence**	**Probability of Impact by Project**
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	Threatened	Primarily occurs along seasonally flooded river terraces, sub-irrigated or spring-fed abandoned stream channels or valleys, and lakeshores. May also occur along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside borrow pits, reservoirs, and other human-modified wetlands.	None. Wetland habitat will not be impacted. The Site elevation ranges from 7,020 to 6,920 feet AMSL, which is higher than the 6,500-foot upper elevation limit documented for the species and recommended for conducting surveys by the USFWS.
Western prairie fringed orchid (*Platanthera praeclara*)	Threatened	Occurs in tallgrass prairie in Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, and Oklahoma. Upstream depletions to the Platte River system in Colorado and Wyoming may affect the species in Nebraska.	None. The proposed Project will not alter or deplete flows to the South Platte.

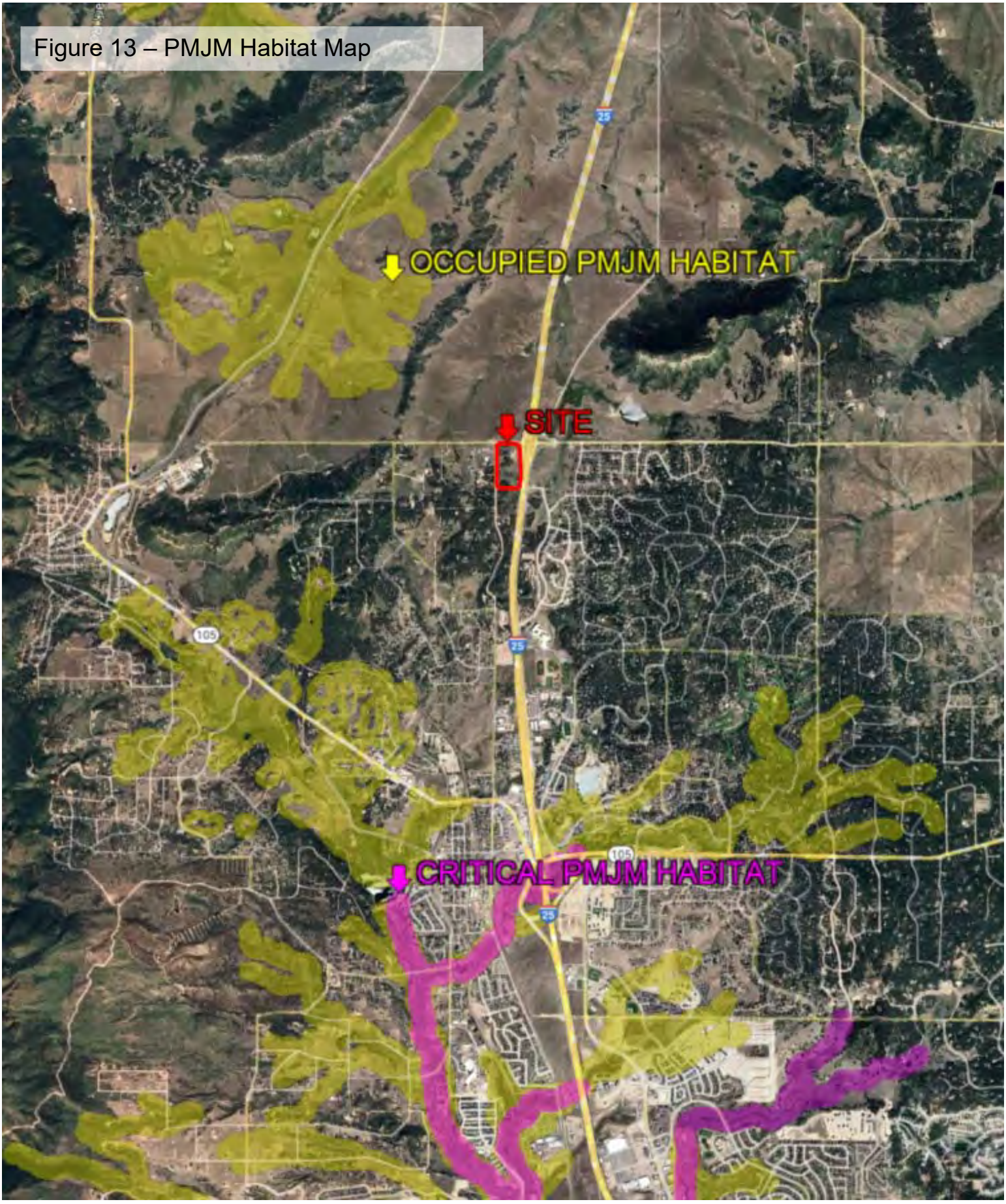
4.6.1 Preliminary Effects Determination

The USFWS IPaC Trust Resource Report (Appendix A) states that there is no Critical Habitat for T&E species in the Site. Based on the review of USFWS IPaC Trust Resources Report for the Project and our onsite assessment, it is ECOS' professional opinion that the likelihood that the Project would impact any of the species listed above in Table 1 is none. Most are not expected to occur in the Project area or on the Site; nor will they be affected by the indirect effects of the project as no downstream impacts to drainage basins supporting these T&E species are expected to affect them in offsite habitat. Therefore, ECOS' has preliminarily determined that the Project would have No Effect on any of the species listed above in Table 1.

PMJM: Preble's meadow jumping mouse (PMJM) is a common concern in El Paso and Douglas County and within their range along the Front Range of the Rockies. As noted in Table 1 above, the Site does not support the constituent elements and habitat requirements of PMJM. The site is not located within, adjacent, and is not connected to Occupied designated Critical Habitat. Refer to representative photos in Appendix C that demonstrate the Site does not support PMJM habitat and Figure 13, PMJM Habitat Map showing the proximity of the Site to PMJM Occupied and Critical Habitat.

FIGURE 13
PMJM Habitat Map

Figure 13 – PMJM Habitat Map



Source: CPW Occupied Habitat Mapping, 10/12/2002 and USFWS, Center for Native Ecosystems, 12/2007

4.7 Raptors and Migratory Birds

Raptors and most birds are protected by the Colorado Nongame Wildlife Regulations, as well as by the federal Migratory Bird Treaty Act. Additionally, eagles are protected by the Bald and Golden Eagle Protection Act (BGEPA).

4.7.1 Office Assessment Findings

ECOS utilized the Colorado Energy and Carbon Management Commission (ECMC) Online GIS data (ECMC, 2025) to screen the Site for potential raptor nests. No raptor nests have been mapped within one mile of the Site (ECMC, 2025). The closest nests site, an active prairie falcon nest is located 3.5 miles to the southwest of the Site.

The USFWS IPaC data (Appendix A) does not have data available at this time regarding the presence of migratory birds or Bald and Golden Eagles on the Site.

4.7.2 Field Assessment Findings

The ponderosa pine forest and midgrass prairie provides foraging habitat for transient migratory birds, including Magpie, Stellar's jay, mountain chickadees, and flickers that were directly observed on the Site. No nest sites or prairie dog burrows for raptors, including burrowing owl were found during the Site visit.

6.0 REGULATIONS AND REGULATORY COMPLIANCE

6.1 Clean Water Act

Section 404 of the Clean Water Act (CWA) and Colorado HB 24-1379, administered by the USACE and State of Colorado Water Quality Control Division (WQCD), prohibit the discharge of dredged or fill material into federal or state jurisdictional waters and wetland habitat without a valid 404 permit or HB 24-1379 authorization. ECOS identified one ephemeral channel (Channel 1) and two ephemeral swales (Swales 1 and 2) that are tributaries to Channel 1. During precipitation events, Channel 1 is an ephemeral tributary to Carpenter Creek, which is tributary to East Plum Creek and then the South Platte River.

Based on the physical and flow characteristics discussed above; the absence of wetlands on the Site; no ordinary high water marks or indicators; and Federal and State of Colorado rules, definitions, and guidance documents pertaining to WOTUS and WOSOC, Channel 1 and tributary swales are not relatively permanent or jurisdictional waters and therefore Federal or State CWA Permits and Notifications are not required for any proposed impacts. Water quality concerns to downstream receiving waters are addressed separately in other Project documents.

6.2 Endangered Species Act

The Endangered Species Act (ESA), administered by the USFWS, protects federally listed plant and animal species with the goal of ensuring their long-term

survival and recovery. The ESA prohibits the “taking" of a listed species, which includes adverse modification of critical or occupied habitat, harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting them, or attempting to do so without a valid permit.

The Site is not located within any Critical Habitat for T&E Species, Wildlife Refuges or Hatcheries according to the USFWS IPaC Trust Resources Report (USFWS, 2025a), nor does it exhibit any of the requisite or suitable habitat components to support T&E species listed for the area, including Preble’s meadow jumping mouse. As such, requests for concurrence with this report, clearance letters, or consultation with the USFWS under the ESA is not required.

Please note the following standard response from the USFWS in regard to ESA concurrence or clearance: *“If you (the project proponent) have determined that your project will have no effect to listed species or their habitat, or if suitable habitat for a listed species does not occur within your project area, you may not receive any further response or notification from us, as neither section 7 of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C 1531 et seq.), nor implementing regulations under section 7 of the ESA, require us to review or concur with projects where “no effect” determinations have been made”.* This means that the USFWS may or may not comment or concur with ECOS’ effects determination as documentation of ESA compliance, regardless of the Project being constructed, funded or permitted by a federal agency or requests for ESA concurrence by local jurisdictions, counties, or FEMA.

6.3 Migratory Bird Treaty Act & Bald and Golden Eagle Protection Act

The Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act – Both Acts protect migratory birds, nests, and nesting activities that could be disrupted or destroyed during construction activities such as clearing vegetation, moving earth, and demolishing bridges. The USFWS administers these requirements in collaboration with CPW.

No raptor nests have been mapped within one mile of the Site (ECMC, 2025) and no migratory bird nests were observed within the Site. The closest active raptor nest to the Site is a prairie falcon nest 3.5-miles to the southwest of the Site (ECMC, 2025). Activities on the Site will not have any bearing on the viability of that nest. Given the seasonal and transitory nature of migratory birds and raptors, ECOS recommends a nesting bird survey immediately prior to any construction activity to identify any new nests within the Site that could potentially be occupied with eggs or chicks at the proposed time of construction. Construction activities should be restricted during the breeding, egg laying, and fledging season near any active or occupied raptor or migratory bird nests unless a Take Permit is obtained through consultation with the USFWS.

6.4 Colorado Nongame Species Conservation Act

The Colorado Nongame, Endangered, and Threatened Species Conservation Act (Conservation Act), administered by Colorado Parks and Wildlife (CPW), prohibits actions that "take" endangered, threatened species, or State-listed

species of special concern in danger of extinction or likely to become endangered. A take includes harming, harassing, possessing, transportation, exportation, sale, or shipment of listed species without a permit from CPW. The Conservation Act is a state-level regulation aimed at protecting and conserving “significant” wildlife habitat and species that are not commonly hunted, fished, or trapped (CPW, 2009). Hunted, fished, or trapped species are typical referred to as common or game species.

The data presented herein indicates that no significant non-game species or habitat are present or utilize the Site that are protected under the Conservation Act or warrant special protection or permits. Notwithstanding, as responsible stewards, CPW and CDOT recommendations to avoid, minimize, and mitigate project impacts to common game species should be implemented where feasible. The full body of CPW and CDOT recommendations can be found in their Project review comments.

6.5 Colorado Department of Agriculture Noxious Weed Act

The Colorado Department of Agriculture (CDA) Noxious Weed Act (NWA) of 2003 defines and prioritizes management objectives for state-designated noxious weeds. The NWA requires all landowners in Colorado, both public and private, to manage noxious weeds on their property. The Act mandates that State-listed noxious weeds (List A, B and C) are to be controlled within certain thresholds to prevent their spread and minimize their negative impacts on native plant communities, agricultural lands, and property values (CDA, 2003).

The El Paso County Noxious Weed Management Plan (NWMP) outlines best management practices (BMPs) for managing noxious weeds in El Paso County. The EPC NWMP encourages the use of integrated methods to control noxious weeds, which may include mechanical, biological, and chemical control techniques, as well as cultural practices like establishing healthy native vegetation (EPC, 2014).

Some noxious weeds exist on the Site now. Recruitment of weeds (common and noxious) is inevitable after earthwork and ground disturbance activities if the soil is not conditioned, revegetated, and managed. It is recommended that Buc-ee’s retain a qualified weed management specialist certified to apply chemical herbicides to identify and control any common or noxious weeds that emerge on the Site after landscaping and site revegetation/reclamation has been conducted. Only native trees, shrubs and grasses are recommended for landscaped and reclaimed areas.

6.6 Other Local and State Regulations

This report is focused on ecological assets and associated recommendations to maintain regulatory compliance with applicable laws. Construction related permit activities such as stormwater discharge permits, grading, erosion and sediment control plans, water quality, passive treatment systems, stormwater management plans, etc. that will assist in avoiding potential impacts to downstream receiving waters and aquatic species fall under the purview of the project engineer and as

such are addressed in other Project documents. Construction related regulations, requirements, and recommendations will be provided by the project engineer either in their reports or construction documents when appropriate.

7.0 SUMMARY and CONCLUSIONS

Based on the information presented in this Environmental Assessment, it is ECOS' professional opinion that the Site is suitable for the proposed Project for the following reasons:

1) Location:

The Site is situated just south of the El Paso - Douglas County line along the south side of Palmer Divide Road, with Beacon Lite Road along the west and I 25 to the east.

2) Environmental Setting:

The Site is not located within a CNHP Potential Conservation Area. No Critical Habitat for Federally-listed T&E Species, Wildlife Refuges or Hatcheries are present in the Site or vicinity of the Site. The El Paso County Open Space Composite Analysis shows that the Site and immediate vicinity around the Site is rated as having Lower Attribute Value. The CNHP Landscape Disturbance Index (LDI) for the Site and surrounding lands in El Paso County, particularly the I-25 corridor is rated as high due to low biodiversity; high disturbance status due to the presence of roads, a major highway (I-25), residential development, other current/future anthropogenic impacts. The high CNHP LDI rating for the Site means it is already compromised or impaired and not a candidate or priority for conservation.

3) Vegetation:

Sixty-five (65%) of the Site consists of a mono-culture of mountain brome, with scattered remnants of a few midgrass prairie species and some Wood/s rose. This low diversity grass cover is likely due to agricultural practices to maximize hay forage for cattle. Thirty-five (35%) of the Site consists of multi-aged, mono-culture of ponderosa pine with no understory shrubs. Aerial imagery dating back to 1937 indicates that the site was treeless and used for livestock grazing and hay production. Ponderosa pine succession started in the 1980's. In short, the vegetation cover on the site is of low diversity due to anthropogenic disturbances. Previously disturbed ponderosa pine and grassland on this Site are not rare or particularly significant habitats.

4) Wetland Habitat, Riparian Habitat and Waters:

No wetland habitat, riparian habitat or waters are present on the Site.

5) Common Wildlife Habitat:

CPW does not show or list any High Priority Habitat (HPH) or Species of Greatest Conservation Need on the Site for those species listed for El Paso County. Elk, deer, bear, and many other species listed by CPW are common wildlife, many of which are game species that are not imperiled and can be hunted without concern for extinction or significance. Beacon Lite Road, Palmer

Divide Road, and I-25 directly abut the Site on three sides. These roads isolate it from the surrounding landscape and impair its functional value for a broad spectrum of wildlife, including common game species.

Douglas County conservation easements protect the land north of the Site across Palmer Divide Road. These lands provide moderate to high habitat values for wildlife. However, given a lack of previous conservation planning in El Paso County, the moderate to high habitat values present in Douglas County cannot be extrapolated to open land located south of Palmer Divide Road, nor can the Douglas County conservation goals and directives supplant those in El Paso County.

Within a regional or landscape context, comparing Douglas County and El Paso County open space distribution and values, CPW wildlife usage patterns, and a high CNHP LDI, it is ECOS opinion that the Site is impaired and has relatively low habitat value except for transient wildlife escaping I-25.

6) Regulations and Regulatory Compliance:

There is no nexus associated with the proposed Project that would require Federal or State environmental regulatory review, permitting, or consultation under the following laws and regulations:

a. Clean Water Act – No federal regulated Waters of the U.S, including wetland habitat, are present on the Site.
b. Endangered Species Act – No Threatened and Endangered Species are present on the Site of in the vicinity.
c. Migratory Bird Treaty Act & Bald and Golden Eagle Protection Act – No Raptors or Migratory Birds are present in the Site and this will be verified during a pre-construction survey.
d. Colorado Nongame Species Conservation Act –
    - no significant non-game species or habitat are present or utilize the Site that are protected under the Conservation Act or warrant special protection or permits. Notwithstanding, as responsible stewards, CPW and CDOT recommendations to avoid, minimize, and mitigate project impacts to common game species should be implemented where feasible.
    - Native bats are not present on the Site and this will be verified during a pre-construction survey.

e. Colorado Department of Agriculture Noxious Weed Act - Some noxious weeds exist on the Site now. Buc-ee's will retain a qualified weed management specialist certified to apply chemical herbicides to identify and control any common or noxious weeds that emerge on the Site after landscaping and site revegetation/reclamation has been conducted.
f. Local Regulations - The Town Community Master Plan indicates the Buc-ee's Site has been planned for retail/commercial development due to its adjacency to two existing major roads, I-25, an I-25 interchange, and residential development that already compromise the ecological value of

the Site for wildlife. The master planning process acknowledges that retail development is not necessarily sensitive, compatible, or consistent with conservation values of other jurisdictions.

7) Impacts and Mitigation:

The proposed Project will attract additional traffic, and produce light and noise that can disrupt wildlife movement and behavior in the local area. Wildlife movement through the Site are important concerns to CDOT, CPW, and the public. These concerns and impacts will be addressed by Buc-ee's but cannot be viewed in isolation or falsely raise their overall level of importance and scrutiny by the public. The existing anthropogenic impacts at this Site are already high particularly when compared to the conservation lands to the north in Douglas County. However, given a lack of previous conservation planning in El Paso County, the moderate to high habitat values present in Douglas County (north of the Site) cannot be extrapolated to open land located south of Palmer Divide Road, nor can the Douglas County conservation goals and directives supplant those in El Paso County or the Town of Palmer Lake.

The Site is immediately adjacent to the 21-mile swath of I-25 and adjacent lands (between MP 160 near Monument and MP181 near Castlerock) through Douglas and El Paso Counties, known as the Gap. The Buc-ee's Site was included in this analysis as it is located on the west side of I-25 between MP 163.15 and 163.45. The Site represents 0.3-mile or 1.4% of the length of the west side of the Gap and is benefitting from the success of the Wildlife Mitigation Measures installed during the Gap project by CDOT and CPW to protect wildlife and the public from WVC's and negative encounters.

To mitigate impacts to wildlife, Buc-ee's will implement measures recommended by CPW that discourage large game from entering and moving through the site to avoid conflicts on Site and at the I-25/Palmer Divide Road interchange by guiding them around and to more suitable habitat and travel corridors away further west of I-25. Trees, shrubs and grasses that are native to Colorado will be used in landscape areas in respect to the nativity, wildlife, and character of the natural landscape and to provide habitat for bird life and mitigate for noise, human activity, and light that may emanate from the Site.

Buc-ee's will also be implementing noise, light, and food waste mitigation measures as recommended by CPW and outlined in this EA. These are intended to avoid human-wildlife conflicts on the Site and reduce disruption to wildlife behavior in adjacent open space to support long-term ecosystem function in the broader landscape.

Water quality concerns to downstream receiving waters are addressed separately in other Project documents.

8.0 REFERENCES

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Appendix A

USFWS IPaC Trust Resource Report

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

El Paso County, Colorado

Local office

Colorado Ecological Services Field Office

(303) 236-4773
(303) 236-4005

MAILING ADDRESS
Denver Federal Center
P.O. Box 25486
Denver, CO 80225-0486

PHYSICAL ADDRESS
1 Denver Federal Center
Bldg 53 Room Fw100}
Denver, CO 80225-0001

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Preble's Meadow Jumping Mouse Zapus hudsonius preblei Wherever found There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/4090	Threatened

Birds

NAME	STATUS
Eastern Black Rail Laterallus jamaicensis ssp. jamaicensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10477	Threatened
Piping Plover Charadrius melodus This species only needs to be considered if the following condition applies: • Project includes water-related activities and/or use in the N. Platte, S. Platte, and Laramie River Basins which may affect listed species in Nebraska. There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/6039	Threatened
Whooping Crane Grus americana There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/758	Endangered

Fishes

NAME	STATUS

Pallid Sturgeon Scaphirhynchus albus Wherever found This species only needs to be considered if the following condition applies: • Water use or contamination may adversely affect the species. Within the Platte River basin, depletions may adversely affect the species. These affects must be considered even outside occupied range. See local FWS office for more information. No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7162	Endangered

Insects

NAME	STATUS
Monarch Butterfly Danaus plexippus Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Suckley's Cuckoo Bumble Bee Bombus suckleyi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10885	Proposed Endangered

Flowering Plants

NAME	STATUS
Ute Ladies'-tresses Spiranthes diluvialis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/2159	Threatened
Western Prairie Fringed Orchid Platanthera praeclara Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1669	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their nests, should follow appropriate regulations and implement required avoidance and minimization measures, as described in the various links on this page.

The data in this location indicates that no eagles have been observed in this area. This does not mean eagles are not present in your project area, especially if the area is difficult to survey. Please review the 'Steps to Take When No Results Are Returned' section of the Supplemental Information on Migratory Birds and Eagles document to determine if your project is in a poorly surveyed area. If it is, you may need to rely on other resources to determine if eagles may be present (e.g. your local FWS field office, state surveys, your own surveys).

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Measures for Proactively Minimizing Migratory Bird Impacts

Your IPaC Migratory Bird list showcases birds of concern, including Birds of Conservation Concern (BCC), in your project location. This is not a comprehensive list of all birds found in your project area. However, you can help proactively minimize significant impacts to all birds at your project location by implementing the measures in the Nationwide avoidance and minimization measures for birds document, and any other project-specific avoidance and minimization measures suggested at the link Measures for avoiding and minimizing impacts to birds for the birds of concern on your list below.

Ensure Your Migratory Bird List is Accurate and Complete

If your project area is in a poorly surveyed area, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information on Migratory Birds and Eagles document, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

Review the FAQs
The FAQs below provide important additional information and resources.

NAME	BREEDING SEASON
Broad-tailed Hummingbird Selasphorus platycercus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 25 to Aug 21
Ferruginous Hawk Buteo regalis This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/6038	Breeds Mar 15 to Aug 15
Northern Harrier Circus hudsonius This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8350	Breeds Apr 1 to Sep 15

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

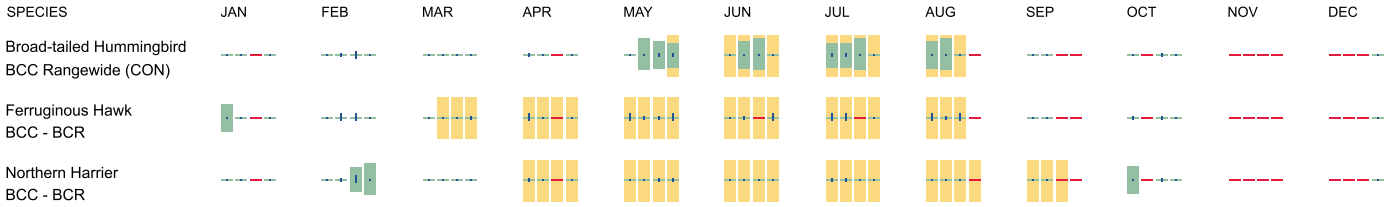
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort – no data



Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

RIVERINE
R4SBC

A full description for each wetland code can be found at the National Wetlands Inventory website

NOTE: This initial screening does **not** replace an on-site delineation to determine whether wetlands occur. Additional information on the NWI data is provided below.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

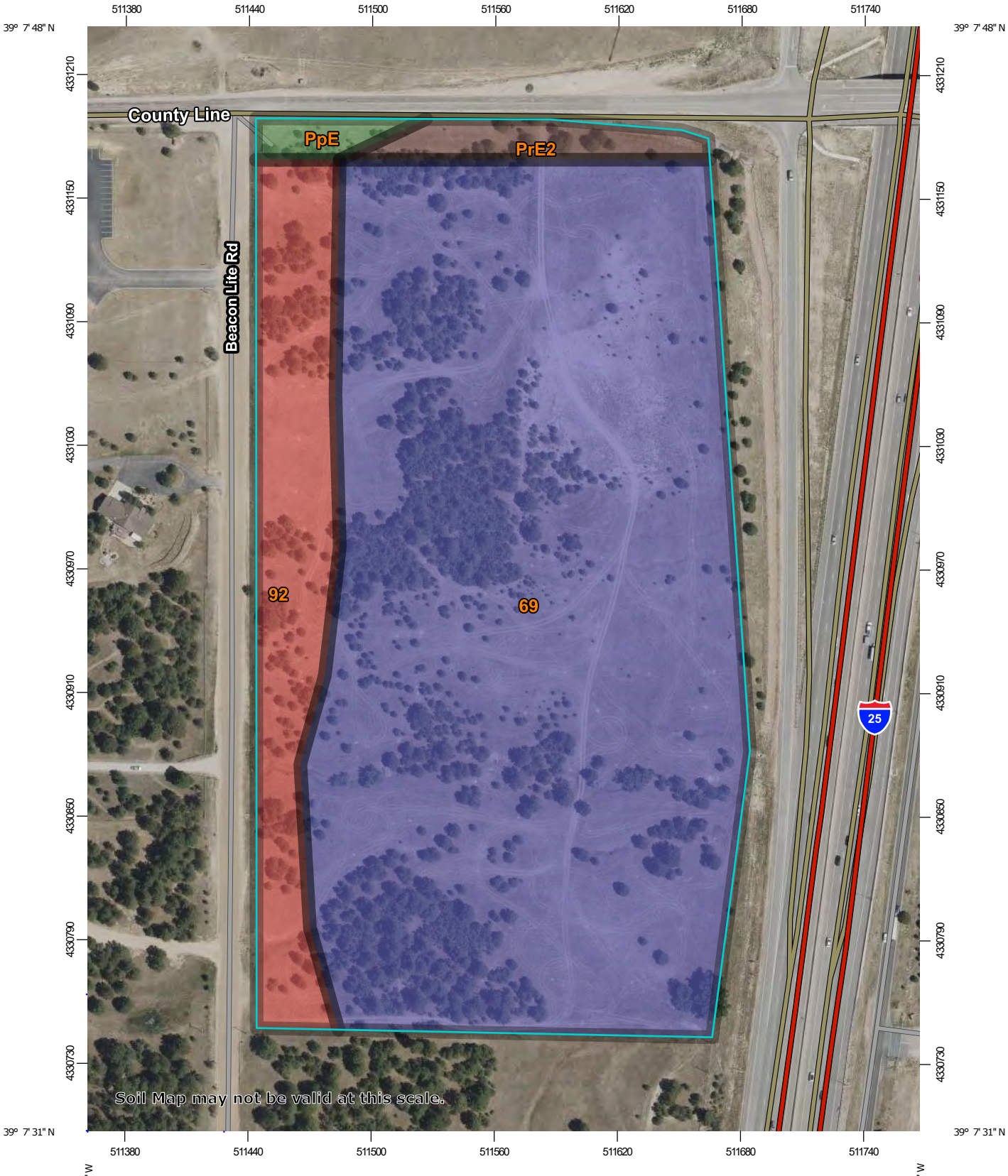
Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Appendix B

USDA Custom Soil Resource Report

Map Unit Name—Castle Rock Area, Colorado, and El Paso County Area, Colorado
(BUCEES_SITE BNDRY_ROUGH)



Map Scale: 1:2,610 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 35 70 140 210

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Peyton-Pring complex, 8 to 15 percent slopes
- Peyton-Pring-Crowfoot complex, 3 to 15 percent slopes, eroded
- Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes
- Tomah-Crowfoot loamy sands, 3 to 8 percent slopes
- Not rated or not available

Soil Rating Lines

- Peyton-Pring complex, 8 to 15 percent slopes
- Peyton-Pring-Crowfoot complex, 3 to 15 percent slopes, eroded
- Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes
- Tomah-Crowfoot loamy sands, 3 to 8 percent slopes
- Not rated or not available

Soil Rating Points

- Peyton-Pring complex, 8 to 15 percent slopes
- Peyton-Pring-Crowfoot complex, 3 to 15 percent slopes, eroded
- Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes
- Tomah-Crowfoot loamy sands, 3 to 8 percent slopes
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:20,000 to 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Castle Rock Area, Colorado
Survey Area Data: Version 17, Aug 29, 2024

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 22, Sep 3, 2024

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 23, 2024—Aug 4, 2024

Map Unit Name

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
PpE	Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes	Peyton-Pring-Crowfoot sandy loams, 5 to 25 percent slopes	0.3	1.2%
PrE2	Peyton-Pring-Crowfoot complex, 3 to 15 percent slopes, eroded	Peyton-Pring-Crowfoot complex, 3 to 15 percent slopes, eroded	0.7	2.8%
Subtotals for Soil Survey Area			**1.0**	**4.0%**
Totals for Area of Interest			**25.3**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
69	Peyton-Pring complex, 8 to 15 percent slopes	Peyton-Pring complex, 8 to 15 percent slopes	20.7	81.8%
92	Tomah-Crowfoot loamy sands, 3 to 8 percent slopes	Tomah-Crowfoot loamy sands, 3 to 8 percent slopes	3.6	14.2%
Subtotals for Soil Survey Area			**24.3**	**96.0%**
Totals for Area of Interest			**25.3**	**100.0%**

Description

A soil map unit is a collection of soil areas or nonsoil areas (miscellaneous areas) delineated in a soil survey. Each map unit is given a name that uniquely identifies the unit in a particular soil survey area.

Rating Options

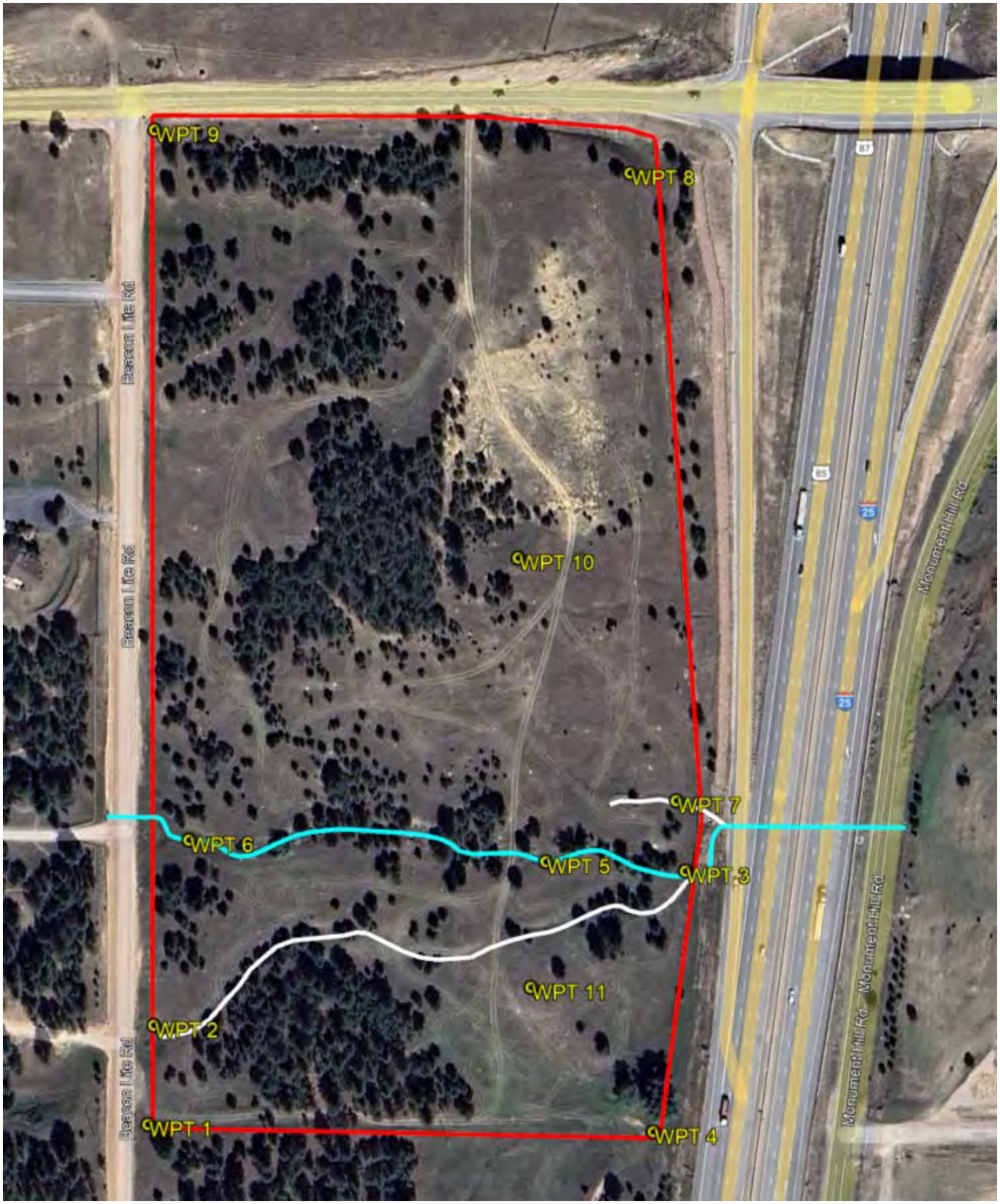
Aggregation Method: No Aggregation Necessary

Tie-break Rule: Lower

Appendix C

Photo Location Map and Representative Photos

Photo Location Map



Representative Photos

WTP 1: View north of ponderosa pine forest and midgrass prairie from southwest corner of the Site.

WTP 1: View east of ponderosa pine forest and midgrass prairie from southwest corner of the Site.

WTP 2: View east of upstream portion of Swale 1 from Beacon Lite Road.

WTP 3: View south of downstream portion of Swale 1 near I-25.

WTP 3: View west of downstream portion of Channel 1 near I-25.

WTP 3: View northeast of wildlife fence and ramp adjacent to I-25.

WTP 4: View west of midgrass prairie meadow and ponderosa pine forest from southeast corner of the Site near I-25.

WTP 4: View north of midgrass prairie meadow and ponderosa pine forest from southeast corner of the Site near I-25.

WTP 5: View of downstream portion of Channel 1 below old ranch road (two-track).

WTP 5: View upstream of Channel 1 downstream of old ranch road (two-track) and culvert.

WTP 6: View downstream of Channel 1 near Beacon Lite Road.

WTP 6: View upstream of Channel 1 toward Beacon Lite Road.

WTP 7: View downstream of confluence of Channel 1, Swale 1 and Swale 2 towards I-25, 24-onche culvert, wildlife fence and ramp.

WTP 7: View west of Swale 2 from I-25 Site boundary near I-25.

WTP 8: View south of midgrass prairie (ponderosa savannah) and I-25 corridor from northeast corner of the Site.

WTP 8: View southwest of midgrass prairie (ponderosa savannah) and I-25 corridor from northeast corner of the Site.

WTP 8: View west of midgrass prairie (ponderosa savannah) and Palmer Divide Road from northeast corner of the Site.

WTP 9: View east of midgrass prairie and ponderosa pine forest from northwest corner of the Site at Palmer Divide Road and Beacon Lite Road intersection.

WTP 9: View south of midgrass prairie and ponderosa pine forest from northwest corner of the Site at Palmer Divide Road and Beacon Lite Road intersection.

WTP 10: View north of midgrass prairie and ponderosa pine forest from center of the Site.

WTP 10: View northeast of midgrass prairie and ponderosa pine forest from center of the Site.

WTP 10: View east of midgrass prairie and ponderosa pine forest and I-25 from center of the Site.

WTP 10: View southeast of midgrass prairie and ponderosa pine forest and I-25 from center of the Site.

WTP 10: View south of midgrass prairie and ponderosa pine forest from center of the Site.

WTP 10: View south of midgrass prairie and ponderosa pine forest from center of the Site.

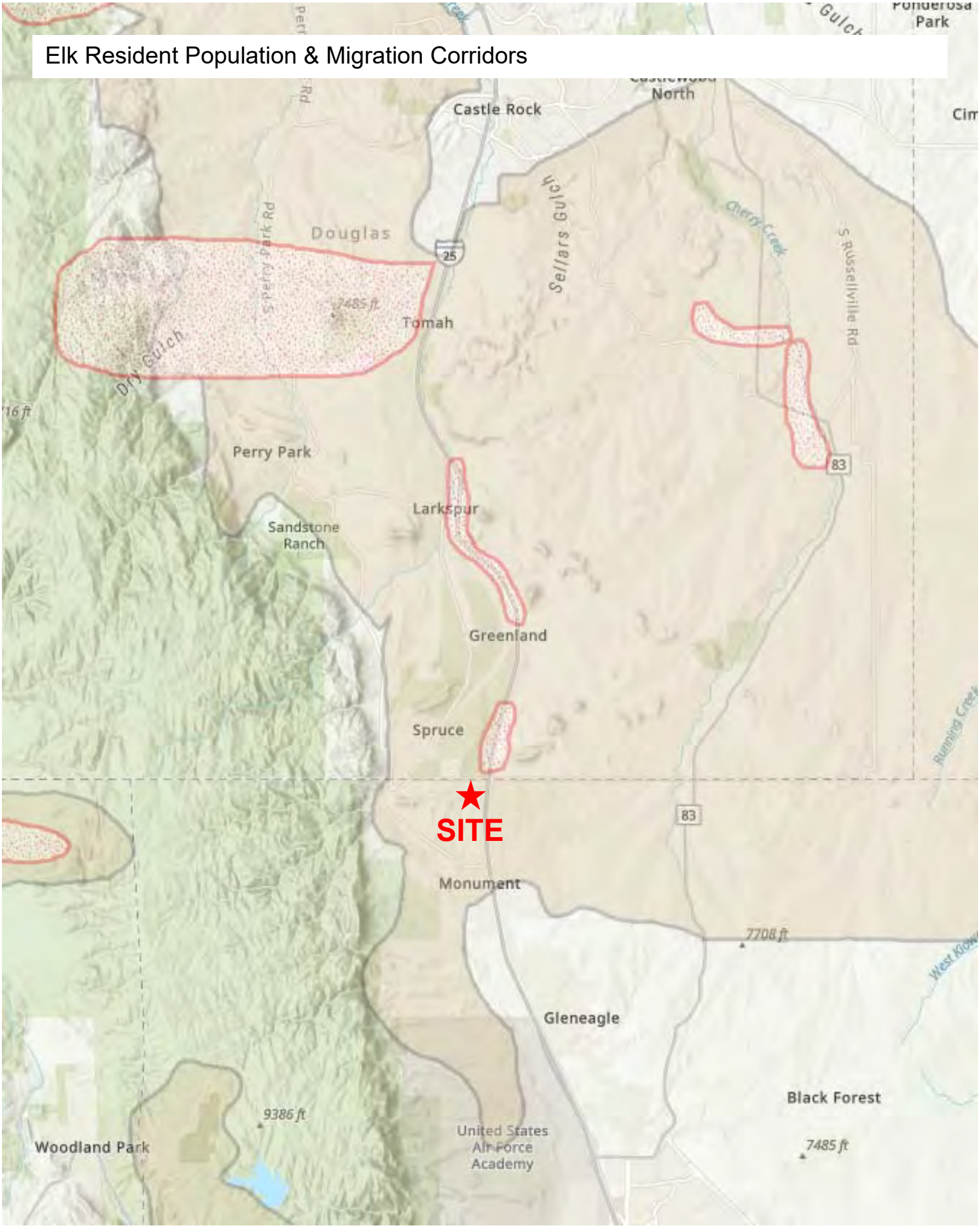
WTP 11: View east of midgrass prairie and ponderosa pine forest and I-25 from south-central portion of the Site.

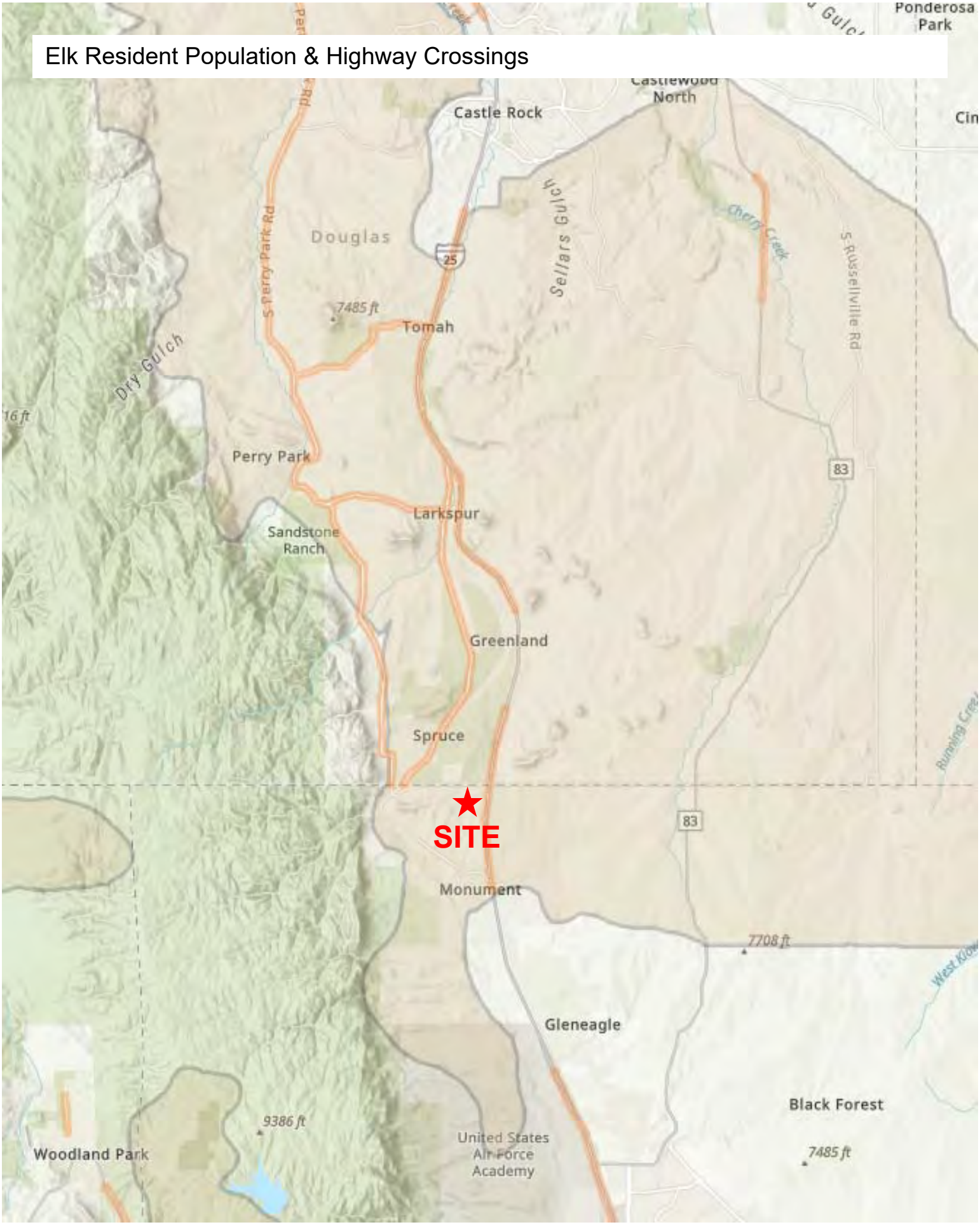
WTP 11: View southeast of midgrass prairie and ponderosa pine forest and I-25 from south-central portion of the Site.

WTP 11: View south of midgrass prairie and ponderosa pine forest beyond southern site boundary.

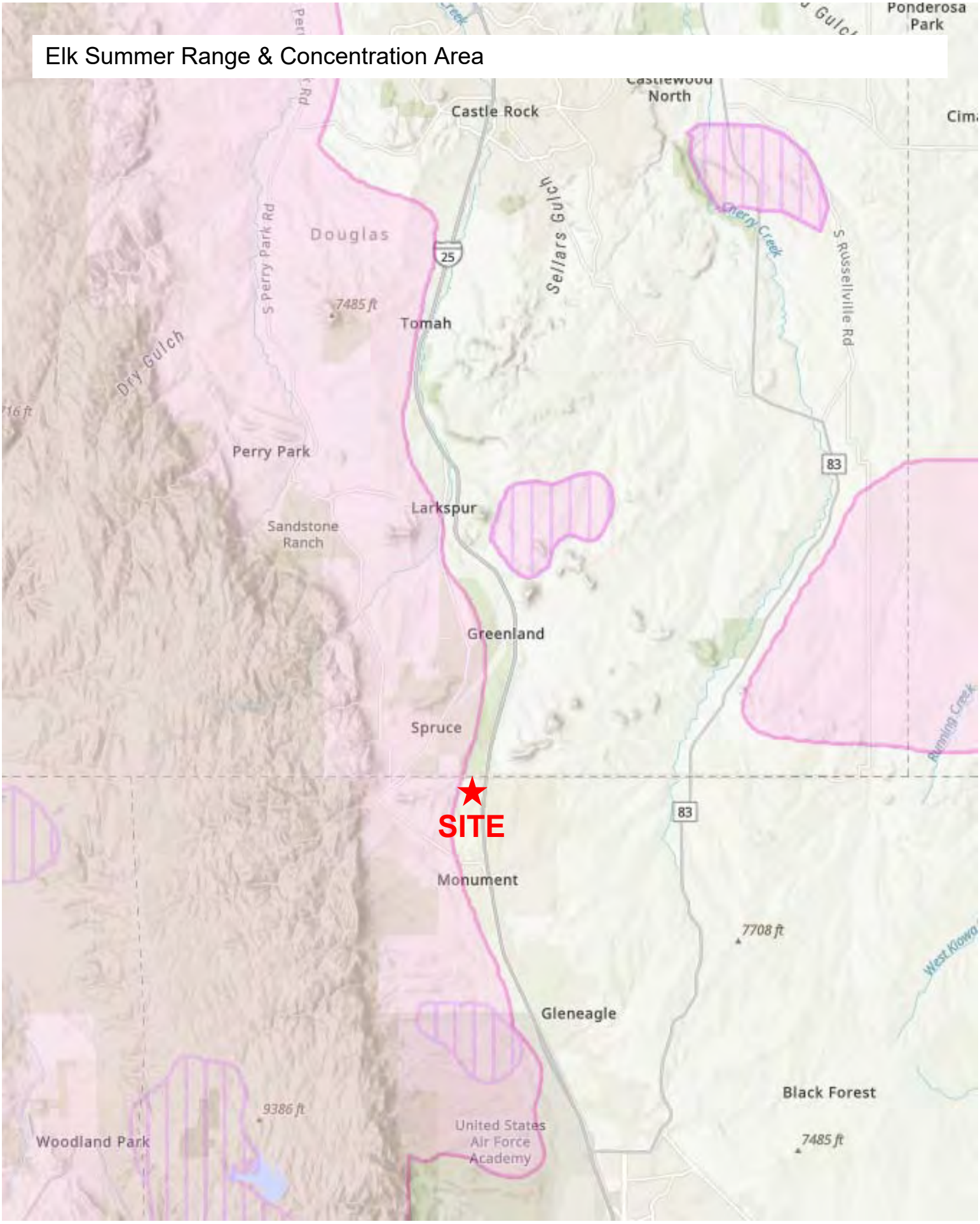
Appendix D

Elk and Mule Deer Habitat Maps

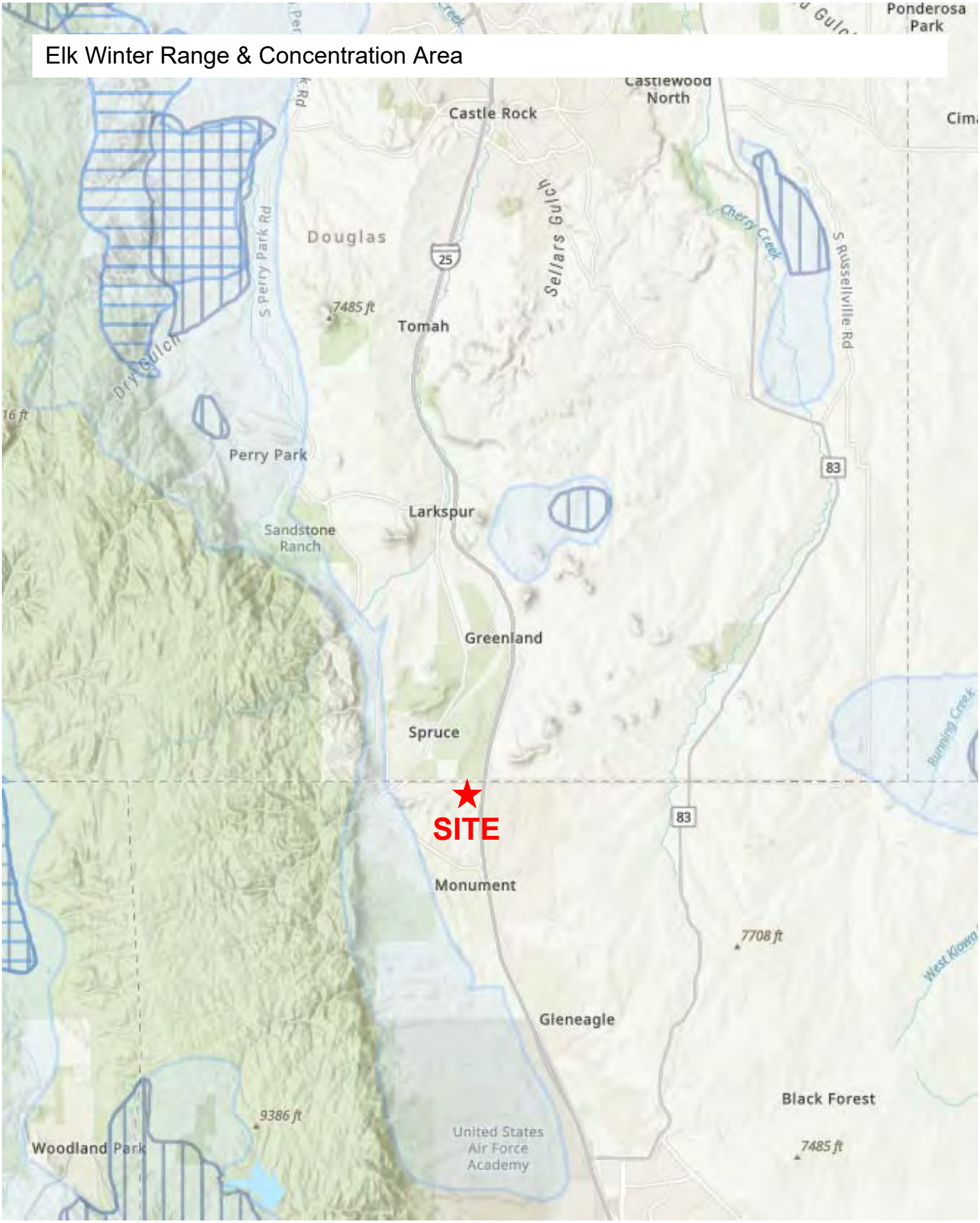

Elk Resident Population & Migration Corridors
Castle Rock
North
Douglas
25
Sellars Gulch
Cherry Creek
S Russellville Rd
S Perry Park Rd
7485 ft
Tomah
Dry Gulch
Perry Park
83
Larkspur
Sandstone Ranch
Greenland
Spruce
SITE
83
Monument
7708 ft
Gleneagle
Black Forest
9386 ft
Woodland Park
United States Air Force Academy
7485 ft


Elk Resident Population & Highway Crossings
Ponderosa Park
Castle Rock
Castlewood North
Douglas
25
Sellars Gulch
Cherry Creek
S Russellville Rd
S Perry Park Rd
7485 ft
Tomah
Dry Gulch
Perry Park
83
Larkspur
Sandstone Ranch
Greenland
Spruce
SITE
83
Monument
7708 ft
Gleneagle
Black Forest
9386 ft
Woodland Park
United States Air Force Academy
7485 ft

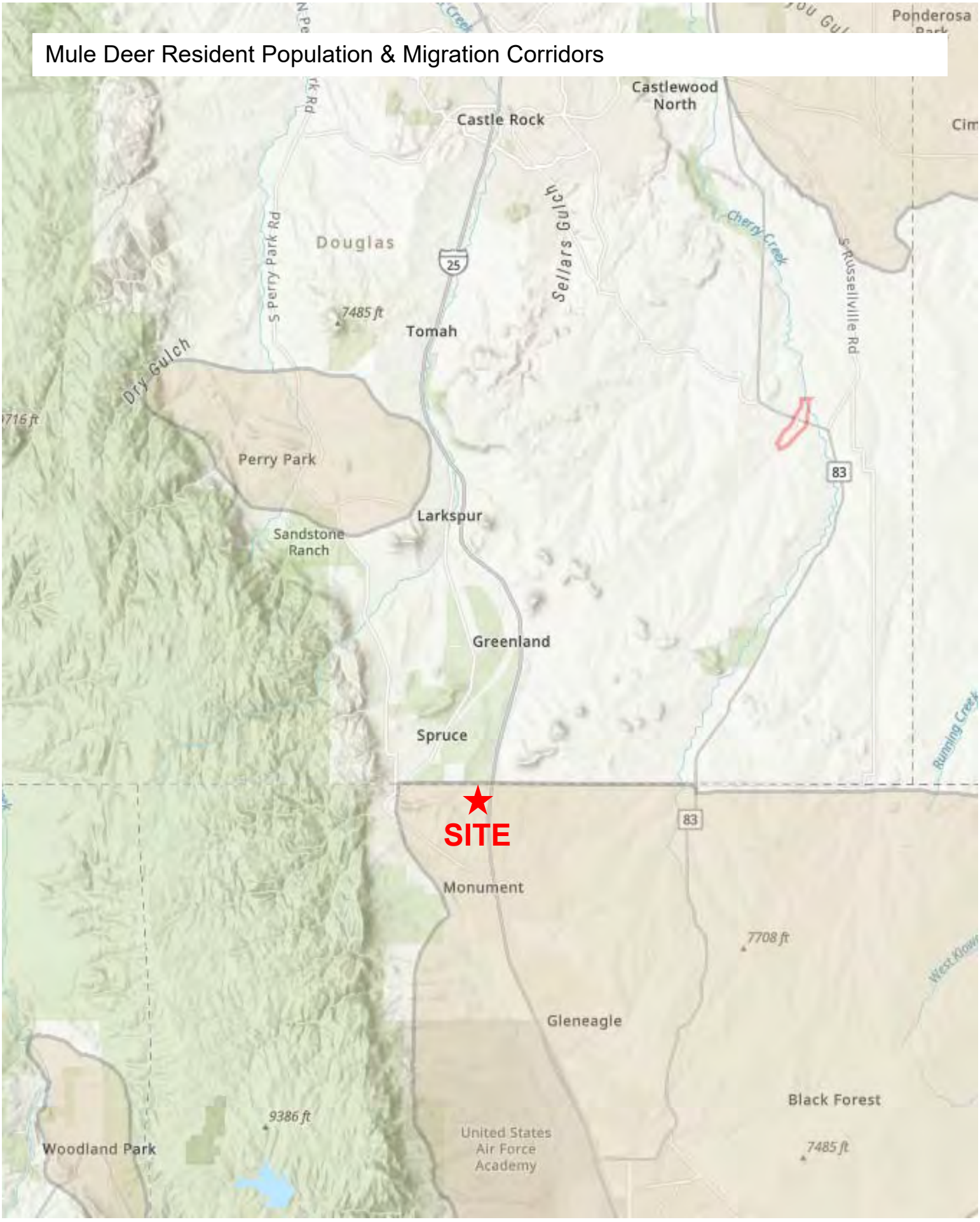
Elk Summer Range & Concentration Area

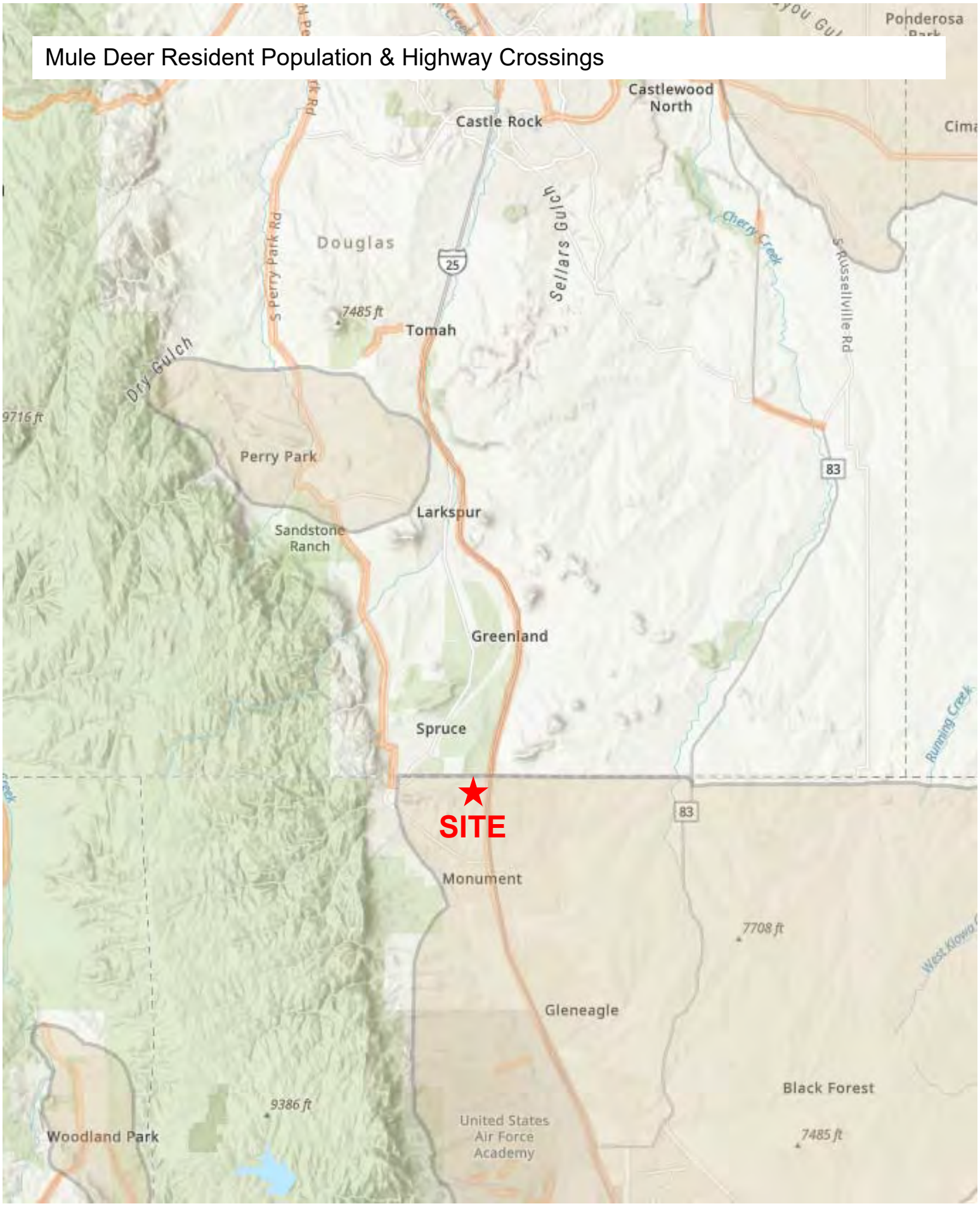


Elk Winter Range & Concentration Area

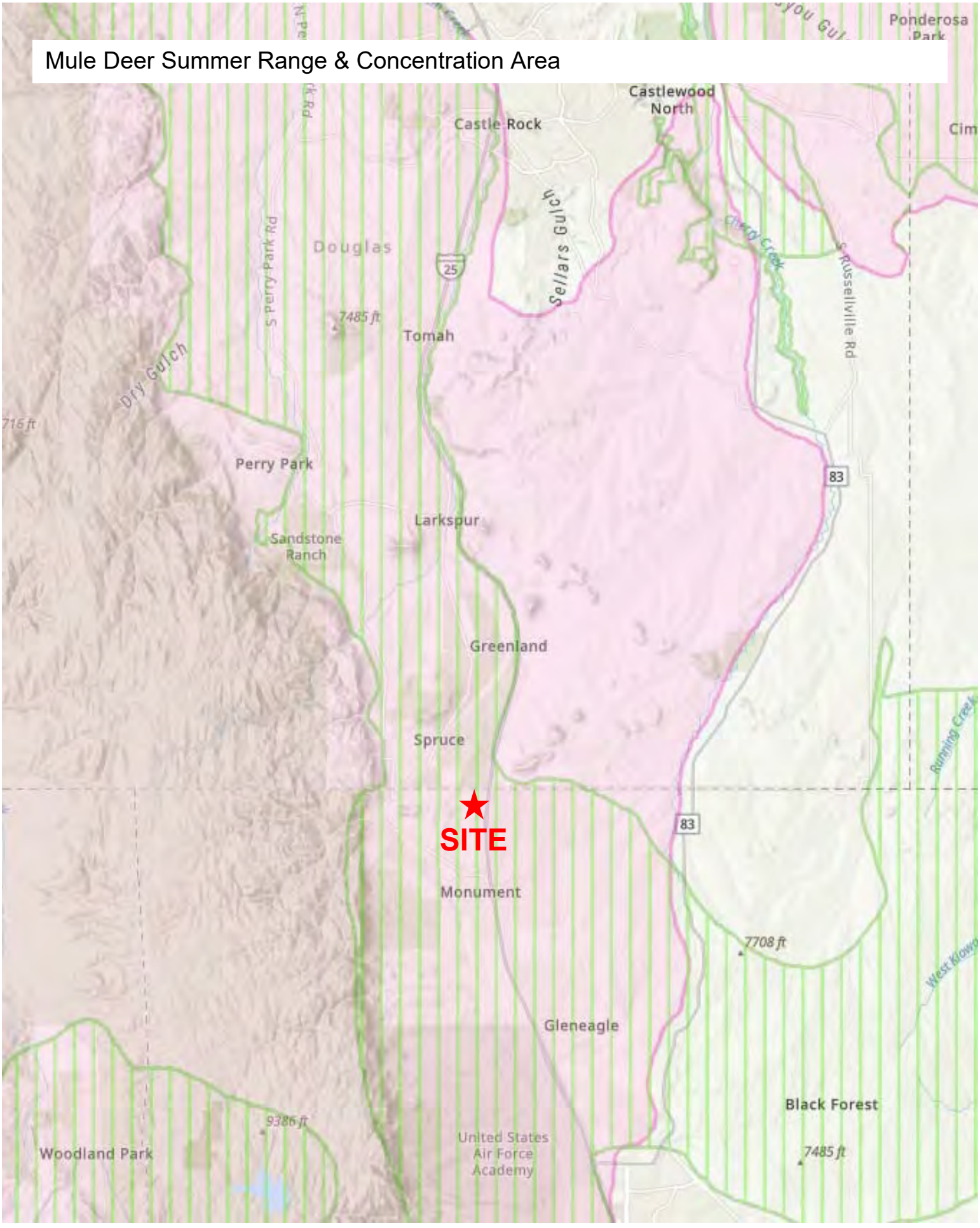


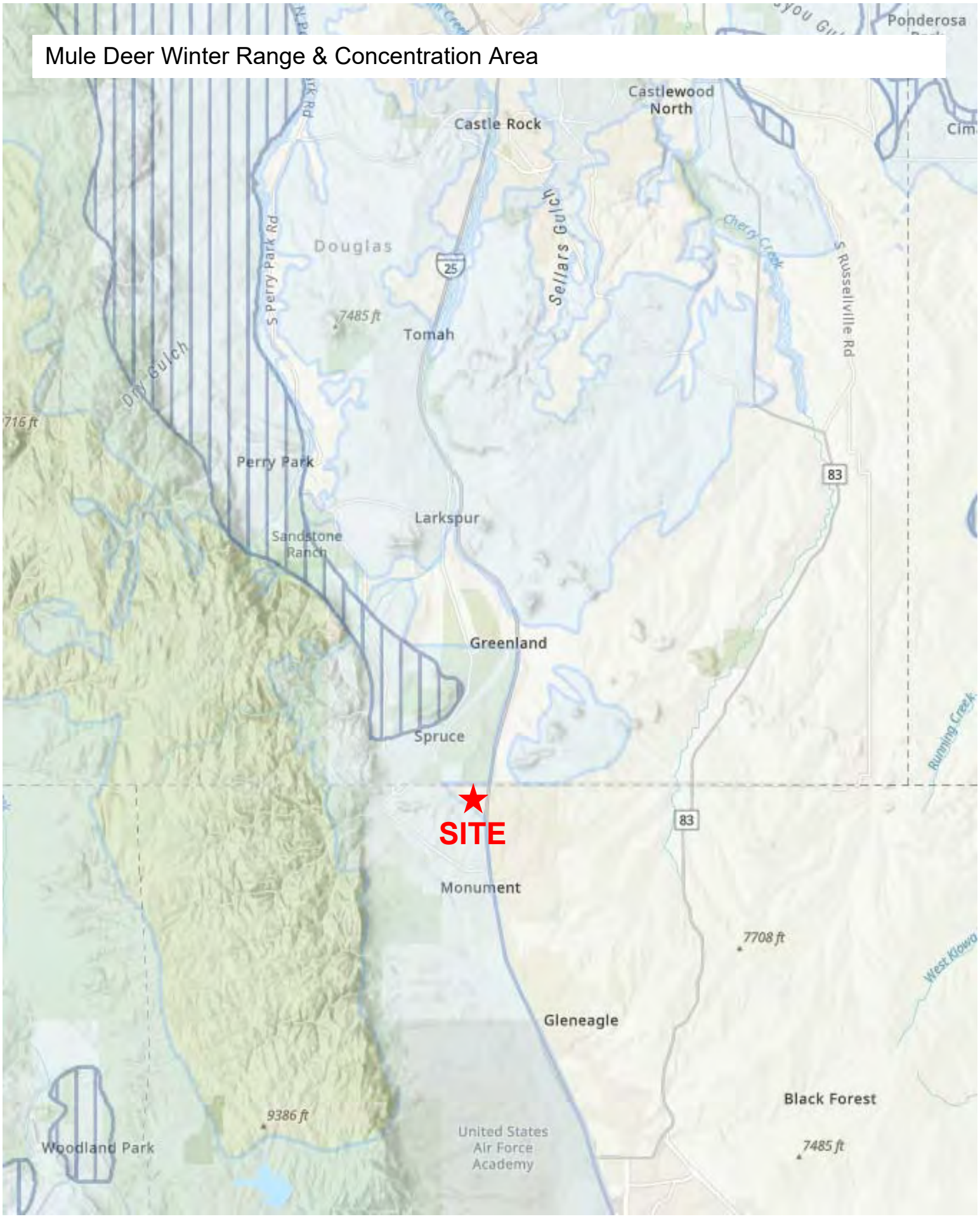
Mule Deer Resident Population & Migration Corridors



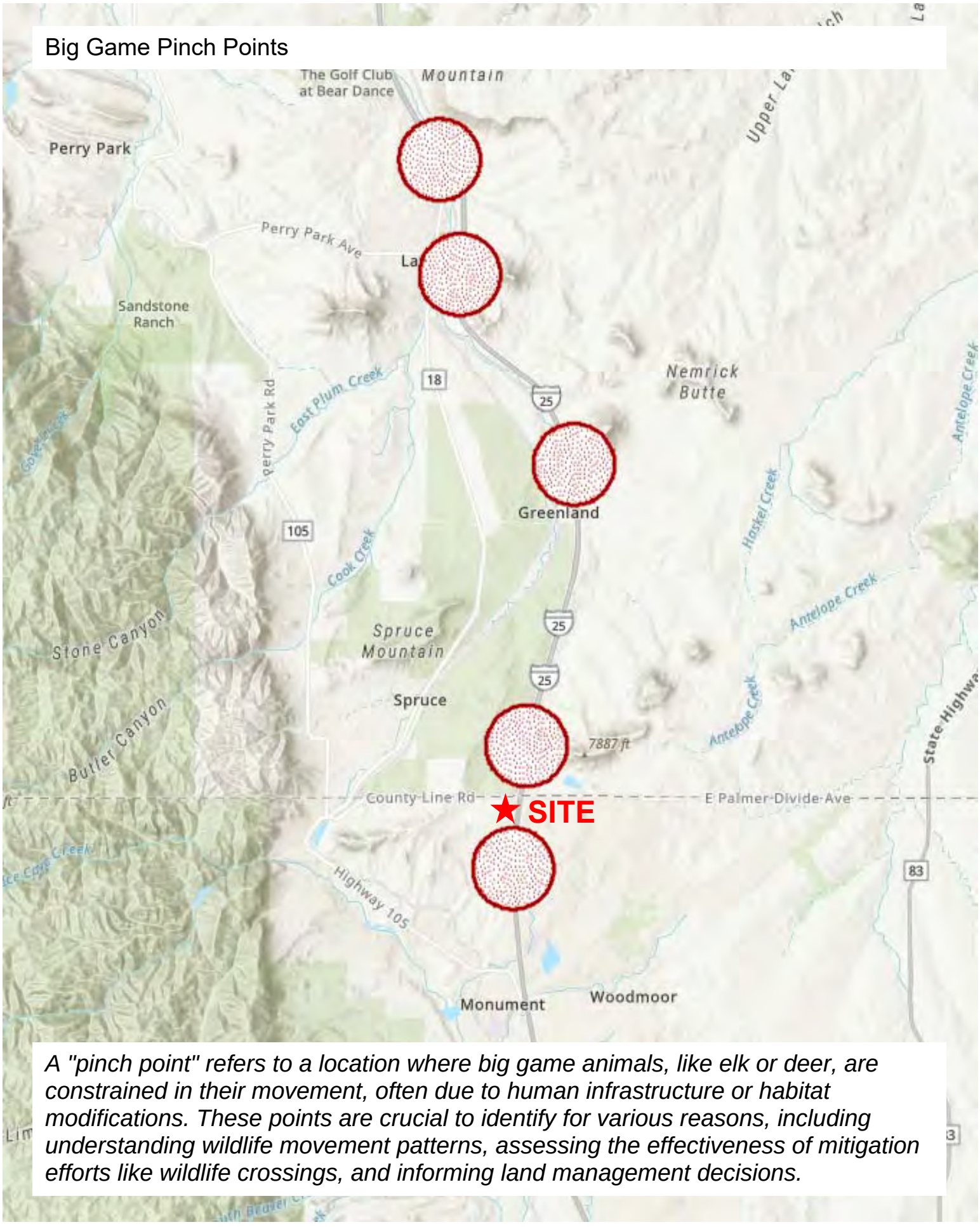

Mule Deer Resident Population & Highway Crossings
Ponderosa
Castlewood North
Castle Rock
Douglas
25
Sellars Gulch
Cherry Creek
S Russellville Rd
S Perry Park Rd
7485 ft
Tomah
Dry Gulch
9716 ft
Perry Park
83
Larkspur
Sandstone Ranch
Greenland
Spruce
Running Creek
SITE
83
Monument
7708 ft
Gleneagle
Black Forest
9386 ft
Woodland Park
United States Air Force Academy
7485 ft

Mule Deer Summer Range & Concentration Area




Mule Deer Winter Range & Concentration Area
Ponderosa
Castlewood North
Castle Rock
Douglas
25
Sellars Gulch
Cherry Creek
S Russellville Rd
S Perry Park Rd
7485 ft
Tomah
Dry Gulch
716 ft
Perry Park
83
Larkspur
Sandstone Ranch
Greenland
Spruce
SITE
83
Monument
7708 ft
Gleneagle
Black Forest
9386 ft
Woodland Park
United States Air Force Academy
7485 ft

Big Game Pinch Points

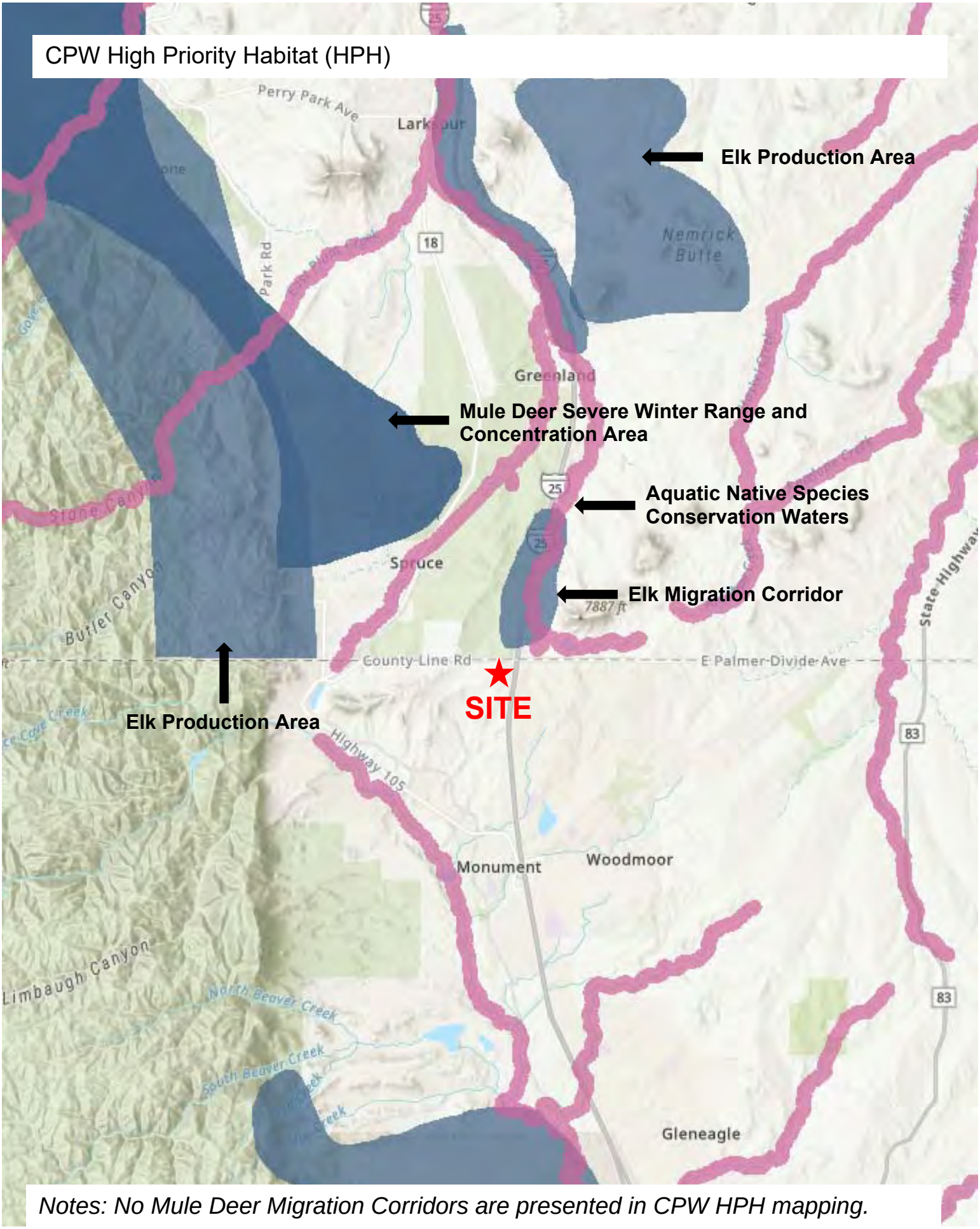


A "pinch point" refers to a location where big game animals, like elk or deer, are constrained in their movement, often due to human infrastructure or habitat modifications. These points are crucial to identify for various reasons, including understanding wildlife movement patterns, assessing the effectiveness of mitigation efforts like wildlife crossings, and informing land management decisions.

Source: CPW – Wildlife Species Map Application, accessed 6/3/25

Appendix E

CPW High Priority Habitat

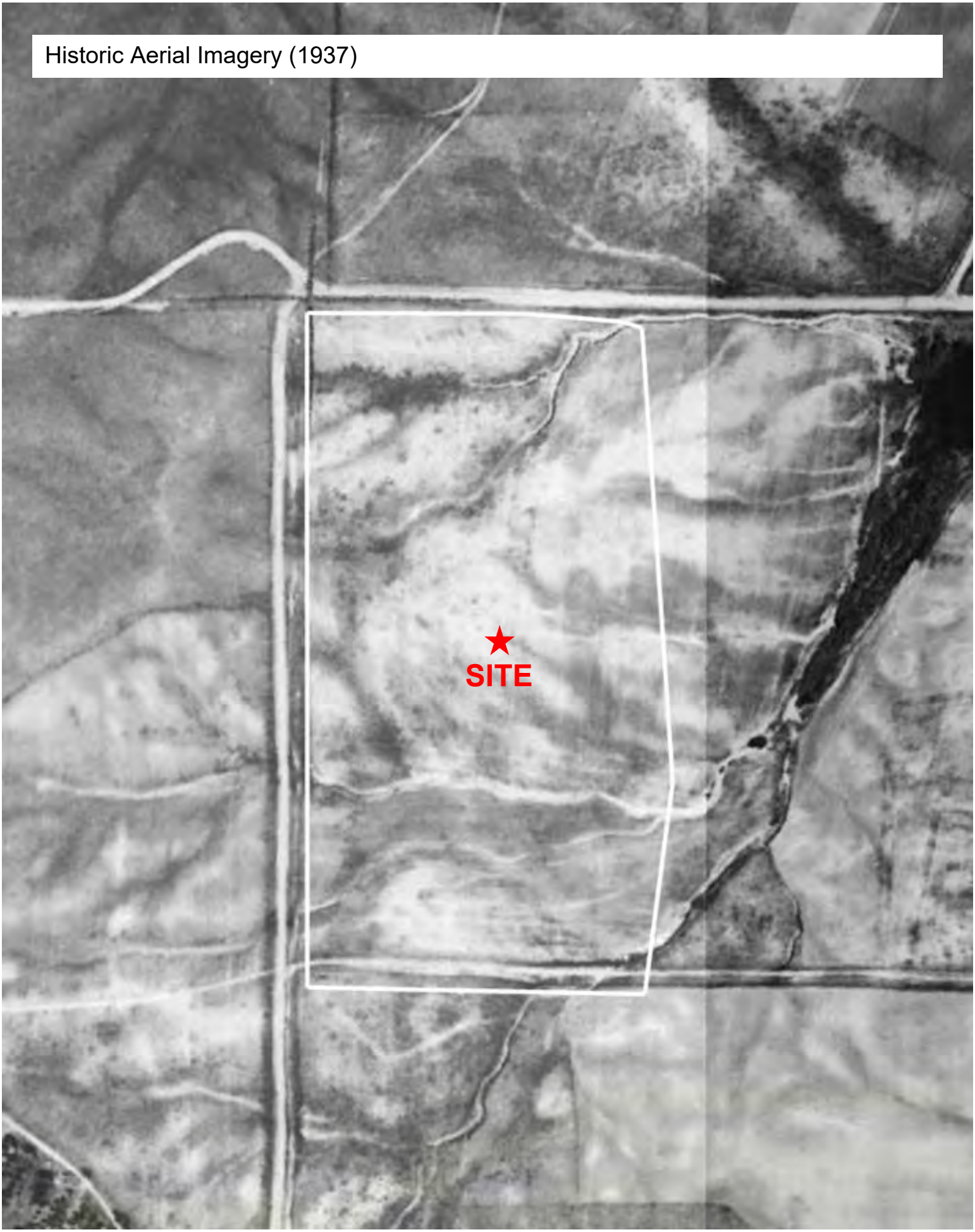


Notes: No Mule Deer Migration Corridors are presented in CPW HPH mapping.

Source: Colorado Parks and Wildlife (CPW) High Priority Habitat (HPH) Web Map Application

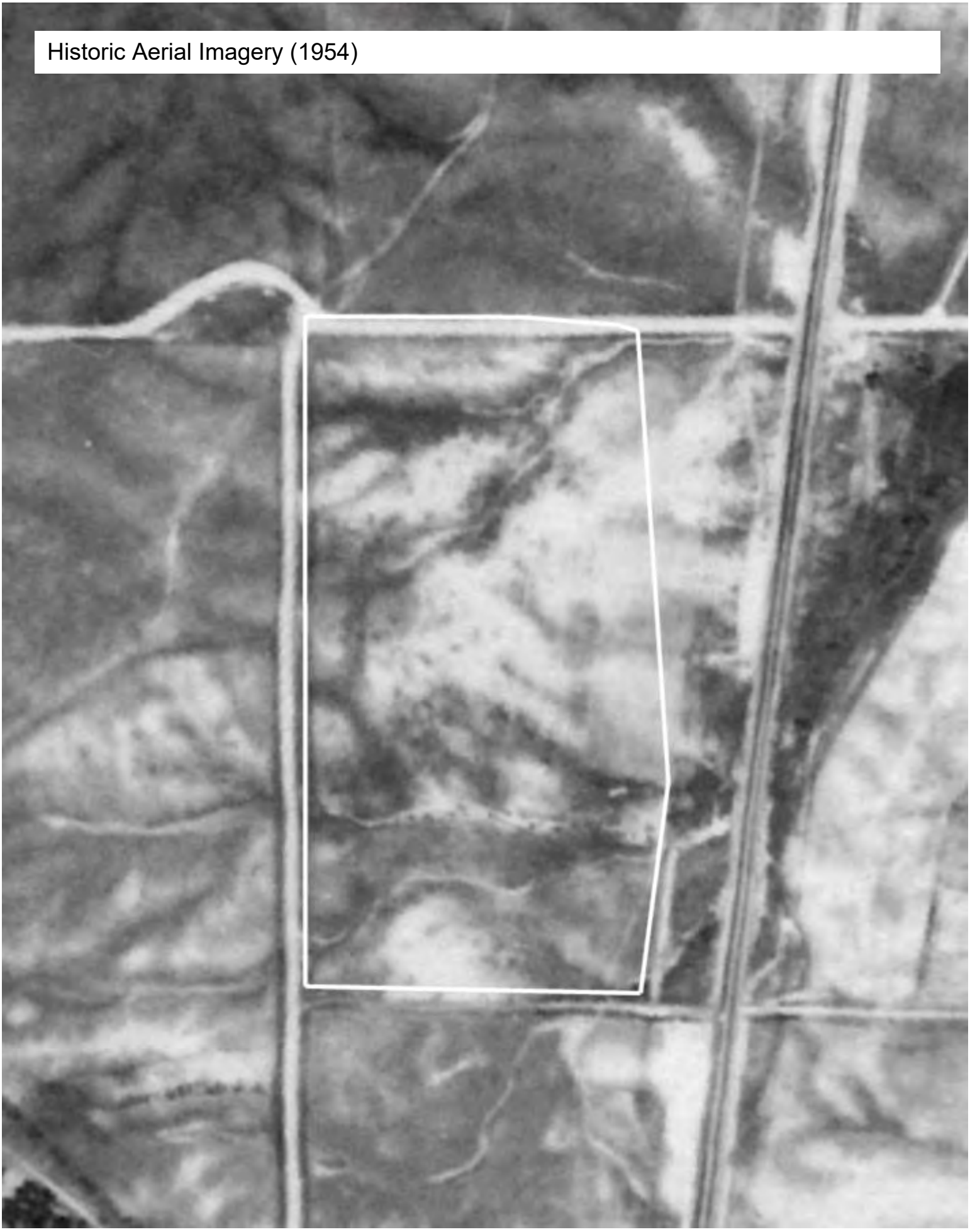
Appendix F

Historic Aerial Imagery



Source: Google Earth, 12/31/1936

Historic Aerial Imagery (1954)



Source: Google Earth, 12/31/1954

Source: Google Earth, 6/26/1993

Source: Google Earth, 9/29/1999

Source: Google Earth, 6/16/2005

Source: Google Earth, 10/7/2010

Source: Google Earth, 11/2/2015

Source: Google Earth, 5/5/2020

Source: Google Earth, 5/29/2025

Appendix G

Professional Qualifications

ecos ecosystem services LLC

RESUME

Jon Dauzvardis, M.L.A, P.W.S.

Owner/Managing Partner
Senior Restoration Ecologist
Senior Wetland Ecologist
Landscape Architect

AREAS OF EXPERTISE:

- Vegetation Inventories and Mapping
- Habitat Assessment, Functional Assessment and Wetland Delineation
- Aquatic, Wetland, and Riparian Restoration Ecology, Planning and Design
- Landscape Ecology, Planning and Landscape Architecture
- Conservation and Resource Mitigation Bank Support Services
- Grant Funding Support for Conservation and Restoration Projects
- Open Space and Trail Planning, Design and Habitat Management
- Construction Oversight & Best Management Practices
- AutoCAD, Mapping, Presentation Graphics

EDUCATION:

- Master of Landscape Architecture, Texas A&M University, College Station, Texas, 1995
- Bachelor of Science, Environmental Design, University of Missouri, Columbia, 1991
- Architecture Study, Harvard University Graduate School of Design, Cambridge, Massachusetts, 1989

EMPLOYMENT HISTORY:

- 2008-Present, Owner/Manager and Senior Restoration Ecologist, Ecosystem Services, LLC, Erie Colorado
- 2000 – 2011, Senior Restoration Ecologist, Walsh Environmental Scientists and Engineers, LLC, Boulder, Colorado
- 1997 – 2000, Restoration Ecologist, Construction Supervisor, Aquatic and Wetland Company, Boulder, Colorado
- 1996-1997, Landscape Architect, Design Studios West, Denver, Colorado
- 1995-1996, Landscape Architect, Wenk Associates, Denver, Colorado
- 1994-1995, Graduate Researcher, ALCOA – Texas A&M University, College Station, Texas
- 1994, Johnson County Parks and Recreation Department, Shawnee Mission, Kansas
- 1992-1994, Grounds Maintenance Superintendent, Brazos County, Texas

CONTINUING EDUCATION:

- Stream Functions Pyramid Workshop, Denver, CO - 2014
- Colorado Natural Heritage Program, Wetland Plant Identification - 2014
- Colorado Natural Heritage Program, Ecological Integrity Assessment for Colorado Wetlands - 2013
- FACWet – Functional Assessment of Colorado Wetlands - 2010, 2012 and 2013
- ESRI, ARC View Geographic Information System (GIS) Training, 1996
- Bicycle Planning and Facilities Training, 1994
- AutoCAD Drafting and Design, Self-taught, 1991

CERTIFICATIONS:

- Professional Wetland Scientist Certification (# 1699), Society of Wetland Scientists Certification Program, 2004

EXPERIENCE SUMMARY:

Mr. Dauzvardis is a founder and managing partner of Ecosystem Services, LLC (ECOS), an ecological planning and design business dedicated to the restoration, enhancement and creation of aquatic, wetland and riparian habitat. Jon is a certified Professional Wetland Scientist with 30 years of experience working as a landscape architect and restoration ecologist in Colorado, Wyoming, Texas, Kansas and the Intermountain West. Jon's academic and professional work history in home design and construction, community planning, architecture, landscape architecture, ecological planning and restoration is unique and makes him a valuable and multi-faceted asset to his company, clients and their projects. His diverse knowledge and skills in landscape planning, habitat design, graphic communications, bioengineering, and hands-on experience demonstrate that he can easily negotiate between art and science, man-made and natural systems, generalities, and detail from concept to construction to monitoring to maintenance. Jon takes a practical and realistic approach to problem solving, concentrating on broad scale ecological master planning simultaneously with fine scale design. Jon's specialty is in restoring and enriching habitat structure, stability, and health and how to manage and maintain landscapes and natural systems so that they function, change, and respond positively over time. Jon's strengths are rooted in his understanding of natural and landscape processes; finding design solutions that integrate the needs of people, wildlife, and visual quality; sustaining ecosystem goods, services, and nature-based recreation. The formation of ECOS and Jon's experience has culminated in the completion of over a thousand projects that have resulted in the conservation of hundreds of miles and acres of stream, riparian, and wetland habitat – habitat that provides essential ecosystem services and ecological benefits for all those that inhabit the communities we serve.

RELEVANT PROJECT EXPERIENCE:

Mr. Dauzvardis has been an essential team lead and player in hundreds of habitat assessment; permitting efforts; master plans; and aquatic, wetland, riparian, and upland habitat design and mitigation projects. The following is a sampling of select projects that Jon has successfully completed and clientele that he is currently involved with:

Habitat Assessment, Permitting and Regulatory Compliance

Mr. Dauzvardis routinely performs ecological site and resource impacts assessments, jurisdictional waters and wetland determinations and functional assessments to assist clients in site planning, design, and preparation of Clean Water Act (CWA), Endangered Species Act (ESA), Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA) permits where assessment methods established by the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, and Colorado Department of Transportation among others are required to assess habitat elements for threatened and endangered plants and animals, wetlands, migratory birds, raptors and other wildlife. During permitting processes, Jon stresses habitat impact avoidance and minimization to maximize a site's ecosystem services, values and benefits and to minimize regulatory constraints, timing and costs. Jon has conducted a 100's of site assessments, habitat delineations, and prepared permits covering 1000's of acres throughout the Inter Mountain West, including but not limited to the following notable projects and clientele across many market sectors:

- **Silver Charm Fire Habitat Impact Assessment, Colorado Springs, CO** – ecos performed an impact assessment of PMJM habitat on Black Squirrel Creek that was burned by the Silver Charm Wildfire to facilitate an insurance claim and reparations for multiple years of damaged habitat mitigation and conservation efforts. Ecos mapped the entire perimeter of the Burn Area using mobile GIS/GPS software, gathered geo-referenced photographs and inventoried the mortality of the lost vegetation that was planted for mitigation to meet the life requisites of PMJM. Said information and mapping was assembled in a technical memorandum and coordinated with the USFWS to resolve the loss and prepare a game plan moving forward to ensure our client could take credit for the mitigation to meet ESA Permit requirements.

- **Sand Creek, Black Squirrel Creek, and Kettle Creek Channel Stability Analysis, Colorado Springs, CO** – ecos developed a channel stability analysis protocol that uses the latest scientific research on the behavior of riparian and wetland vegetation under various flood regimes to assist developers in Colorado Springs with floodplain and habitat conservation planning, bed and bank stabilization, and in-channel structure design where needed. The protocol relies on detailed mapping of vegetation classes, utilizes Manning's N coefficients of vegetation, substrate/soil characteristics, surface irregularities and obstructions, channel planform, variations in shape and size of the channel cross-section, and modelled velocity and shear stress to determine the permissible tolerances of existing and proposed vegetation to flood stress. This protocol was developed in response to local codes and ordinances that proposed whole-sale destruction and "stabilization" of riparian and wetland habitat with antiquated stabilization techniques and is now being used by the City and the engineering community to help conserve riparian corridors and habitat occupied by Preble's Meadow Jumping Mouse protected under the ESA.
- **Banning Lewis Ranch, Colorado Springs, CO –** ecos was retained by Norwood Homes to perform an ecological assessment, delineation and mapping of waters and wetlands, including Sand Creek, Jimmy Camp Creek and its tributaries; and provide CWA, ESA, MBTA and BEGPA regulatory guidance for the Banning Lewis Ranch (BLR), an 18,000-acre site that will eventually double the size of Colorado Springs. Part of Jon's work on the project included recommendations on how to buffer and plan for the conservation of pristine prairie, wildlife and sensitive, highly erodible sand-dominated creek systems to maximize their ecological benefits and economic value for our client and future landowners under a regime of increasing urbanization to meet the demands of population growth.
- **Bellvue, Gold Hill and Terry Ranch Pipeline Projects, Larimer County, CO** – ecos was retained by the City of Greeley as Best Management Practices (BMP) Facilitators to provide pre-construction ecological assessment, documentation, upland and wetland site restoration design and post-construction oversight of pipeline reclamation processes. Essential responsibilities include meeting with landowners prior to construction to facilitate project understanding and post-construction outcomes; to document landowner needs and wants relative to project goals and land use; and to document and monitor pre- and post-construction reclamation and maintenance requirements.
- **Appraisal Support Documentation Report for the 1st Bank Parcel, Colorado Springs, CO** - ecos was retained by 1st Bank Holding Company to perform a Preble's meadow jumping mouse (PMJM) habitat assessment, mitigation cost analysis, and conceptual lot layout for the approximate 9.4-acre Parcel located adjacent to the Northgate Open Space along Smith Creek. Jon was responsible for preparing the lot layout, existing habitat aerial photo interpretation/delineation, proposed conceptual mitigation, and quantification of impacts and associated mitigation to ascertain appraisal value of the site if it were to be developed.
- **Encana Oil and Gas (USA), Denver Julesburg Basin, CO** – Encana hired ecos to assess their ecological constraints, recommend means and methods to avoid, minimize and permit impacts; and to mitigate, restore and prepare ecological management plans for their drilling and pipeline operations in the Denver Julesburg basin. Jon's role on the team is to perform site assessments, research background data, and prepare assessment reports and mapping data that can be utilized by Encana's project managers and geographic information systems (GIS) department to proactively track ecological resources before issues arise. In addition to client consultation, Jon is responsible for tracking drill site schedules, constraints, restoration and management efforts in a data base and reporting said information to Encana's project manager on a regular basis.
- **Tollgate Creek Riparian and Wetland Habitat Assessment, Aurora, CO** – Jon performed high level aerial photo interpretation and delineation of riparian and wetland habitat along Toll Gate Creek and East Toll Gate Creek from confluence with Sand Creek upstream to East Hampden Avenue. The delineation was performed in Google Earth and imported into AutoCAD by digitizing riparian and wetland habitat zones. Once complete, the data was turned over to the project engineer to incorporate into a Drainage Master Plan for the Urban Drainage and Flood Control District (UDFCD).
- **Eagle River Meadows Ecological Inventory and Strategic Wetland Action Plan, Edwards, CO** – Mr. Dauzvardis delineated, assessed, and provided an analysis of potential adverse effects to wetlands within a complex site adjacent to the Eagle River. Jon also developed a strategic process and decision making tool to determine avoidance, minimization, low impact development (LID), and mitigation measures in support of a County Sketch Plan application for a Multi-use Health Care Community.

- **Mesa County Colorado Riverfront Trail, Grand Junction, CO** – Jon performed wetland delineation, jurisdictional determination, Section 404 Permitting; and prepared wetland mitigation plans to construct approximately two miles of regional trail along the north side of the Colorado River between the James M. Robb and the Colorado River State Park at Corn Lake.
- **ARCO Upper Clark Fork River Basin Superfund Site Functional Wetland Assessment, MT** – Between 2000 and 2008, Jon managed the assessment team and performed extensive wetland delineation, GPS surveying, functional assessments, and impact mapping and analysis covering a 200 square mile Superfund Site affected by historic mining practices. Assessments we done in preparation for soil remediation of heavy metals, capping of tailings ponds, sediment and dam removal, and implementation of compensatory wetland mitigation plans required under a consent decree. Assessment areas included the Anaconda Smelter, Old Works, Opportunity Ponds, and Milltown Reservoir.
- **Jefferson County Highways & Transportation Department Gunbarrel Bridge Replacement, Oxyoke, CO** – Jon consulted with the USACE, USFWS, CDOT, and the FHWA to document regulatory requirements. Produced a CDOT Wetland Finding Report, Biological Assessment, Preble's meadow jumping mouse and wetland mitigation plans, and helped acquire a Section 404 Permit and Biological Opinion.
- **Pole Canyon Wind Farm, Babcock and Brown, Huerfano County,** CO – Assessed and prepared critical issues analysis and County 1041 Permit application for a 125-megawatt wind farm and associated transmission lines located on a 5,800-acre site. The project included detailed site assessments to document the presence or absence of potential development constraints and site-specific ecological conditions as well as preparation of permit maps, plot plans, and environmental analyses, alternatives analysis, and mitigation measures.
- **Dalton Property Wetland Assessment, Longmont, CO** – Provided site assessment, regulatory analyses, and developed a restoration plan for critical riparian and wetland habitat along Left Hand Creek in Boulder County, CO.
- **Colowyo Coal Mine Wetland Delineation, Meeker,** CO – Delineated 1.5 miles of jurisdictional waters and wetlands in preparation for wetland mitigation design along West New Goodspring Creek.
- **Lafarge Northbank Resources Gravel Pit Wetland Assessment, Rifle, CO** – Delineated and acquired a jurisdictional determination from the USACE for complex tailwater and riparian wetlands along the Colorado River. Prepared gravel pit reclamation plans aimed at providing suitable shallow-water lake edge wetlands to serve as compensatory wetland mitigation.
- **Jefferson County Highways & Transportation Department Highway 73 Expansion, Conifer,** CO – Performed presence/absence study, habitat assessment and documentation of wetlands, Migratory Birds, State Species of Concern, and federally listed T&E Species including Bald eagle, Preble's meadow jumping mouse, the Pawnee montane skipper butterfly and Colorado butterfly plant along a one-mile corridor of highway.
- **Flying Horse Ranch and the Club at Flying Horse Golf Course, Colorado Springs, CO** – Conducted an assessment of wetland habitat, impact avoidance and minimization and Section 404 of the Clean Water Act permitting for a 1500-acre mixed use development and Weiskopf golf course design being implemented by Neiber Golf.
- **C-Lazy-U Nature Conservancy Conservation Easements, Granby, CO** – Prepared ranch-wide resource mapping and documentation of ecological opportunities and constraints of terrestrial, aquatic, riparian, wetland, and threatened and endangered species habitat to facilitate the acquisition of Nature Conservancy conservation easements for majority and minority ranch owners, including Mr. Don Bailey.
- **Village at Avon, Avon, CO** – Delineated wetlands and prepared a Section 404 Permit for the town center expansion and low-density ranchette development.
- **Counties, Municipalities, Metro Districts and Quasi-Public Institutions**: City of Greeley (On-call Services), Town of Lyons (On-call Services), Town of Monument Triview Metro District (On-call Services), Colorado Springs Utilities (On-call Services), Town of Woodland Park (On-call Services), Town of Monument, City of Louisville, City of Westminster, Jefferson County, Todd Creek Village Metro District, Boulder Community Hospital, City of Fort Collins, and the Three-lakes Water and Sanitation District.

- **Residential Developers and Realtors**: Thompson Thrift, Olive Real Estate Group, La Plata Communities, Classic Communities, Vintage Communities, Oakwood Homes, Titan Development, 4 Site Investments, Windsor Ridge Homes, Nor'wood, Stratus Companies, Woodbury Corporation, Koelbel and Company, Proterra Properties, Denver Transit Oriented Development Fund, Windsor Ridge Homes, Clearwater Communities, Schuck Corporation, Equinox Land Group, DR Horton, Melody Homes, Standard Pacific Homes, Gateway American Properties, Zephyr Real Estate Company, Lowell Development Partners, Palmer-McAlister, Stoll Properties, The Bernardi Group, Colorado Commercial Builders, Terra Visions, Smith Creek Holdings, Picolan, Realty Development Services, and Northgate Properties.
- **Commercial and Industrial Developers**: Goodwill, Community Banks of Colorado, First Bank, Atira Group, Leadership Circle, Ridgeway Valley Enterprises, Morley Companies, HF Holdings, Regency Centers, Miller-Weingarten, Gulf Coast Commercial Development, Traer Creek, Mountain Property Associates, Morley Golf, and Executive Consulting, Inc.
- **Planners, Landscape Architects, Architects and Engineers**: Tait and Associates, William Guman and Associates, HR Green, Classic Consulting Engineers, JVA, Otak, CDM Smith, Burns McDonnell, Tetra Tech, Beyers Group, Engineering Analytics, NES Incorporated, URS Corporation, Lynker Technologies, J3 Engineering, DHM Design, Del-Mont Consultants, JW Nakai and Associates, Nolte and Associates, JR Engineering, Hyrdosphere, Executive Consulting Engineers, Muller Engineering, and Farnsworth Group.
- **Educational Institutions**: Mackintosh Academy, Colorado Mountain College - Steamboat Springs, The Classical Academy – Colorado Springs, and Coal Ridge High School – Rifle.
- **Wind Energy Developers**: Cedar Creek Windfarm – Weld County, CO, Wheatland Windfarm – Platte County, WY, Silver Mountain Windfarm – Huerfano County, CO, Pole Canyon Windfarm, Huerfano County, CO.
- **Attorneys**: Vranesh and Raisch, Johnson and Repucci, and Otis, Bedingfield & Peters.

Ecological Master Planning

- **Jackson Creek Land Company PMJM and Wetland Mitigation, Colorado Springs, CO** – ecos has been performing Preble's meadow jumping mouse (PMJM) habitat biological assessments, conservation, mitigation planning and design throughout its range since it was listed under the Endangered Species Act (ESA) in 1995. Among numerous other private land developers in the Colorado Springs areas, ecos is currently assisting the Jackson Creek Land Company and Triview Metropolitan District with the implementation of physical habitat conservation and mitigation measures, including shortgrass prairie, upland hibernaculum, and riparian habitat restoration. Jon is responsible for mapping, design assessment and restoration plan preparation.
- **Park Creek Mitigation Bank, Fort Collins, CO –** ecos was retained by Burns and McDonnell to assess, map, and prepare preliminary mitigation design of aquatic, wetland, riparian and terrestrial habitat in support of a mitigation banking prospectus. Upon completion and acceptance of the prospectus by the USACE, ecos has been tasked to manage the baseline assessment of the site, including groundwater testing, topographic surveys, and hydrology; prepare a detailed habitat design for inclusion in mitigation banking instrument; as well as coordinate design-build process with a selected nursery and contractor. Jon has been responsible for the mapping and preparation of design documents and will co-manage construction and long-term monitoring to help our client meet their performance criteria and sell bank credits.
- **Front Range Umbrella Mitigation Bank, CO –** ecos was retained by Restoration Systems, a nationally renowned wetland mitigation banking firm, to help identify and prepare conceptual design plans for mitigation banking sites to establish the Front Range Umbrella Mitigation Bank. The purpose of the Bank is to provide compensatory mitigation credits for unavoidable, permitted impacts to aquatic, wetland, riparian, upland, wildlife, and threatened and endangered species habitat regulated under the Clean Water and Endangered Species Acts; and to restore, enhance and preserve valuable natural resource functions at degraded mitigation sites within multiple watersheds along Colorado's Front Range. Currently, the Bank is developing banks sites that serve the Cache la Poudre, St. Vrain, Upper South Platte, Fountain and Upper Arkansas watersheds. Jon's primary role on the team is to perform functional habitat assessments; prepare mapping and graphics of baseline and future conditions; grading and plant community design based on hydrologic, hydraulic, and geomorphic modelling and engineering; and communicate with landowners and stakeholders regarding the process, technicalities, and outcomes.

- **Sand Creek Channel Improvements Stability Analysis at Indigo Ranch, Colorado Springs, CO** - ecos was retained to perform an analysis of channel stability under proposed development conditions for a 1.17 mile reach of Sand Creek. Ecos utilized existing vegetation composition data, density and height within the Project reach as a basis; and compared the 10-year and 100-year storm event modelling data (specifically flow velocity, flow depth and shear stress) to reference literature to provide a professional opinion regarding the future stability of the channel under developed conditions. The analysis of channel stability for the proposed Project assumes a bioengineering and biotechnical approach that preserves and enhances the existing vegetation, as well as substrate cohesion and stability, within the channel and its streambanks. The Stability Analysis will likely serve as a benchmark study for the City of Colorado Springs to use to preserve other naturally stable channels.
- **Brush Creek Ranch Stewardship Plan, Saratoga, WY** – Brush Creek Ranch Stewardship Plan, Fishery Enhancement and Bank Stabilization, Saratoga, WY – Mr. Dauzvardis managed the organization, generation and graphic design of the Ranch Stewardship Plan. Jon assessed and prepared stewardship goals, objectives, and implementation action items, including ranch-wide master planning of the trail and recreational systems and design of the Brush Creek riparian corridor trail. Trail and recreation planning and design focused on universal access, habitat sensitivity, environmental education, wildlife observation opportunities and unique landscape experiences. Simultaneously with the master plan, Jon developed revegetation plans to support geomorphic stream alterations and bank stabilization to enhance the creek fishery. Jon was responsible for the design and supervised construction of a cold-water pond to be used by novice anglers to learn the art and experience the pleasure of catching trout.
- **Town of Erie, Comprehensive Plan, Parks Recreation Open Space and Trails Master Plan, and Natural Areas Inventory, Erie, CO -** As a former 8-year Member, Chair, and Vice Chair of the Town Erie Open Space and Trails Advisory Board (OSTAB) and an Erie resident and small business owner, Jon has an intimate knowledge of Erie's political and physical landscape and public processes. During his tenure on OSTAB, Jon actively participated in the writing and development of the Town's guiding documents. Jon authored the Open Space Chapter of the Comprehensive Plan which eventually was codified in the Town's Unified Development Code (UDC). Jon was the key commenter on the content, analysis and synthesis of the Open Space and Trail Chapters and Mapping that was adopted with the Town's first Parks Recreation Open Space and Trails Master Plan (PROST). Jon guided the process used in the development of the Erie Natural Areas Inventory (ENAI) to identify and design a habitat condition, quality and restoration rating and ranking system of significant natural areas throughout the Town's 49-square mile planning area.
- **Uncompahgre River Corridor Master Plan, Montrose, CO** – Jon was responsible for the development of an ecological master plan focusing on the Uncompahgre River as a natural asset for eco-tourism and the generation of riverfront economic development. Mr. Dauzvardis was responsible for assessing the character, condition and quality of aquatic, wetland and riparian habitat; and developing a rating, ranking, land acquisition prioritization system, and associated mapping aimed at the preservation and integration of open space and habitat within the City's parks, recreation and trail system.
- **Ruby Pipeline Wetland, Riparian and Waterbody Mitigation and Restoration Plan, WY, UT, NV and OR** – Jon was responsible for assisting with the generation of a Comprehensive Wetland Mitigation Plan outlining Clean Water Act regulatory guidelines, requirements, and processes. Jon developed an eco-region specific restoration plan for a 675-mile natural gas pipeline specifying the basis of design, construction, revegetation, maintenance, performance criteria, and monitoring means and methods for restoring approximately 460 acres of temporarily impacted riparian and wetland habitat.
- **Dry Creek Regional Urbanization Area, Weld County, CO** – Mr. Dauzvardis performed an ecological inventory and prepared the assessment report for a 6,000-acre Regional Urbanization Area (RUA); and a1000-acre multi-use site development in un-incorporated Weld County. Subsequent phases included establishing ecological policy, goals, and objectives for the study area that will assist the County in the refining their first ever Comprehensive Plan.
- **City of Broomfield I-25 Subarea Environmental Guidelines, Broomfield, CO** – Jon drafted development sensitivity design and ecological sustainability standards.
- **Estes Park Comprehensive Land Use Plan, Estes Park, Larimer County, CO** – Teamed with town planning staff in producing a county-wide land use plan using GIS as a public involvement/participation tool.

- **San Miguel River Park Corridor Master Plan, Telluride, CO** – Prepared park, trail, wetland and riparian corridor master plan and design for the San Miguel River Park Corridor. Jon prepared illustrative plan graphics that assisted the Town in applying for and winning approximately $500,000 in Natural Resource Damage Assessment Fund money from the State of Colorado, which was used for final design and implementation.
- **South Platte River Wildlife and Recreation Corridor Plan, Denver, CO** – Designed the Zuni Riverfront Park and planned the wildlife and recreation corridor between I-25 and 8th Street near Mile High Stadium. Prepared, steered and presented graphics that the City and County of Denver Mayor's Commission (Wellington Webb) and the Urban Drainage and Flood Control District used to help sell the project to the public and federal funding sources in Washington D.C.
- **Historic Arkansas River Walk, Pueblo, CO** – Coordinated and steered the design and presentation of riparian, aquatic, and palustrine wetlands in the HARP Natural Area. Designed environmental Education Park to include outdoor classroom, access, and multi-thematic interpretive nodes.
- **Pueblo Natural Resources and Environmental Education Council Plan, Pueblo, CO** – Designed the identity and jointly produced strategic natural resource based environmental education plan for Pueblo County (PNREEC). The plan helped build consensus among multiple private and governmental agencies and stakeholders on funding, conservation, restoration, and enhancement priorities throughout the County.
- **Aluminum Company of America (ALCOA) Huisache Cove Master and Design Plan Master of Landscape Architecture Thesis, Port Lavaca, TX** – Served as environmental consultant in researching and generating wildlife habitat restoration plan and multi-functional landfill cap redesign incorporating coastal prairie, lacustrine, palustrine, estuarine wetlands, passive recreation, bird watching and ecological interpretation facilities on an industrial superfund clean-up site.

Aquatic, Wetland, Riparian and Upland Habitat Design:

- **Vermillion Creek, Maybell, CO -** In collaboration with attorneys, water resource engineers and geomorphologists, ecos designed for the restoration of over 9 acres of wetland and 1.5 miles of Vermillion Creek upstream of Browns Park National Wildlife Refuge to help settle a lawsuit between a private ranch and Federal agencies. The design and construction includes the excavation of a wide, inset and sinuous floodplain and a series of Beaver Dams Analogs (BDAs) to encourage natural channel evolution, improve channel roughness, capture sediment, and create a complex of open water, herbaceous and willow dominated wetlands to meet the life requisites and aid in the reintroduction/repopulation of beaver in this portion of the watershed. A robust monitoring of stream evolution, wetland hydrology, soil and vegetation and an adaptive management program to meet negotiated performance criteria will ensue after construction utilizing Functional Assessment of Colorado Wetlands (FACWet) metrics.
- **The Farm PMJM and Wetland Mitigation, Colorado Springs, CO** – As part of ESA Section 7 and CWA Section 404 consultation with the USACE and USFWS dating back to 2005, Jon prepared permit and mitigation construction documents, specifications and is currently performing on-going construction observation functions and impact-mitigation accounting aimed at preserving, conserving, restoring, enhancing and creating critical wetland, riparian and upland habitat occupied by Preble's meadow jumping mouse (PMJM), a Federally protected threatened species. Out of a total of 475 acres, The Farm project at full build-out is expected to develop 341.5 acres of residential and commercial uses and conserve 133.5 acres of PMJM habitat that will continue to provide open space and recreational values for wildlife and the residential community.
- **Saint Vrain Creek Reach 3 Phase 2 Flood Recovery and Restoration, Boulder County,** CO - ecos is part of the multi-disciplinary team assisting Boulder County Parks & Open Space (BCPOS) with a multi-facetted and resilient design for the creation of flood overflow areas occupied by Preble's Meadow Jumping Mouse (PMJM), restoration of creek-side riparian and wetland habitat, and rehabilitation of a diversion structure that enables the City of Longmont to divert its allocated water and facilitates upstream and downstream passage of warm and cold water fish. Jon performed impact assessment for PMJM and wetlands for CWA and ESA permitting, generated vegetation community and wildlife habitat restoration design, specifications, cost estimates and will be conducting construction oversight of restoration activities in the spring of 2020.

- **Big Thompson River Flood Recovery and Restoration, Loveland,** CO - ecos recently completed assessment, restoration design, and construction of the Big Thompson River between Rossum and Wilson Drives for the Big Thompson Watershed Coalition (BTWC) in partnership with the City of Loveland and Loveland Ready-mix. As with all the flood recovery projects ecos has worked on, Jon produced 30%, 60% and 100% design plans, construction cost estimates, and specifications guiding soil development/enrichment; upland, riparian, and wetland seeding and planting; and numerous bioengineering techniques aimed at restoring the river and making it more resilient to future flood events.
- **Saint Vrain Creek Reach 3 Phase 1 Flood Recovery and Restoration, Boulder County,** CO - ecos is part of the multi-disciplinary team assisting Boulder County Parks & Open Space (BCPOS) with resilient design for the restoration of Reach 3 of the Saint Vrain Creek (from Highway 36 downstream to Hygiene Road) that was damaged by the 2013 floods. Jon's role in the project includes: 1) desktop and field assessment to inventory and document the characteristics of the stream reach and riparian corridor (e.g. in-stream features, vegetation, wildlife habitat); identify and locate significant habitat features within the areas of proposed construction; identify potential sources of native plant materials for restoration; and identify areas of opportunity within the reach that require native vegetation, wetland, PMJM, leopard frog and fishery habitat restoration; and delineate wetland habitat and waters of the U.S. in all areas of proposed/potential construction-related impact; 2) vegetation community and wildlife habitat restoration design; 3) permitting and compliance under the CWA, ESA and NHPA; and 4) construction oversight of restoration construction activities. This project was completed in the summer of 2018.
- **Bohn Park Flood Recovery and Restoration, Town of Lyons, CO** – ecos is part of the Design Team assisting the Town with the restoration, enhancement and stabilization of Bohn Park which was damaged by the 2013 floods. Ecos role is to assess, design, and prepare design-bid-build specifications for the natural restoration of the vegetation communities and habitat along South St. Vrain Creek that have been incorporated in to the landscape architecture of Bohn Park, the Towns largest and most used recreational asset. This project was completed in the spring of 2018.
- **Fourmile Creek Flood Recovery and Restoration, Boulder County, CO** – ecos was part of the Fourmile Watershed Coalition design-build team tasked with restoring flood-damaged properties that were prioritized in the watershed master plan. Jon generated seeding and planting plans, performance notes, cost estimates, and co-managed construction oversight in collaboration with the executive director of the Watershed Coalition. This project was completed in the summer of 2017.
- **James Creek Post-flood Restoration, Lefthand Watershed Oversight Group (LWOG), Jamestown,** CO – ecos was part of the LWOG Team responsible for preparing the 30-60% design package for James Creek Reach 16 as identified in the Lefthand Creek Watershed Master Plan. ecos performed pre- and post-flood plant community assessment; developed revegetation goals and objectives, the basis of design, monitoring protocols, and revegetation plans according to Colorado Department of Local Affairs, Community Development Block Grant – Disaster Recovery 30% Guidelines. Specific resources and issues of concern addressed by ecos, included federal and state listed candidate, threatened and endangered species, wildlife species of concern (including raptors), fisheries and fish passage, native plant communities, and management of noxious weeds.
- **Saint Vrain Creek Flood Recovery and Restoration, Town of Lyons,** CO – ecos is part of a design-build team tasked with restoring the St. Vrain Creek corridor in the Town of Lyons that was damaged during the September 2013 flood event. The goal of the project is to work with the Town and affected land-owners to create a more resilient floodplain and natural channel condition that will help alleviate future threats to the community, reestablish floodplain connectivity, stabilize banks, and restore aquatic, wetland and riparian habitat that was wiped out during the flood. Mr. Dauzvardis is responsible for developing the plant communities and revegetation strategies needed to restore aquatic and riparian structure and functions within the corridor that support fish, wildlife, recreation, and help the Town regain the ecological benefits and economic value they receive from outdoor enthusiasts. This project was completed in the summer of 2016.
- **Plum Creek Mitigation Bank, Sedalia, CO** – ecos was retained by Restoration Systems to investigate and prepare conceptual design plans for the Plum Creek Mitigation Bank Site to satisfy the mitigation needs of the Chatfield Reservoir Mitigation Company (CRMC). The purpose of the Site is to provide compensatory mitigation credits for unavoidable, permitted impacts to wetland, PMJM and bird (target resources) habitat regulated under the CWA and ESA; and to restore, enhance and preserve natural resource functions. Jon has guided agency and CRMC staff on tours of the Site; performed plant

community mapping, baseline EFU assessment for PMJM, and FACWet assessment of wetlands. Jon was responsible for mapping, interpretation, and quantification of historic and existing habitat on the site. Jon prepared Conceptual Design Plans for resource mitigation including channel geomorphology, PMJM and wetland habitat setting the stage for post-mitigation calculations of EFU's.

- **Bellvue Raw Water Ponds Riverbank Restoration, Bellvue, CO** – The 2013 flood on the Poudre River altered the course of the river and severely eroded a bank nearly causing a breach of the City of Greeley's raw water ponds – their main municipal water supply. The goal of the project was to protect the ponds and create riparian habitat for the Preble's meadow jumping mouse, a federally listed threatened and endangered species. Jon was responsible for preparing bioengineering design plans and specifications that include soil/cobble encapsulated lifts, stream barbs to deflect flows away from the bank, and harder, biotechnical design of soil/riprap and stream bed scour protection measures to prevent erosion and further undermining and sloughing of the bank. Design plans included specification of native plant materials and various techniques to restore cottonwood forest and willow habitat to further stabilize the bank.
- **Poudre River Pipeline Crossing at Kodak, Windsor,** CO – Jon's role on the ecos team was to assess restoration potential, techniques, and prepare design plans and performance specifications to reclaim a pipeline corridor across the lower Poudre River where the City of Greely had to replace 3 major water supply lines. Flooding on the Poudre River in 2013 and 2014 temporarily suspended construction of the pipeline. Jon will oversee site stabilization and restoration measures once all 3 pipelines have been installed.
- **Lions Park Poudre River Restoration Plan, Laporte,** CO – Jon's role on the ecos team was to assess habitat conditions; gather, compile and analyze field survey data; and to prepare the mapping and mitigation design plans for the Lions Park PMJM habitat and the Poudre River Bank Stabilization Plans. Jon simultaneously designed and executed the technical drawings for the structural components of the habitat, ensuring that the proposed riparian plant community, habitat structures (brush piles), and bioengineered streambank stabilization measures will create the conditions that alleviate the current habitat fragmentation; support the life requisites of the PMJM; and enhance the overall health of the Poudre River fishery.
- **St. Vrain River Riparian Corridor Enhancement, Lyons, CO** – Jon designed, managed and led the construction of the Preble's Meadow Jumping Mouse Habitat (PMJM) enhancement project along the St. Vrain River. Jon worked in coordination with the project sponsor and Director of the Town of Lyons, Parks, Recreation and Cultural Events Department to implement required mitigation within a passive greenway park along the St. Vrain. Jon's role included riparian/PMJM mitigation site identification and habitat assessment; and design; and implementation of riverbank stabilization and riparian habitat enhancement measures.
- **Brantner Gulch Urban Stream Restoration, Thornton, CO** – In collaboration with water resource and civil engineers, ecos assisted the Woodbury Corporation with planning a mixed use residential community that respects the distinctive character of the existing high plains ecosystem, including the preservation of open space and the restoration of a degrading creek system characterized by significant erosion, channel incision, bank sloughing, sediment loss and resulting in the loss of aquatic, wetland and riparian and habitat. Restoration design and the CWA Section 404 Permit required for this project included stabilization of the natural form, function and resiliency of Brantner Gulch, Lakeview and Plains Tributaries utilizing a natural channel design, biotechnical bank stabilization measures and specification of upland, riparian and wetland plant communities to meet Mile High Flood District (MHFD) urban drainage criteria.
- **Brush Creek Fishery Enhancement Plan, Saratoga, WY** – Prepared access, staging and design plans, details and performed on-site construction oversight of instream and riparian habitat enhancements and bioengineered bank stabilization along a 3-mile reach of Brush Creek. The purpose of the project is to enhance fish, bird and wildlife habitat and use these resources to facilitate education and improve the recreational experience of Ranch guests. Access routes were planned so that they can be easily converted to trails to avoid repetitive impacts to high quality habitat and productive pastures.
- **St. Vrain River Riparian Corridor Enhancement, Lyons, CO** – Jon is the lead Landscape Architect for the restoration and enhancement of Preble's Meadow Jumping Mouse Habitat (PMJM) along the St. Vrain River. Jon and ecos are working in coordination with the Town of Lyons, Parks, Recreation and Cultural Events team to implement this restoration project within a passive park area along the St. Vrain. Jon's tasks include riparian/PMJM habitat assessment; PMJM site location and habitat design; and implementation of riverbank stabilization and riparian habitat enhancement measures.

- **TZ Ranch, Elk Hollow Creek Fishery Habitat Enhancement Plan, Saratoga, WY -** ecos performed the assessment and design of the Elk Hollow Creek Project, which included instream and riparian habitat improvements aimed at increasing bank stability, improving aquatic habitat and angling opportunities, and providing long-term stability to the reach. Instream improvements included drop structures, plunge pools, deep pools, riffles and spawning habitat. Bank improvements included seeding and planting plans for native wetland and riparian species. Jon was the lead on the generation of design-build plans and provided construction oversight of instream structure and native plant installation.
- **Brush Creek Ranch Pond Creation Plan, Saratoga, WY** – Prepared below grade pond excavation, grading, drainage and revegetation plan for a 0.30-acre fishing pond, followed by on-site field layout and surveying, wetland sod transplanting, submerged aquatic habitat and construction support of heavy equipment operators. The pond was designed to be a self-sustaining, cold water fishery that supports all components of the aquatic food-chain and incorporates all necessary life requisites for trout; and provide fishing opportunities during high water in Brush Creek.
- **Edwards Eagle River Restoration Project, Edwards, CO** – Assessment, planning, native plant community design and construction oversight of aquatic, wetland, riparian habitat along 1.5 mile reach and 168-acres of floodplain along the Eagle River utilizing indigenous materials and methods that naturally integrate habitat structure in the landscape context. Planning and design included trails, boat launch, boardwalks, overlooks, and interpretive sign systems and thematic content.
- **Boone Property, Boulder Creek Fishery Enhancement Project, Boulder, CO** – Performed site assessment and identified instream and overhead cover habitat to enhance fish habitat along a short reach of Boulder Creek adjacent to City of Boulder, Eldorado Canyon Open Space.
- **C-Lazy-U Ranch Willow Creek Fishery Enhancement Plan, Granby, CO** – Assessed and prepared design plans for 2 miles of instream and overhead cover habitat aimed at enhancing water quality through increased bank stability, improving aquatic habitat and angling opportunities, and providing long-term stability to the reach influenced ongoing ranching activities. Bank-side improvements include detailed seeding and planting plans indicating site-specific plant and seed locations, life zones, and species palettes according to hydrologic, soil, and aspect conditions.
- **Colowyo Coal Mine Wetland Creation Plan, Meeker, CO** – Performed wetland mitigation site feasibility assessment and design of 2.2-acres of created wetland benches along a 1.5-mile reach of the West New Goodspring Creek.
- **Uncompahgre River Wetland Creation and Streambank Stabilization, Montrose, CO** – Mr. Dauzvardis developed a Clean Water Act Individual Section 404, alternatives analysis and mitigation plans that successfully defrayed public descent and offset unavoidable impacts related to the River Landing Retail Development Project. Once approved by the USACE, the project turned a degraded, gravel-mined portion of the floodplain into functional and aesthetic riparian habitat that is now enjoyed by the public via a segment of trail that Mr. Dauzvardis designed. Two acres of riparian and “backwater” wetland habitat were strategically created along the Uncompahgre River to ensure reliable hydrologic connectivity and support of the designed wetland plant community. Nearly 350 lineal feet of severely degraded stream bank was stabilized using a naturalized bio-engineering approach that incorporated soil, native seed, erosion control blanket, shrubs, trees, and strategically located river boulders and logs to restore the riparian habitat, create fish habitat and redirect scouring flows away from the once barren bank.
- **River Point at Sheridan Brownfield Redevelopment, Sheridan, CO** – Designed and oversaw the construction of a “bio-engineered” and “bio-technical” vegetative landfill cap system and water quality swale that drains to the South Platte River. Jon was responsible for integrating the swale in to the River Point at Sheridan commercial redevelopment and the City of Englewood Golf Course renewal – renamed to the Broken Tee Golf Course.
- **Broken Tee Golf Course Flood Protection, City of Englewood, CO –** Oversaw the construction of a biotechnical subsurface stabilization and flood protection system (under-armor) designed to ensure that the woodland golf course tees, fairways and greens in the South Platte River floodplain are not compromised by flood scour. Designed and implemented bioengineered bank stabilization and under-armor on Bear Creek that was essential for protecting tees and greens. Jon was responsible for disproving the jurisdictional status of artificially supported wetlands via a groundwater monitoring system.

- **Lafarge Northbank Resources Gravel Pit Wetland Design, Rifle, CO** – Jon asses DMG requirements and prepared gravel pit reclamation plans aimed at providing suitable shallow-water wetlands and islands within the pit closure area to serve as compensatory mitigation for wetland impacts associated with mine operations adjacent to the Colorado River.
- **Leach Creek Stream Enhancement, Grand Junction, CO** – Designed stream corridor enhancements for a ½-mile section of Leach Creek that was channelized and used as an irrigation canal. Enhancements were designed to restore natural channel form and function, improve the aquatic environment, and provide mitigation for jurisdictional impacts permitted under the Nationwide Permit program. This project is being used as a model and replicated along other reaches of Leach Creek
- **Castro Property Wetlands and Wildlife Ponds, Beulah, CO** – Performed the site assessment, feasibility analysis, water resource and minor dam design, native plant design, landscape architecture, and supported the water rights application needed to create shallow water wetland habitat for amphibians, waterfowl, migrating bird and ungulates, and deep water habitat for trout at a sub-alpine elevation of 9000 feet. Project included development of a spring, creation of a creek and a mechanical water circulation and aeration system to support the aquatic, wetland, and riparian ecosystem. Organized, supervised and participated in a volunteer planting effort.
- **Jefferson County Gunbarrel Bridge Replacement, Oxyoke, CO** – Developed construction plans and specifications and oversaw construction of wetland and Preble's mouse habitat mitigation to enhance weedy and degraded wetland and Preble's mouse habitat along Gunbarrel Creek, a tributary to the upper South Platte River near Deckers, CO.
- **Coal Creek Bank Stabilization, Erie, CO** – Assessed, permitted, designed and performed construction oversight of bio-engineered/bio-technical bank stabilization and wetland creation associated with the Vista Parkway bridge crossing over Coal Creek in Erie, CO. The project involved pulling back vertical banks and restoring native wetland, riparian, and short grass prairie habitat.
- **Spring Creek Wetland Mitigation, Colorado Springs, CO** – Generated wetland and creek creation plans that integrated required mitigation into a high density, "new urban" development. The design emphasized re-utilization of urban storm water to sustain wetlands, use of indigenous plants, construction materials, and natural geomorphic relationships.
- **Sulphur Gulch, Parker, CO** – Developed a naturalized sculpted concrete drop structure design, planting and bio-engineering plans for a highly visible, urbanizing reach of a sandy creek through the center of the Town of Parker.
- **Skylark Creek Restoration Plan, Kremmling, CO** – Designed and performed construction oversight of aquatic, wetland and riparian plant community, and trail system along a historic side channel of the Upper Colorado River on a private fishing ranch.
- **ARCO Opportunity Ponds Wetland Mitigation Design, Anaconda, MT –** Jon generated the design of a 908-acre complex of wetlands and terrestrial habitat required to meet the Consent Decree and the functional assessment criteria established during the wetland assessment process mentioned previously. The design is currently being implemented. Once complete, the grading, drainage, hydrology, and revegetation strategy used to create wetlands from massive soil borrow pits will potentially be the largest inland, freshwater wetland mitigation project in the United States.
- **Northgate Boulevard Realignment, Colorado Springs, CO** – Coordinated and prepared ESA Section 7 and CWA Section 404 consultation documents as required by the USFWS and USACE, including mitigation construction documents, specifications, on-site layout of plant communities and construction supervision aimed at restoring wetland and riparian habitat occupied by Preble's meadow jumping mouse.
- **Northgate PMJM and Wetland Mitigation Plan, Colorado Springs, CO** – Mr. Dauzvardis was an instrumental member of multidisciplinary team responsible for delineating wetlands, preparing ESA Section 7 and CWA Section 404 assessment, impact analysis and consultation documents as required by the USFWS and USACE. As the lead designer, Jon was responsible for the design of over 80 acres of wetland, riparian, and grassland habitat utilized as primary and secondary habitat for Preble's Meadow Jumping Mouse, a Federally-listed threatened species. Jon prepared mitigation construction documents, specifications, onsite layout of plant communities and supervised construction for this precedent setting mitigation plan designed to offset impacts to critical habitat over a 1200-acre site.

- **Martin County Coal Corporation, Inez, KY** – Mr. Dauzvardis bioengineered and performed on-the-ground triage of two stream corridors, consisting of 26 miles, impacted by a coal slurry spill that originated from a mountaintop mine reservoir used to hold liquefied coal dust. Jon identified and documented critically imperiled stream banks and human settlements, and then designed, coordinated, led and supervised local crews during the implementation of specified floodplain, bioengineered bank stabilization, and reforestation efforts.
- **Uncompahgre River Restoration and Park Corridor, Ouray, CO** – Jon designed and performed construction oversight of the restoration and reclamation of one mile of upland, riparian and wetland habitat left barren by historic placer mining. The major challenge presented by this project was a lack of soil, organic matter and nutrients to sustain vegetation. This constraint was addressed by amending the soil with humate and planting and seeding riparian vegetation to initiate natural succession and bioaccumulation of matter, assisted by an irrigation system that injected organic fertilizer and microbes (mycorrhizea) in to the substrate.
- **Burlington Mine Remediation, Jamestown, CO** – Preparation and management of specification package, best management practices (BMPs), and revegetation design for mine waste capping and closure.
- **Powder River Coal Company – Porcupine Creek Restoration, Douglas, WY** – Designed and supervised the construction of this post mine wetland/creek restoration project. Following the pit closure, reclamation specialists reestablished the original location and geomorphic relationships of the creek using historic aerial photography using a trapezoidal channel cross-section design. Jon adapted the design creating grading and wetland planting plans that mimic the landform, natural lateral and longitudinal channel tilt, and plant communities that are indigenous to ephemeral creeks in the shortgrass prairie landscapes of eastern Wyoming.
- **Sand Creek Corridor Habitat Enhancement at Bluff Lake, Denver, CO** – Prepared plant community, bioengineering and bank stabilization design. Prepared visualization graphics to present and receive design approval.
- **Intrawest Resort Development, West Ten Mile Creek, Copper Mountain Village, CO** – Prepared vegetation community and concept design of village base streamside recreational amenities.

Construction and Plant Installation:

- **St. Vrain Creek Riparian Corridor Enhancement, Lyons, CO –** Jon managed construction and implementation of the restoration and enhancement of 0.60-acre of riparian Preble's Meadow Jumping Mouse Habitat (PMJM) along the St. Vrain River.
- **Standley Lake Protection Project, Westminster, CO** – Designed and supervised construction of a 0.50-acre created emergent wetland to fulfill final mitigation requirements of the USACE and bring closure to the City's drinking water protection project.
- **Caribou Peat Bog Restoration, Nederland, CO** –Prepared native plant community design, planting cost estimate, and on-the-ground oversight of volunteers to restore a high-altitude peat bog disturbed by an illegal four-wheel drive "mudfest".
- **Department of Energy (DOE) Wetland Mitigation Bank, Westminster, CO** – Construction supervision of grading and planting plans of a 12-acre wetland mitigation bank design for the Department of Energy.
- **ARCO Lower Area One and Butte Reduction Works, Butte, MT** – Performed construction observation and supervision of temporary labor crews to plant a passive treatment wetland designed to absorb heavy metals from groundwater.
- **Colorado Department of Transportation Mitigation Bank, Limon, CO** – Performed in-field planting design and supervised local labor to complete a 10-acre wetland mitigation bank designed by CDOT to offset future wetland impacts in the transportation region.
- **Irvine Ranch Water District – San Joaquin Wetland Treatment System, Irvine, CA** – Planting superintendent of a wetland designed to be a used as tertiary wastewater treatment facility and waterfowl refuge.

PRESENTATIONS & INSTRUCTION:

Dauzvardis, Jonathan B. 2019. Future City Innovation Project - Designing Water Efficient Cities in the Future. Classroom instruction with Middle-school Students. Peak to Peak Charter School. November 20, 2019. Lafayette, Colorado.

Dauzvardis, Jonathan B. 2019. Water Innovation Education Project – Designing Wetlands for School-yard Habitat Education Center. Classroom instruction with Elementary Students. Peak to Peak Charter School. January 23, 2019. Lafayette, Colorado.

Dauzvardis, Jonathan B. 2008. Preserving the Ecological Services of Willow Cuttings. Research presented at the Colorado Riparian Association (CRA) Sustaining Colorado Watersheds Conference. October 2, 2008. Vail, Colorado.

Dauzvardis, Jonathan B. 2006. Water Pollution and Wetland Plant Tolerance to Various Ph Levels. Classroom instruction with Elementary Students. Flagstaff Academy Charter School. February 2, 2006. Longmont, Colorado.

Dauzvardis, Jonathan B. 2006. Soil Erosion and Habitat Destruction. Classroom instruction with Elementary Students. Flagstaff Academy Charter School. January 26, 2006. Longmont, Colorado.

Dauzvardis, Jonathan B. 2004. Wetland and Wildlife Habitat Restoration, Opportunity Ponds, Anaconda, Montana. Poster Presentation at Ecological Restoration Conference. October 2003. Orlando, Florida.

Dauzvardis, Jonathan B. 2003. Application of Landscape Ecology Principles to Mine Remediation and Wetland Creation: An Ecological Restoration Seminar using a Case Study of the Opportunity Ponds Wetlands Plan, Anaconda, Montana. Presented at the University of Colorado, Denver. November 2003. Denver, Colorado.

Dauzvardis, Jonathan B. 2000. Endangered Species Act Issues: Incorporating the ESA into Mitigation Projects. Presented at the Continuing Legal Education (CLE, International) Colorado Wetlands Conference. September 18, 2000. Denver, Colorado.

AWARDS:

- Colorado Landscape Contractors Award, Sand Creek Enhancement Project – 2000
- Colorado Landscape Contractors Award, Skylark Creek Restoration Project – 1998
- Colorado American Society of Landscape Architects, Research, and Communications – 1997
- Texas American Society of Landscape Architects Honor Award – 1995
- Texas A&M Landscape Architecture Faculty Award – 1995

PROFESSIONAL ASSOCIATIONS:

- Town of Erie, Colorado Open Space and Trails Advisory Board (OSTAB) - As a former member and chair of the Town of Erie Open Space and Trails Advisory Board (OSTAB), Mr. Dauzvardis routinely collaborated with Town Administrator, Community Planning, Public Works, and Parks and Recreation Directors and Staff, and advised the Board of Trustees on all matters related to the goals, objectives, prioritization, acquisition, conservation, and the management of open space and trails throughout a 49-square mile planning area. Jon's 8-year experience on the OSTAB translates to an intimate knowledge of public processes.
- Society of Wetland Scientists (SWS)

ecos ecosystem services LLC

RESUME

Grant E. Gurnée, P.W.S.

Owner/Managing Partner
Senior Restoration Ecologist
Professional Wetland Scientist
Fisheries and Wildlife Biologist

AREAS OF EXPERTISE:

- Project Management for Complex, Natural Resource & Land Use Projects
- Habitat Assessment, Functional Assessment, Delineation, Planning, Permitting, Restoration Design, Construction Oversight & Monitoring for:
  - Streams, Rivers and other Aquatic Habitat
  - Wetland, Riparian and Upland Habitat
  - Fish and Wildlife Habitat
  - Threatened & Endangered (T&E) Species, Special Status Species, and Species of Concern
  - Nesting Birds & Raptors
- Natural Resource & Land Use Regulatory Compliance, Public Presentations, Hearings and Expert Witness Services
- Grant Funding Support for Conservation and Restoration Projects

EDUCATION:

- MCRP, Environmental Planning and Law Program, Rutgers University, 1989-1994
- Bachelor of Science, Biology, Richard Stockton College of N.J., 1984

EMPLOYMENT HISTORY:

- 2008-Present: Owner, Managing Partner and Senior Restoration Ecologist
  Ecosystem Services, LLC, Erie, Colorado
- 1999-2011: Ecological Restoration Group Manager
  Walsh Environmental Scientists and Engineers, LLC, Boulder, Colorado
- 1994-1999: Vice President and Consulting Division Manager
  Aquatic and Wetland Company, Boulder, Colorado
- 1987-1994: Ecological Assessment Group Manager
  Killam Associates, Millburn, New Jersey
- 1989 – 1994: Owner and Ecologist, Westhill Environmental, Colonia, NJ
- 1986-1987: Project Manager, Connolly Environmental, Denville, New Jersey
- 1985-1986: Biological Technician/Team Lead, EA Engineering Science and Technology, Forked River Field Station, New Jersey

CONTINUING EDUCATION:

- Colorado Stream Restoration Network, Stream Restoration Body of Knowledge Seminars – 2014 to 2019
- Stream Functions Pyramid Workshop, Denver, CO - 2014
- Colorado Natural Heritage Program, Wetland Plant Identification - 2014
- Colorado Natural Heritage Program, Ecological Integrity Assessment for Colorado Wetlands - 2013
- FACWet – Functional Assessment of Colorado Wetlands - 2010, 2012 and 2013
- Continuing Education in Coastal and Wetland Ecology, Rutgers University, 1985 – 1994

CERTIFICATIONS:

- Professional Wetland Scientist, Certification (#559), Society of Wetland Scientists Certification Program, 1995
- Certified Wetland Delineator, Army Corps of Engineers Wetland Delineator Certification Program, 1993

1455 Washburn Street Erie, CO 80516 (p): 970-812-3267 (e): grant@ecologicalbenefits.com

- Wetland Mitigation Planning and Design Certification, Environmental Concern, Sparks, MD, 1992
- Certified Ornithologist, Marine Biologist, Aquatic Biologist and Ecologist for the preparation and certification of Environmentally Sensitive Areas Protection Plans, N.J. Dept. of Environmental Protection and Energy, 1988
- Wetland Delineation and Regulatory Certification, National Wetland Science Training Institute, 1988

PROTECTED SPECIES SURVEYS AND HABITAT ASSESSMENTS:

- Bald Eagle, Golden Eagle, Burrowing Owl, raptor and nest surveys and monitoring
- Ute-ladies' tresses orchid and Colorado butterfly plant
- Preble's meadow jumping mouse
- Swift fox and bobcat
- Boreal toad
- Pine Barrens and grey tree frogs
- Freshwater, estuarine and marine surveys for native fish
- Western Tiger Salamander
- Terrestrial and sea turtles

EXPERIENCE SUMMARY:

Mr. Gurnée is a founder and managing partner of Ecosystem Services, LLC (ecos), a design-build, ecological planning and design firm that is the culmination of his life's work and passion for restoring and conserving the natural world. Grant is a certified Professional Wetland Scientist with 40 years of experience in wetland ecology, restoration ecology, wildlife and fisheries biology, environmental planning, and regulatory compliance. Prior to ecos Grant established the Ecological Restoration Group at Walsh Environmental and was the Vice President in charge of the Consulting & Design Division for Aquatic and Wetland Company, the first design-build-grow firm in Colorado. Mr. Gurnée utilizes his diverse field assessment and hands-on experience to bring a unique and pragmatic, big-picture perspective to projects from conceptual planning through implementation. Grant's environmental planning and law education combined with his regulatory compliance experience make him one of the leading experts in the Intermountain West in Clean Water Act and Endangered Species Act issues. He enjoys teaching and furthering the science and art that comprise the field of restoration ecology. As such, Grant has published and presented papers and technical manuals, and lectured nationally and internationally at educational programs that further the understanding of aquatic, wetland, riparian and Threatened and Endangered (T&E) species habitat assessment and restoration. Mr. Gurnée has also been called upon to provide expert reports, expert witness testimony and liaison representation in complex regulatory compliance matters.

RELEVANT PROJECT EXPERIENCE:

The following is a sampling of select projects and clientele that Grant has successfully completed or is currently involved in:

Protected Species Surveys and Habitat Assessments

- **Golden Eagle Monitoring at Meadow Park in Lyons, CO** - ecos was retained by the Town of Lyons (Town) to perform the monthly monitoring of the Golden Eagle (*Aquila chrysaetos*) nest sites at Meadow Park, to prepare monthly Monitoring Summary Memorandum following each event, and to prepare and submit annual reporting to the U.S. Fish and Wildlife Service (USFWS) associated with the *Lyons Federal Fish and Wildlife Permit #MB82833B-0, Eagle Take Associated With But Not The Purpose Of An Activity* (Take Permit).
- **Nesting Birds, Raptors and Burrowing Owls** – Grant has completed over 100 pre-construction nesting surveys and numerous monitoring studies for raptors and burrowing owls. His projects include pipeline rights-of-way, housing and commercial development projects, stream and river restoration projects, wind and solar farm projects, and oil and gas projects along the Front Range of Colorado, as well as projects in the Pine Barrens of southern New Jersey. His avian experience includes golden eagle nest monitoring; barred owl roost and nest monitoring, and call playback inventory; and multi-species raptor surveys.
- **Native Plants** - Grant has completed numerous pre-construction and monitoring surveys for Ute ladies' tresses orchid and Colorado butterfly plant since 1994. His projects include pipeline rights-of way, mined

land reclamation projects, housing and commercial development projects, stream and river restoration projects, wind and solar farm projects, and oil and gas projects along the Front Range of Colorado.

- **Threatened, Endangered and Candidate Species** – Grant trained with the leading expert, Robert Stoecker, PhD, in 1994 and 1995 to gain an understanding of the (then) soon to be listed, Preble's meadow jumping mouse, a threatened species; and since that time, he has completed numerous surveys, habitat assessments, and ESA consultations. He has also performed night-time Swift fox surveys at windfarm sites in southern CO and Boreal toad surveys in northern CO. Prior to relocating to CO Grant performed numerous surveys in N.J., including bobcat surveys to assist in protecting the Pyramid Rock Natural Area; Pine Barrens and gray tree frog surveys, and native Pine Barrens fish surveys with his mentor, Dr. Rudy Arndt; and Eastern box turtle surveys. He also assessed migration routes and alternative mitigation measures for sea turtles that were being impacted by the Garden State Parkway in southern New Jersey.

Habitat Assessment, Permitting and Regulatory Compliance

- **Sand Creek, Black Squirrel Creek, and Kettle Creek Channel Stability Analysis, Colorado Springs, CO** – ecos developed a channel stability analysis protocol that uses the latest scientific research on the behavior of riparian and wetland vegetation under various flood regimes to assist developers in Colorado Springs with floodplain and habitat conservation planning, bed and bank stabilization, and in-channel structure design where needed. The protocol relies on detailed mapping of vegetation classes, utilizes Manning's N coefficients of vegetation, substrate/soil characteristics, surface irregularities and obstructions, channel planform, variations in shape and size of the channel cross-section, and modelled velocity and shear stress to determine the permissible tolerances of existing and proposed vegetation to flood stress. This protocol was developed in response to local codes and ordinances that proposed whole-sale destruction and "stabilization" of riparian and wetland habitat with antiquated stabilization techniques and is now being used by the engineering community to help conserve riparian corridors and habitat occupied by Preble's Meadow Jumping Mouse protected under the ESA.
- **4 Way Ranch Assessment & Regulatory Compliance Report, El Paso County, CO** - ecos was retained by 4 Way Ranch to perform a natural resource assessment for their Phase 2 development, and to prepare a Natural Features Wetland, Wildfire, Noxious Weeds & Wildlife Report (Report) pursuant to El Paso County environmental review regulations. The purpose of the project was to identify and document the natural resources, ecological characteristics and existing conditions of the Site; identify potential ecological impacts associated with Site development; and provide current regulatory guidance related to potential development-related impacts to natural resources, including: Mineral and Natural Resource Extraction; Vegetation; Wetland Habitat and WOUS; Noxious Weeds; Wildfire Hazard; Wildlife; Federal and State Listed Candidate, Threatened and Endangered Species; and Raptors and Migratory Birds.
- **Banning Lewis Ranch, Colorado Springs, CO** – ecos was hired by Norwood Homes to perform a PHA for the Banning Lewis Ranch (BLR), an 18,000-acre property within El Paso County, Colorado that will double the size of Colorado Springs once it is developed. The PHA included an assessment and mapping of vegetation, noxious weeds, Federal and State Listed Candidate, T&E Species, Wildlife Species of Concern (including Raptors), Waters of the U.S. and Wetland Habitat, Floodplains, and Cultural, Archeological and Paleontological Resources. The PHA Report summarizes ecos' Site assessment findings and includes the mapping of all ecological constraints and cultural resources, a preliminary jurisdictional status determination of all potential wetland habitat and WOUS under the CWA, a summary of ecological opportunities and constraints, and provides regulatory guidance to assist in planning and implementing the future development of the BLR. Norwood and their planning team, in association with ecos, are currently uploading and interpreting all of the ecos Site assessment mapping into their base GIS layers to inform future site planning and recommend proactive measures to conserve wildlife and wetland habitat, pristine prairie and ephemeral creeks, floodplains, and significant cultural resources.
- **Clean Water Act Jurisdictional Assessment of El Guique Mine in Estaca, New Mexico –** Ecos assisted Espanola Transit Mix, LLC (ETM) in their assessment at the El Guique Mine in Estaca, New Mexico (Site) by determining the potential jurisdictional status of onsite drainages and other waters under the CWA. We reviewed available background information and base mapping to gain a better understanding of the Site and the adjacent offsite area and prepared an overlay of potential WOUS on Google Earth aerial Imagery for mark-up and notation in the field. Ecos then conducted a field assessment to review Site conditions, and potential offsite, downstream connections to WOUS, and particularly the presence of a Significant Nexus to the Rio Grande, a TNW. We drafted a Technical Memorandum summarizing the

methodology employed, the results of the field assessment, the rationale under the CWA for all areas deemed to be excluded or non-jurisdictional and illustrated the locations of potential jurisdictional and non-jurisdictional features identified in the field on Google Earth aerial imagery.

- **Bellvue Pipeline Project, BMP Facilitator, Larimer County, CO** – ecos was retained by the City of Greeley as Best Management Practices (BMP) Facilitators to provide pre-construction documentation post-construction oversight of pipeline reclamation processes. Essential responsibilities include meeting with landowners prior to construction to facilitate project understanding and post-construction outcomes; to document landowner needs and wants relative to project goals and land use; to document and monitor pre- and post-construction reclamation and maintenance requirements; and to ensure the contractors maintain compliance with all state and federal laws, county regulations, and Greeley construction and restoration specifications.
- **Encana Oil and Gas (USA), Denver Julesburg Basin, CO** – Encana hired ecos to assess their ecological constraints, recommend means and methods to avoid, minimize and permit unavoidable impacts; and to mitigate, restore and prepare ecological management plans for their drilling and pipeline operations in the Denver Julesburg basin. Grant's role on the team is to perform site assessments, research background data, and prepare assessment reports and mapping data that can be utilized by Encana's project managers to proactively track ecological resources before issues arise. In addition to client consultation, Ecos is responsible for tracking drill site schedules, constraints, restoration and management efforts in a data base and reporting said information to Encana's project manager on a regular basis.
- **Georgetown Lake, Georgetown, CO** –ecos was hired to perform an onsite assessment of ecological resources and prepare a summary report to describe the physical/ecological characteristics of the Project area and evaluate the potential effects of the construction of a loop trail project on environmental issues and species of concern to support a GOCO grant application. Items evaluated and documented, include site location/ownership, general site characteristics, current land use, proposed impacts, possible effects on Federal– and State-listed T&E animal and plant species, unique or important wildlife, water quality, water bodies, wetlands, and floodplains, stormwater runoff, sedimentation, soil erosion, and invasive species. The assessment report also included mitigation measures, project benefits, and environmental compliance recommendations under applicable regulatory programs.
- **Site Assessments for General Vegetation Cover and T&E Species Presence/Absence** – ecos was retained by JADE Consulting, LLC to perform the assessment of two future development sites located in Lafayette and Yuma, Colorado. We performed a desk-top assessment to identify existing site characteristics and screen the potential presence/absence of federally-listed T&E species and followed up with onsite assessments to verify our preliminary findings. Our findings and recommendations were summarized in a Technical Memorandum in which we determined that no further assessment or regulatory compliance actions are required.
- **The Cove Assessment & Regulatory Compliance Report, El Paso County, CO** - ecos was retained by Lake Woodmoor Development, Inc.to perform a natural resource assessment for The Cove development, and to prepare a Natural Features Wetland, Wildfire, Noxious Weeds & Wildlife Report (Report) pursuant to El Paso County environmental review regulations. The purpose of the project was to identify and document the natural resources, ecological characteristics and existing conditions of the Site; identify potential ecological impacts associated with Site development; and provide current regulatory guidance related to potential development-related impacts to natural resources, including: Mineral and Natural Resource Extraction; Vegetation; Wetland Habitat and Waters of the U.S.; Noxious Weeds; Wildfire Hazard; Wildlife; Federal and State Listed Candidate, Threatened and Endangered Species; and Raptors and Migratory Birds.
- **Jurisdictional Determination Request for Banning Lewis Ranch, Villages 1 and 2 Residential Development, El Paso County, CO** - ecos was retained by Oakwood Homes, LLC to review a 2014 Jurisdictional Boundary Delineation and determine if a portion of the wetlands and waters within the site could be deemed non-jurisdictional under the Clean Water Act (CWA) based on their "isolated" status. Following data review, ecos arranged a field assessment with the U.S. Army Corps of Engineers (Corps) to review site conditions, and potential offsite, downstream connections to waters of the U.S. (WOUS), and particularly the presence of a Significant Nexus to Traditional Navigable Waters TNW). Ecos and the Corps agreed that several of the intermittent drainages on the suite are not jurisdictional under the CWA, as they are not: 1) a TNW or wetland adjacent to a TNW; 2) a Relatively Permanent Water (RPW) or a wetland directly abutting an RPW with perennial or seasonal flow; 3) a tributary to a TNW; or 4) a direct tributary to

a downstream WOUS as the feature loses it bed and banks. The Corps submitted ecos' findings to the U.S. Environmental Protection Agency (EPA) and they concurred and issued an Approved Jurisdictional Determination stating that the drainages were indeed "isolated" features exempt from the CWA.

- **Bellvue Pipeline Project, CWA and ESA Regulatory Negotiation, Larimer County, CO** – ecos assisted the City of Greeley from 2011 through 2014 in their negotiations with the Corps to facilitate review and verification of the Project under CWA, Nationwide Permit12 (NP12) in 2014. Grant aided the City during Corps meetings, field visits and teleconferences; in coordinating with the Corps and the technical experts on the Corps Common Technical Platform (CTP) team; and in utilizing the CTP Poudre watershed data to assess the probability of Project-specific impacts. Grant also provided regulatory and technical support to the City for the CWA, Pre-Construction Notification (PCN) Supplement for the Project from 2014 through the USACE's 2017 issuance of the "removal of capacity conditions for the Northern and Fort Collins segments" placed on the 2014 NP12. His tasks included performing Impact Avoidance Evaluations, providing historical context and data from the initial work performed for the City on this Project, assisting a Team of multi-disciplinary professionals in the preparation of Impact Assessment Reports, meeting with the City to discuss overall regulatory strategy, assisting with the preparation of the cover letter to transmit the PCN Supplement to the USACE, and assisting with discussions and presentations to the USACE during their review and processing of a Minimal Effects Determination for the Project.
  Mr. Gurnée also assisted Greeley in their negotiations with the FWS to facilitate review and consultation for the Northern Segment of the Project under Section 7 of the ESA. Grant led the field assessment with FWS, identification and prioritization of potential PMJM habitat mitigation sites, development of a conceptual design for the selected PMJM habitat mitigation sites, and preparation of the Biological Assessment Addendum and Habitat Mitigation Plan. Grant also aided the City during agency review and approval of the FWS Biological Opinion by utilizing his relationships with the FWS, and extensive experience of ESA regulations, policies and precedents.
- **Appraisal Support Documentation Report for the 1st Bank Parcel, Colorado Springs, CO** - ecos was retained by 1st Bank Holding Company to perform a Preble's meadow jumping mouse (PMJM) habitat assessment, mitigation cost analysis and conceptual lot layout for the approximate 9.4-acre 1st Bank Parcel (Site) situated south of the Gleneagle residential development and north of the current Northgate Open Space along Smith Creek in Colorado Springs, Colorado.
- **South Boulder Canon Ditch Maintenance, CWA Exemption Determination, Erie, CO** – ecos assisted the Town of Erie in exempting their proposed ditch maintenance project by performing an assessment of site conditions, submitting the assessment report to the Corps, and verifying that said project is exempt pursuant to Section 404(f) of the CWA.
- **Endangered Species Act (ESA) Compliance Documentation for the Pinon Lake tributary CLOMR Application, Forest Lakes Filing 2B in El Paso County, Colorado** – ecos performed an assessment to document the absence of federally-listed T&E species and their habitat and prepared a report for FEMA that documents that the proposed CLOMR action will not result in a "take" of T&E species.
- **Gleneagle Infill Development Assessment & Regulatory Compliance Report, El Paso County, CO** - ecos was retained by G & S Development, Inc. to perform a natural resource assessment for the proposed Gleneagle Infill Development at the former Gleneagle Golf Course, and to prepare a Natural Features and Wetland Report (Report) pursuant to El Paso County environmental review regulations. The purpose of the project was to identify and document the natural resources, ecological characteristics and existing conditions of the Site; identify potential ecological impacts associated with Site development; and provide current regulatory guidance related to potential development-related impacts to natural resources, including: Mineral and Natural Resource Extraction; Vegetation; Wetland Habitat and Waters of the U.S.; Weeds; Wildfire Hazard; Wildlife; Federal and State Listed Candidate, Threatened and Endangered Species; and Raptors and Migratory Birds. As part of the Project, ecos obtained an Approved Jurisdictional Determination from the Corps.
- **North Fork at Briargate Habitat Evaluation and ESA Compliance, Colorado Springs, CO** - ecos performed a habitat evaluation on behalf of High Valley Land Co., Inc. and La Plata Communities to support informal consultation with the U.S. Fish and Wildlife Service (FWS) under the ESA for potential effects to the Federally-listed, threatened PMJM from the proposed North Fork development, Filings 3 through 7 at Briargate.
- **C Lazy U Preserves Natural Resource Inventory and Conservation Easement Documentation, Grand County, CO** – ecos is assisting the C Lazy U Preserves in assessing and documenting the conservation

values of the 980-acre site known as C Lazy U Preserves near Granby, CO such that the site may be protected under Conservation Easements (CE's) held by The Nature Conservancy. The purpose of the CE's is the long-term preservation of the scenic, open space, agricultural, significant natural habitat, native vegetation, rare plant communities, riparian, and wetland values of the Property. ecos staff completed the Easement Documentation Reports Phase 1 of the CE's in 2006, Phase 2 in 2007, and Phase 3 in 2015.

- **Seaman Water Management Project, Riparian-Wetland Technical Support -** Mr. Gurnée supported Greeley in the NEPA EIS process by reviewing riparian and wetland technical reports prepared by the Corps CTP team, and providing comments to assist the City in their formal review and response to the Corps. He also provided technical and regulatory support for CWA and ESA (PMJM habitat) assessment, consultation, and compensatory mitigation planning and design.
- **City of Louisville, City of Westminster, Jefferson County and Town of Monument** – ecos performed numerous wetland habitat, wildlife, MBTA and T&E species habitat ecological assessments, wetland delineations, and Clean Water Act Section 404 and Endangered Species Act Section 7 Permits and mitigation plans for counties, municipalities and quasi- municipalities, including Highway 42 and 96th Street realignment, Jim Baker Reservoir, Standley Lake Protection Project, Triview Metro District Preble's and wetland habitat mitigation planning.
- **ARCO Clark Fork River Basin Anaconda Smelter Superfund Site, Anaconda, MT** – Grant and his Team performed wetland delineation, functional assessments, and impact analysis over a 200 square mile area affected by historic mining practices and current remedial actions required by an EPA consent decree.
- **ARCO Clark Fork River Basin Milltown Reservoir Superfund Site, Missoula, MT** – Mr. Gurnée and his Team performed wetland delineation, functional assessments, and impact analysis of proposed remedial actions that will remove metal laden sediments from the site prior to dam removal.
- **C-Lazy-U and Horn Ranch Environmental Assessments, Granby, CO** – Mr. Gurnée and his Team performed an assessment of ecological opportunities and constraints in the aquatic, riparian, wetland and threatened and endangered species habitat along the Colorado River for the development and enhancement of fishing/resort ranch amenities.
- **Village at Avon, Avon, CO** – Grant and his Team performed a wetland delineation and prepared CWA Section 404 permitting for the town center expansion and low-density ranchette development.

Mitigation and Habitat Restoration

- **Park Creek Mitigation Bank, Fort Collins, CO –** ecos was retained by Burns and McDonnell to assess, map, and prepare preliminary mitigation design of aquatic, wetland, riparian and terrestrial habitat in support of a mitigation banking prospectus. Upon completion and acceptance of the prospectus by the USACE, ecos has been tasked to manage the baseline assessment of the site, including groundwater testing, topographic surveys, and hydrology; prepare a detailed habitat design for inclusion in mitigation banking instrument; as well as coordinate design-build process with a selected nursery and contractor.
- **Front Range Mitigation and Habitat Conservation Bank –** ecos is assisting Restoration Systems, LLC (RS), the Bank Sponsor, with the assessment, planning and design of the Front Range Umbrella Bank for Aquatic Resource Mitigation & Habitat Conservation (Bank). This "umbrella" Bank is intended to provide habitat mitigation for projects along the entire Front Range of Colorado. The **ecos**/RS Team is in the process of securing viable sites in the major watersheds along the Front Range; and recently submitted the Draft Prospectus for the establishment of the Bank to the U.S. Army Corps of Engineers, Albuquerque District, Southern Colorado Regulatory Office and Omaha District, Denver Regulatory Office.
- **Lions Park Poudre River CWA and ESA Mitigation Site** - ecos assisted Greeley in developing and constructing an advance river and wetland mitigation site at Lions Park in LaPorte, Colorado that may be used for future CWA impacts in the Poudre River watershed. We also prepared a conceptual design for Preble's meadow jumping mouse habitat that will be used to support ESA consultation. ecos assessed the site, prepared the designs, and coordinated review with Greeley, Colorado Department of Parks and Wildlife, Larimer County Parks and Open Lands and Larimer County Engineering Department. The mitigation site provides compensatory mitigation for impacts to wetland and waters of the U.S. under the CWA and will also provide compensation for PMJM habitat under the ESA. This mitigation project entails development of mitigation measures including bioengineered streambank stabilization, fishery habitat enhancement, riparian and wetland habitat restoration and PMJM habitat enhancement.
- **Bellvue Transmission Line Project, Preliminary Compensatory Mitigation Plan (PCMP) -** Mr. Gurnée was the Project Manager for the preparation of the Preliminary Compensatory Mitigation Plan (PCMP) for

the Bellvue Transmission Line Project. Built upon preferred strategies in the 2008 Corps Compensatory Mitigation Rules, the PCMP leverages a broad strategy to ensure mitigation success and employs a watershed approach to select and prioritize compensatory mitigation (CM) measures that will best mitigate adverse environmental effects. It is intended to support a Corps determination of minimal adverse effect and allow verification of the Northern Segment of the Project under Nationwide Permit 12. Grant led the Team during the watershed assessment of the Poudre River, identification and prioritization of potential CM and preservation sites, development of a Pilot Watershed Plan, and conceptual design of priority CM sites. The PCMP has been submitted to the Corps for review and approval.

- **Flatirons Parcel Riparian and Wetland Habitat Restoration Project** – Grant assisted Greeley in developing a multiple use project at the Flatirons Parcel, a gravel quarry site in Greeley, Colorado. The site is being decommissioned over the next decade and offers great potential to create a system of ponds connected via a naturalized stream that discharges into the Poudre. The concept design incorporates recreation opportunities that are tied into the Poudre River Trail, a passive park, and the development of wetland, riparian and wildlife habitat.
- **Ruby Pipeline Wetland, Riparian and Waterbody Mitigation and Restoration Plan, WY, UT, NV AND OR -** Mr. Gurnée was the lead restoration ecologist and wetland scientist for the 675-mile, Ruby Pipeline; a natural gas pipeline traversing four states. He was the lead for the preparation of Wetland Mitigation, Riparian and Waterbody Restoration Plans under the CWA, BLM regulations and state equivalent programs. The plans included regulatory guidelines, requirements, and processes; and ecoregion specific restoration plans. The plans detailed specifications for the basis of design, construction, and revegetation; outlined performance criteria, maintenance and monitoring methods for the restoration of approximately 460 acres of temporary wetland impacts.
- **River Point, Sheridan, CO -** Mr. Gurnée was the project manager and lead restoration ecologist for the team that assessed, permitted and designed the natural and aesthetic features of this Brownfields project. The project included a naturalized water quality swale and riverfront improvements which complement the aesthetics and ecology of the South Platte River corridor. The swale was designed to mimic the form and function of a tributary stream, providing passive water treatment with native wetland and riparian vegetation, as well as flood attenuation with instream structures and grade control. The project utilized natural, “bio-engineering” and “bio-technical” techniques to repair and maintain channel and stream bank stability, and native vegetation to enhance and restore habitat. This project also addressed the interface of proposed restaurants, a regional greenway trail, and the river through planning and design of nature trails, interpretive nodes and overlooks/access features that will function to both stabilize banks and help connect people with the river.
- **Caribou Peat Bog Restoration, Nederland, CO –** Grant performed the impact assessment, prepared native plant community design, planting cost estimate, and on-the-ground oversight of restoration volunteers to restore a high-altitude peat bog disturbed by an illegal off-road-vehicle “mudfest”.
- **Opportunity Ponds Operational Unit, Anaconda, MT -** Mr. Gurnée was the project manager and lead restoration ecologist providing technical support to Atlantic Richfield/British Petroleum at a Superfund site in the Upper Clark Fork River basin in Montana between 1995 and 2008. Services included wetland delineation and functional assessment of over 3,000 acres of wetland, stream and pond habitat; design of stream and wetland habitat mitigation projects; and permitting/compliance services. The largest project within the Superfund site was the Opportunity Ponds, a 908-acre wetland, stream and wildlife habitat creation project. The project will result in the largest freshwater mitigation project in the U.S; and is intended to mitigate for historic wetland/waters impacts from Anaconda Mining Company operations and current impacts resulting from remedial actions associated with the Superfund cleanup process.
- **The Club at Flying Horse Golf Course, Colorado Springs, CO –** On behalf of Classic Communities, Grant and his Team assessed wetland habitat, recommended impact avoidance and minimization measures, and prepared the Section 404, CWA permit for a 1500-acre mixed use development and Weiskopf golf course. The project aesthetic and mitigation measures included the design of native prairie roughs, meandering stream channels and native wetland meadows within the golf course. Extra wetland mitigation was created to serve as a private mitigation bank for the client.
- **Maloit Park, Minturn, CO -** Grant was the project manager and restoration ecologist for the Maloit Park Restoration Project, which was necessitated by the accidental release of mine slurry that contaminated the soils and vegetation of critical wetland habitat at the confluence of Cross Creek and the Eagle River. The project included the assessment of the site, the collection of native wetland seed (that was adapted to site

conditions); the selection of appropriate replacement soil; the design of the restoration grading and planting plans; and oversight during the soil replacement, grading and planting phases. Mr. Gurnée also provided follow-up monitoring and reporting to ensure the successful establishment of the wetland habitat.

- **Department of Energy, Private Mitigation Bank, Westminster, CO -** Mr. Gurnée provided the project assessment, design, permitting, mitigation banking instrument negotiation with the Corps and EPA, and construction supervision of a 12-acre wetland mitigation bank for the Department of Energy in Westminster, CO. The project provides compensatory mitigation for impacts associated with the Rocky Flats clean-up and remediation project. It should be noted that this was the first private mitigation bank negotiated in Colorado, and as such it assisted in setting the precedent for future negotiations.
- **Saudi Arabia Coastal Wetland Restoration -** Mr. Gurnée assisted in the restoration planning for 67 square kilometers (41 square miles) of high salt marsh (sabhka) impacted by Gulf War oil spills.

Aquatic, Wetland, and Riparian Habitat Design

- **The Farm PMJM and Wetland Mitigation, Colorado Springs, CO** – As part of ESA Section 7 and CWA Section 404 consultation with the USACE and USFWS dating back to 2005, ecos prepared permit and mitigation construction documents, specifications and is currently performing on-going construction observation functions aimed at preserving, conserving, restoring, enhancing and creating critical wetland, riparian and upland habitat occupied by Preble's meadow jumping mouse (PMJM), a Federally protected threatened species. Out of a total of 475 acres, The Farm project at full build-out is expected to develop 341.5 acres of residential and commercial uses and conserve 133.5 acres of PMJM habitat that will continue to provide open space and recreational values for wildlife and the residential community.
- **Saint Vrain Creek Reach 3 Phase 2 Flood Recovery and Restoration, Boulder County, CO** - ecos is part of the Design Team assisting Boulder County Parks & Open Space (BCPOS) with the restoration, repair and enhancement of the Phase 2 reach of the Saint Vrain Creek in rural Boulder County, which was damaged by the 2013 floods. Our role on the project includes: 1) desktop and field assessment to inventory and document the characteristics of the stream reach and riparian corridor (e.g. stream/in-stream features, vegetation, wildlife habitat); identifying and locating significant habitat features within the areas of proposed construction; identifying potential sources of native plant materials for restoration; and identifying areas of opportunity within the breach repair work areas for native vegetation, wetland, PMJM, and fishery habitat restoration; and delineate wetland habitat and waters of the U.S. in all areas of proposed/potential construction-related impact; 2) vegetation community and wildlife habitat restoration design and fish passage design parameters; 3) permitting and compliance under the CWA and ESA; 4) construction oversight for restoration construction; and 5) monitoring and reporting project success/establishment to BCPOS, stakeholders, the Corps, FWS and the State of Colorado Department of Local Affairs (DOLA) under the (the Grant funding agency under the Community Development Block Grant Disaster Recovery (CDBGDR) Resilience Planning Program grant.
- **Saint Vrain Creek Reach 3 Flood Recovery and Restoration, Boulder County, CO** - ecos was part of the Design Team assisting BCPOS with the restoration, repair and enhancement of the reach of the Saint Vrain Creek from Highway 36 downstream to Hygiene Road in rural Boulder County, which was damaged by the 2013 floods. Our role on the project included: 1) desktop and field assessment to inventory and document the characteristics of the stream reach and riparian corridor (e.g. stream/in-stream features, vegetation, wildlife habitat); identifying and locating significant habitat features within the areas of proposed construction; identify potential sources of native plant materials for restoration; and identify areas of opportunity within the breach repair work areas for native vegetation, wetland, PMJM, leopard frog and fishery habitat restoration; and delineate wetland habitat and waters of the U.S. in all areas of proposed/potential construction-related impact; 2) vegetation community and wildlife habitat restoration design and fish passage design parameters; 3) permitting and compliance under the CWA, ESA and NHPA; 4) construction oversight for restoration construction; and 5) monitoring and reporting project success/establishment to BCPOS, stakeholders, the Corps, FWS and the State of Colorado DOLA under the CDBGDR Resilience Planning Program grant.
- **Bohn Park Flood Recovery Design, Town of Lyons, CO** – ecos is part of the Design Team assisting the Town with the restoration, repair and enhancement of Bohn Park in Lyons, which was damaged by the 2013 floods. Ecos roles is to assess and design the natural restoration of the vegetation communities and habitat along St. Vrain Creek and riparian corridor; and to support the project design by acquiring permits/approvals and maintaining regulatory compliance under the CWA, ESA and National Historic

Preservation Act (NHPA). The final design will address goals and priorities associated with the Parks Flood Recovery Planning Process, FEMA Project Worksheets and Project Scopes, the Lyons Recovery Action Plan (LRAP), associated Program Development Guides (PDG's), existing Town master plans, comprehensive plans and other relevant documentation and studies.

- **James Creek Post-Flood Restoration, Lefthand Watershed Oversight Group (LWOG), Jamestown, CO** – ecos was part of the LWOG and Boulder County Department of Transportation Team responsible for preparing the 30-60% design package for James Creek Reach 16 as identified in the Left Hand Creek Watershed Master Plan. ecos performed pre- and post-flood plant community assessment; developed revegetation goals and objectives, the basis of design, monitoring protocols, and revegetation plans in accordance with Colorado Department of Local Affairs (DOLA), Community Development Block Grant – Disaster Recovery (CDBG-DR) 30% Guidelines. Specific resources and issues of concern addressed by ecos, included federal and state listed candidate, threatened and endangered species, wildlife species of concern (including raptors), fisheries and fish passage, native plant communities, and management of noxious weeds, all in concert with geomorphic, hydrology and hydraulic analysis and design prepared by other team members.
- **Saint Vrain Creek Restoration and Floodplain Resiliency Plan, Lyons, CO** – ecos is part of the design-build team intent on restoring the St. Vrain Creek corridor in the Town of Lyons that was damaged during the September 2013 flood event. The goal of the project is to create a more resilient floodplain and natural channel condition that will alleviate future threats to the community, reestablish floodplain connectivity, stabilize banks, and restore aquatic, wetland and riparian habitat that was wiped out during the flood. Grant is responsible for CWA, ESA, Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act permitting; as well as developing the plant communities and revegetation strategies needed to restore aquatic and riparian structure and functions within the corridor that support fish, wildlife, recreation, and help the town regain the ecological benefits and economic value they receive from outdoor enthusiasts.
- **Bellvue Raw Water Ponds Riverbank Restoration, Bellvue, CO –** The 2013 flood on the Poudre River altered the course of the river and severely eroded a bank nearly causing a breach of the City of Greeley's raw water ponds – their main municipal water supply. The goal of the project was to stabilize the bank to protect the ponds and to create riparian habitat for the Preble's meadow jumping mouse, a federally listed threatened and endangered species. Jon was responsible for preparing bioengineering design plans and specifications that include soil/cobble encapsulated lifts, stream barbs to deflect flows away from the bank, and harder, biotechnical design of soil/riprap and stream bed scour protection measures to prevent erosion and further undermining and sloughing of the bank. Design plans included specification of native plant materials and various techniques to restore cottonwood forest and willow habitat to further stabilize the bank.
- **Poudre River Pipeline Crossing at Kodak, Windsor, CO –** ecos role on the project was to assess restoration potential, techniques, and prepare design plans and performance specifications to reclaim a pipeline corridor across the lower Poudre River where the City of Greely had to replace 3 major water supply lines. ecos also provided oversight during the construction of site and riverbank stabilization and restoration measures following installation of the pipelines.
- **Lions Park Poudre River Restoration Plan, Laporte, CO –** ecos role on the project was to assess habitat conditions; gather, compile and analyze field survey data; and to prepare the mapping and mitigation design plans for the Lions Park PMJM habitat and the Poudre River Bank Stabilization Plans. We designed and executed the technical drawings for the structural components of the habitat, ensuring that the proposed riparian plant community, habitat structures (brush piles), and bioengineered streambank stabilization measures will create the conditions that alleviate the current habitat fragmentation; support the life requisites of the PMJM; and enhance the overall health of the Poudre River fishery.
- **C Lazy U Ranch, Willow Creek Fishery Enhancement Plan, Granby, CO -** Mr. Gurnée was the lead fisheries biologist and wetland ecologist for the assessment and design of this project. The project entailed 2 miles of instream and riparian cover habitat aimed at enhancing water quality through increased bank stability, improving aquatic habitat and angling opportunities, and providing long-term stability to the reach given existing land-use constraints, and ongoing ranching activities. Bank-side improvements included wetland mitigation design to support ranch impacts, detailed seeding and planting plans indicating site-specific plant and seed locations, life zones, and species palettes according to hydrologic, soil, and aspect conditions. Grant was the regulatory lead, consulting with the Corps under Section 404 of the CWA.

- **Edwards Eagle River Restoration Project, Edwards, CO –** Grant was the senior wetland ecologist and fisheries biologist for the Edwards Eagle River Restoration Project (Project); which is roughly 1.5 miles long covering an area of 168 acres of floodplain along the Eagle River in the heart of the Edwards community. The project utilized indigenous materials and methods to naturally integrate habitat structure in the landscape context. He provided grant funding support; stream, riparian, wetland and fisheries habitat assessment, planning and design; and construction oversight services to the Eagle River Watershed Council for the Project. He assisted the ERWC in facilitating the public process associated with developing stakeholder support and gaining funding through the Eagle Mine Natural Resources Damage Fund. The Project was awarded over $2,000,000 in grant funding; $1,400,000 of which was from the Eagle Mine NRDF. The total project cost is projected at $4,300,000.
- **Gypsum Creek Fisheries Enhancement, Gypsum, CO -** Mr. Gurnée was the lead fisheries biologist and restoration ecologist for the instream and riparian habitat assessment, design, permitting and implementation of habitat improvements along Gypsum Creek. Project treatments included both instream and bankside treatments. Instream treatments served to improve deep-water habitat, create flow separation or concentration zones, increase low flow sinuosity, provide instream cover, improve adult fish habitat, create nursery areas, and enhance spawning opportunities. Bankside treatments for aquatic habitat improvements included creation or enhancement of overhead cover; provision of protective cover; and enhancing shading, cooling, and nutrient cycling functions. Bank protection treatments served to correct localized bank instabilities and reduce bank erosion and the potential for sediment deposition downstream. The Colorado Division of Wildlife (CDOW) commented that, “The Gypsum Creek project was implemented in such a low impact manner that you cannot tell that construction had occurred in the area.”
- **Cache La Poudre River Removal Action, Fort Collins, CO -** On behalf of the City of Fort Collins, Mr. Gurnée led negotiations between the EPA, stakeholders and the City regarding riverine, riparian and wetland regulatory and restoration design standards during the removal and remediation of a contaminated reach of the Poudre River. He also provided design review and revision, as well as construction oversight to ensure successful implementation of the instream and streambank restoration along the 0.50 mile, highly visible reach of the river near downtown Fort Collins.
- **TZ Ranch, Elk Hollow Creek Fishery Habitat Enhancement Plan, Saratoga, WY -** ecos performed the assessment and design of the Elk Hollow Creek Project, which included instream and riparian habitat improvements aimed at increasing bank stability, improving aquatic habitat and angling opportunities, and providing long-term stability to the reach. Instream improvements included drop structures, plunge pools, deep pools, riffles and spawning habitat. Bank improvements included seeding and planting plans for native wetland and riparian species. Grant was the regulatory lead, consulting with the Corps under Section 404 of the CWA and the Wyoming Department of Fish and Game. ecos also provided construction oversight and native plant installation services to ensure the successful implementation of the Project.
- **Brush Creek Fishery Enhancement Plans, Saratoga, WY –** Grant assisted in the preparation of access and staging plans, design plans and details, and performed on-site construction oversight of instream and riparian habitat enhancements and bioengineered bank stabilization for a 3-mile reach of Brush Creek. The purpose of the project is to enhance fish, bird and wildlife habitat and use these resources to facilitate education and improve the recreational experience of Ranch guests.
- **Brush Creek Ranch Pond Creation Plans, Saratoga, WY –** ecos provided design-build services including site optimization selection; excavation, grading, drainage and revegetation plans; and construction oversight for a 0.30-acre fishing pond. The pond design included an innovative undercut bank design incorporating a framework of trees supporting transplanted, native sod; which provided excellent fish habitat.
- **Boulder Creek Fishery Enhancement and Pond Creation Project, Boulder, CO -** Grant was the lead fisheries biologist and restoration ecologist for this project along a private reach of South Boulder Creek adjacent to City of Boulder, Eldorado Canyon Open Space. His tasks included instream and riparian habitat assessment, design of instream and pond fishery habitat and riparian enhancement measures and permitting and consultation. Grant was also the regulatory lead, consulting with the FWS regarding PMJM habitat and with the Corps under Section 404 of the CWA.
- **Stream and Floodplain Restoration at A.T. Massey Coal Mining Facility, KY -** Grant was the Project Manager, fisheries biologist and restoration ecologist for the technical team tasked with assessment and restoration of 26 miles of stream corridor following the accidental release of 250 million gallons of coal slurry into two separate drainages in eastern Kentucky. He was the first ecologist to respond after the spill

to ensure that fisheries, stream and riparian habitat restoration objectives were incorporated into the selected cleanup measures. As such, Grant devised a "triage" categorization and remediation system for all affected reaches that minimized impacts to sensitive aquatic and riparian habitat based on the site-specific level of cleanup and remediation required. In addition to instream and bank restoration and stabilization, comprehensive riparian corridor restoration was a major component of the project. Grant was the regulatory and permitting lead and coordinated permits and approval with EPA, Corps and State agencies.

- **Roaring Fork Golf and Fishing Club, Basalt, CO -** Mr. Gurnée was the lead fisheries biologist and restoration ecologist for the assessment, design, permitting and construction supervision of a native trout stream (1 mile) with associated wetland complexes (3 acres). The trout stream was created as an amenity and functional fly-fishing challenge for this fishing component of the Roaring Fork Club; and the associated wetland and riparian habitat were created to naturalize the stream and provide compensatory mitigation for impacts associated with the development of the club facilities. Grant was the regulatory and permitting lead and coordinated permits and approval with Corps and CDOW.
- **Spring Creek Wetland Mitigation, Colorado Springs, CO** – Grant and his team generated wetland and creek creation plans that integrated required mitigation into a high density, "new urban" development. The design emphasized re-utilization of urban storm water to sustain wetlands, use of indigenous plants, construction materials, and natural geomorphic relationships.
- **Tobacco Island Project, Kansas City, MO -** Grant was the lead fisheries biologist and restoration ecologist on a multi-disciplinary Team for the Corps, Tobacco Island Project - a portion of the Missouri River Bank Stabilization and Navigation, Fish and Wildlife Mitigation Project. Project tasks included assessment and conceptual design of measures aimed at reconnecting floodplain and riparian habitat to a reach of the Missouri River near Kansas City. He prepared preliminary designs of channel and backwater wetlands; provided regulatory analysis under Section 404 of the CWA; and assisted in the preparation of an Environmental Impact Statement.
- **San Miguel River Corridor Restoration Plan -** Mr. Gurnée was the lead restoration ecologist, planner and designer for phase 1 of the San Miguel River Corridor Restoration Plan, which included a 1-mile reach through Town. He and his team assisted the Town of Telluride in applying for and winning approximately $500,000 in Natural Resource Damage Assessment Fund money from the State of Colorado. The money, along with other funding, was utilized for final design and construction of the project which included instream habitat, streambank restoration, riparian and wetland restoration, trails and parks. Grant was responsible for leading all public meetings, regulatory negotiation and permitting; assisted the Town with grant funding; and provided construction oversight services.
- **High Altitude Stream Restoration at Copper Mountain Resort, CO -** Grant was the lead ecologist for the restoration of an alpine stream and enhancement of associated wetland and riparian habitat situated within tundra habitat atop Union Peak at Copper Mountain Resort. Grant performed the assessment, design, permitting, and construction oversight for one of the highest altitude stream restoration and wetland mitigation projects in Colorado (approximately 11,500 feet above sea level). Innovative bioengineering and construction techniques were designed and adapted to this sensitive environment to minimize construction-related impacts and maximize environmental benefits.

Threatened & Endangered Species Consultation & Habitat Restoration

- **Jackson Creek Land Company PMJM and Wetland Mitigation, Colorado Springs, CO –** ecos has been performing PMJM habitat biological assessments, conservation, mitigation planning and design throughout its range since 1994. Among numerous other private land developers in the Colorado Springs areas, ecos is currently assisting the Jackson Creek Land Company and Triview Metropolitan District with the implementation of physical habitat preservation and mitigation measures, including shortgrass prairie, upland hibernaculum, and riparian habitat restoration. We are also assisting the client with construction oversight and maintaining regulatory compliance during the implementation of the phased mitigation plans.
- **The Farm (formerly Allison Valley Ranch), Colorado Springs, CO –** Mr. Gurnée performed the habitat assessment and mapping; and prepared ESA, Section 7 and CWA, Section 404 consultation documents as required by the FWS and Corps, including mitigation construction documents, specifications, on-site layout of plant communities and construction supervision aimed at restoring wetland and riparian habitat occupied by Preble's meadow jumping mouse. Ecos is currently assisting the owner with construction oversight for habitat restoration and native planting.

- **Advance Mitigation for PMJM Habitat** – ecos is assisting a private client in identifying, assessing, prioritizing and designing advance mitigation sites for PMJM habitat in the North Fork and main stem of the Cache la Poudre River.
- **TriView Metropolitan District ESA and CWA Permit Resolution, Monument, CO -** Mr. Gurnée represented the TriView Metropolitan District (TriView) and Phoenix Bell as the lead consultant to resolve outstanding compliance issues related to a joint ESA, Section 7 Consultation and CWA, Section 404 Permit. Grant lead negotiations amongst the various landowners, TriView and the Town to resolve compliance issues related to PMJM and wetland habitat, such that development may proceed in this core area of the town. Upon resolution and agreement of the stakeholders, he led the negotiations with the FWS and Corps to formally amend the Biological Opinion and 404 Permit. Once the approvals were amended, Grant lead the planning and design of PMJM and wetland habitat to meet mitigation requirements under the ESA and CWA.
- **Bernardi Residential Property, Eldorado Canyon, Boulder, CO –** ecos consulted with the Corps and FWS to document and fulfill regulatory requirements for a residential home construction project in PMJM, wetland and riparian habitat. Mr. Gurnée coordinated with the FWS and Corps and obtained approvals under ESA, Section 7 and CWA, Section 404. He prepared all consultation documents, including the Biological Assessment, mitigation plan, and construction documents and specifications. Grant is leading the on-site layout of plant communities and construction supervision, aimed at restoring wetland and riparian habitat occupied by the PMJM.
- **Northgate Boulevard Realignment, Colorado Springs, CO –** Mr. Gurnée performed the habitat assessment and mapping; and coordinated and prepared ESA, Section 7 and CWA, Section 404 consultation documents as required by the FWS and Corps, including mitigation construction documents, specifications, on-site layout of plant communities and construction supervision aimed at restoring wetland and riparian habitat occupied by Preble's meadow jumping mouse.
- **Jefferson County Highways and Transportation Department Gunbarrel Bridge Replacement, Oxyoke, CO -** ecos staff consulted with the Corps, FWS, CDOT, and the FHWA to document regulatory requirements for a bridge replacement project in PMJM, wetland and riparian habitat. He and his Team produced a CDOT Wetland Finding Report, Biological Assessment, acquired a Section 404 Permit and Biological Opinion (Section 7 of the ESA), and then implemented habitat mitigation improvements at the site.
- **Northgate Project, Colorado Springs, CO -** As project manager, Mr. Gurnée led the team in the assessment, permitting and regulatory negotiation (Section 404 of the CWA and Section 7 of the ESA) for the project which included the planning, design and construction supervision of a precedent setting, "joint" mitigation plan for 60 acres of wetland, riparian and PMJM habitat.

Ecological Master Planning

- **Sundance Trail Guest Ranch, Larimer County,** CO – ecos is currently assisting a local guest ranch in the assessment of natural resources and site features, and the development of site plans to balance natural habitat and aesthetic values with the expansion of guest facilities and services.
- **Sand Creek Channel Improvements Stability Analysis at Indigo Ranch, Colorado Springs, CO** - ecos was retained to perform an analysis of channel stability under proposed development conditions for a 1.17-mile reach of Sand Creek. Ecos utilized existing vegetation composition data, density and height within the Project reach as a basis; and compared the 10-year and 100-year storm event modelling data (specifically flow velocity, flow depth and shear stress) to reference literature to provide a professional opinion regarding the future stability of the channel under developed conditions. The analysis of channel stability for the proposed Project assumes a bioengineering and biotechnical approach that preserves and enhances the existing vegetation, as well as substrate cohesion and stability, within the channel and its streambanks. The Stability Analysis will likely serve as a benchmark study for the City of Colorado Springs to use to preserve other naturally stable channels.
- **Uncompahgre River Corridor Master Plan, Montrose, CO –** Grant and his Team assessed the character, condition and quality of aquatic, wetland and riparian habitat along a 10-mile rural and urban corridor of the Uncompahgre River through the City of Montrose. Habitats were then rated, ranked, prioritized and master planned for their preservation potential and integration in to the parks, recreation and trail system. The master plans form the foundation for the City to focus environmental stewardship, tourism

and generate riverfront economic development with a focus on the river – the major asset of the Community.

- **Brush Creek Stewardship and Enhancement Plan, Saratoga, WY –** Mr. Gurnée managed the assessment of a 12,000-acre, private ranch near Saratoga, Wyoming and the preparation of the Ranch Stewardship Plan (Plan). The Plan includes land and resource stewardship goals, objectives, and implementation action items; including ranch-wide master planning of the trail and recreational systems, design of the Brush Creek riparian corridor trail, and restoration/fisheries habitat enhancement of Brush Creek. Trail and recreation planning and design focused on universal access, habitat sensitivity, environmental education, and wildlife observation opportunities and unique landscape experiences.

Renewable Energy Projects

- **Silver Mountain Windfarm and Transmission Line, Huerfano County, CO -** Mr. Gurnée was the Project Manager for the land use permitting and environmental assessment of the Silver Mountain Windfarm and Transmission Line project on behalf of Renewable Energy Systems (RES), Americas. Ecos assisted RES in the preparation and submittal of their preliminary 1041 permit application; and performed detailed site assessments to document potential site development constraints and site-specific environmental/ecological conditions. Grant has represented RES at the Huerfano County pre-application conference, an onsite meeting with CDOW, and informal consultation with USFWS.
- **Flat Land Solar Project, Huerfano County, CO -** Grant was the Project Manager for the permitting and environmental assessment of the Flat Land Solar (FLS) project. Ecos assisted FLS in the preparation of their preliminary 1041 permit application; and performed detailed site assessments to document potential site development constraints and site-specific environmental/ecological conditions.
- **Haynes Creek Solar Project, Pueblo County, CO -** Mr. Gurnée was the project manager for the Critical Issues Analysis for the Haynes Creek Solar project on behalf of enXco. Ecos performed desktop level analyses and a preliminary site assessment to document potential site development constraints, site-specific environmental/ecological conditions; and detail regulatory compliance issues (federal, state and local).
- **Cucharas Windfarm Project, Huerfano and Las Animas Counties, CO -** Mr. Gurnée was the project manager for the Critical Issues Analysis for the Cucharas Windfarm project on behalf of enXco. His team performed desktop level analyses and a preliminary site assessment to document potential site development constraints, site-specific environmental/ecological conditions; and detail regulatory compliance issues (federal, state and local).
- **Wheatland Windfarm, Wheatland, WY -** Mr. Gurnée was the project manager for the Critical Issues Analysis for the Wheatland Windfarm on behalf of enXco. Ecos performed desktop level analyses and a preliminary site assessment to document potential site development constraints, site-specific environmental/ecological conditions; and detail regulatory compliance issues (federal, state and local).
- **Pole Canyon Windfarm and Transmission Line Projects, Huerfano and Pueblo Counties, CO -** Grant was the Project Manager for the proposed 20,000-acre, 300-MW windfarm; and the 42-mile transmission line. He provided comprehensive client representation for all public, regulatory agency, state and county processes. The windfarm includes 125 wind turbine generators, five 60-meter wind-monitoring towers, internal access roads, improvements to county roads, two substations and an electrical collection system, and an operations and maintenance facility. The transmission line will extend from the windfarm in Huerfano County to the Comanche Power Plant in Pueblo County.

  Ecos performed detailed site assessments to document potential site development constraints and site-specific environmental/ecological conditions including: wetlands/waters of the US, T&E species listed by USFWS and the CDOW, habitat and avian species covered by the Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act, and historic and culturally significant resources. The detailed field surveys included preliminary site characterization studies, wetland delineations, land use impact studies, habitat assessments, and avian and bat data analyses and surveys to evaluate the potential impacts of proposed wind farm and transmission line development on raptors and bats.

  Ecos prepared the preliminary and final land use permits (1041 applications) for Huerfano County; and the 1041 permit application for Pueblo County; and supported the applicant during the three public presentations and two hearings. The client received approval of their 1041 permit applications for the wind energy facility and 17 miles

transmission line from Huerfano County Board of Commissioners in August 2008; and for the remaining 25 miles of transmission line from the Pueblo County Board of commissioners in September 2008.

Ecos successfully completed the jurisdictional determination with the U.S. Army Corps of Engineers and formal consultations with the USFWS and CDOW. He and his team completed the detailed environmental assessment (NEPA EA) of the transmission line corridor including management of the Cultural resources sub-consultant.

- **Alta Windpower Development, LLC, Kern County, CA -** Grant was the lead Restoration Ecologist for the preparation of the Draft Biological Sampling Plan (Draft Plan) that was prepared on behalf of Alta Windpower Development, LLC (Alta). The intent of the Draft Plan was to provide the basis for an efficient and scientific approach to the characterization of biological resources that could be affected by construction, operation, and maintenance of future wind energy projects in Kern County, California. The Draft Plan described the regulatory framework under which the future projects would be evaluated; defined the biological resources to be characterized pursuant to Federal, State, and local regulations; and identified the agency-prescribed protocols by which the biological assessments would be implemented. The Draft Plan was prepared such that it would be consistent with the West Mojave Plan, a habitat conservation plan (HCP) and an amendment to the California Desert Conservation Area Plan covering over nine million acres in five counties (Inyo, Kern, Los Angeles, San Bernardino, and Riverside).
- **Cedar Creek Windfarm, Weld County, CO -** Mr. Gurnée was the project manager for the permitting and environmental assessment of BP Alternative Energy (formerly Greenlight Energy) 300 MW Cedar Creek windfarm and associated transmission line in Weld County, Colorado. Grant and Jon conducted wetland and riparian area surveys over the proposed windfarm and transmission line site (including several river crossings), and assisted in meetings with federal, state, and county regulatory agencies.
- **Sunrise Eagle Flats Windfarm, Huerfano County, CO -** Mr. Gurnée was the project manager for the Sunrise Eagle Flats windfarm project. He provided a full-range of environmental services to Sunrise Enterprise Renewable Energy Development, LLC for Phase 1 of a proposed 40-megawatt wind farm in Huerfano County, Colorado. He and Jon conducted all necessary field surveys including preliminary site characterization studies, wetland delineations, land-use impact studies, habitat assessments and avian and bat surveys including a bat fall migration survey using active monitoring methods with AnaBat acoustic detectors. Baseline data was analyzed, along with other available studies and data, to evaluate the potential impacts on bats from proposed wind farm development.

Environmental Assessment and Impact Studies

- **NEPA EA for Eagle County Airport Runway Expansion, Eagle County, CO -** Grant was project manager and senior ecologist for an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA) for a proposed 1000-foot runway expansion and ILS installation at the Eagle County Airport, west of Vail, Colorado. Critical issues addressed included noise, ecological, and public opinion considerations. Grant conducted the work under FAA guidance requirements for EAs.
- **NEPA EA for the Avon Interstate 70 Interchange -** Mr. Gurnée was project manager and senior ecologist for this NEPA EA. He performed environmental assessment and data compilation work for construction of a new CDOT interchange and associated development on Interstate 70. This included evaluating T&E Species; a wetlands inventory; a cultural/archeological resources survey; noise and air pollution modeling and studies; and reviewing soils, meteorology, geologic hazards, and other impacts.
- **Raritan River Wetland Inundation Impact Study, N.J. -** Grant's work on the preparation and processing of the first Individual Permit under the New Jersey Freshwater Wetlands Protection Act of 1987 included a precedent setting wetland inundation study. This study shaped the N.J. Department of Environmental Protection's policy regarding the need to assess hydrologic impacts during wetland permit reviews.

Construction Oversight and Plant Installation

- **St. Vrain Creek Reach 3 Flood Recovery and Restoration, Lyons, CO –** Ecos performed construction lay-out and observation during the implementation of the restoration and enhancement of 0.60-acre of riparian Preble's Meadow Jumping Mouse Habitat (PMJM) along the St. Vrain River.
- **2013 Flood and 2014 Runoff Events, Damage Restoration, Cache la Poudre River, CO** - ecos performed the construction oversight of 3 flood and runoff damage restoration projects along the Cache la

Poudre River for the City of Greeley, including the Bellvue Treatment Plant Raw Water Ponds Restoration, the Kodak Pipeline Crossing Restoration and the Watson Lake Pipeline Crossing Restoration.

- **Lions Park CWA and ESA Mitigation Site** - ecos performed the construction oversight for an advance river and wetland mitigation site at Lions Park in LaPorte, Colorado.
- **TZ Ranch, Elk Hollow Creek Fishery Habitat Enhancement Plan, Saratoga, WY -** ecos performed the construction oversight for the Elk Hollow Creek Project.
- **Brush Creek Ranch Fishery Enhancement Plans, Saratoga, WY –** Mr. Gurnée assisted in the construction oversight for a 3-mile reach of Brush Creek to improve fisheries and outdoor recreation experiences for guests of the Ranch.
- **C Lazy U Ranch, Willow Creek Fishery Enhancement Plan, Granby, CO -** Grant assisted in the construction oversight for this fishery habitat, channel stabilization and streambank restoration project.
- **Standley Lake Protection Project, Westminster, CO –** Mr. Gurnée performed construction oversight of a 12-acre created emergent wetland that he and his Team designed to fulfill CWA mitigation requirements and bring closure to the City's drinking water protection project.
- **Caribou Peat Bog Restoration, Nederland, CO –** Grant prepared native plant community design, planting cost estimate, and on-the-ground oversight of volunteers to restore a high-altitude peat bog disturbed by an illegal four-wheel drive "mudfest".
- **Department of Energy Wetland Mitigation Bank, Westminster, CO –** Mr. Gurnée provided construction supervision of the grading and planting of a 12-acre wetland mitigation bank that he and his Team designed for the Department of Energy.
- **ARCO Lower Area One and Butte Reduction Works, Butte, MT –** Grant performed construction observation and supervision of temporary labor crews to plant a passive treatment wetland designed to absorb heavy metals from groundwater.

Natural Treatment System Design

- **Natural Treatment Wetlands, Butte, MT -** Mr. Gurnée and his Team performed the assessment and design of the ARCO Lower Area One and Butte Reduction Works passive treatment wetlands. These natural treatment systems were situated within two units of a reclaimed superfund site to treat heavy metals in surface and groundwater.
- **Natural Treatment Wetlands, Avondale, AZ –** Grant and his Team performed the assessment and design of a constructed wetland system to treat surface water and inject/recharge the municipal well system for the City of Avondale, AZ. This system successfully alleviated a well moratorium necessitated by a contaminated groundwater aquifer.

PUBLICATIONS:

Giordanengo, John H., Randy Mandel, William Spitz, Matthew Bossler, Michael Blazewicz, Steven Yochum, Katie Yagt, William LaBarre, Grant Gurnée, Robert Humphries and Kelly Uhing. 2016. Living Streambanks, A Manual of Bioengineering Treatments for Colorado Streams. Submitted to the State of Colorado, Colorado Water Conservation Board Denver, Colorado. Submitted by AloTerra Restoration Services, LLC, and Golder Associates, Inc.

Gurnée, Grant E. 1998. Wetland Revegetation Techniques chapter in Native Plant Revegetation Guide for Colorado, Caring for the Land Series, Volume III. A joint publication of the Colorado Natural Areas Program, Colorado State Parks, and Colorado Department of Natural Resources. Denver, Colorado.

Gurnée, Grant E. 1995. Optimizing Water Reclamation, Remediation and Reuse with Constructed Wetlands. Environmental Concern Wetland Journal, Summer 1995 Issue. Environmental Concern, Inc. St. Michaels, Maryland.

PRESENTATIONS & INSTRUCTION:

Gurnée, Grant E., 2016. Clean Water Act, Section 404 Permits for Flood Recovery Projects. Presented at the Colorado Stream Restoration Network (CSRN) conference in Longmont, CO on March 23, 2016.

Gurnée, Grant E., 2016. Endangered Species Act Consultation for Flood Recovery Projects. Presented at the Colorado Stream Restoration Network (CSRN) conference in Longmont, CO on March 23, 2016

Gurnée, Grant E., 2010. Stream Corridor/Bioengineering Round Table. Presented at the Colorado Riparian Association (CRA) Sustaining Colorado Watersheds Conference. October 5 - 7, 2010. Vail, Colorado.

Gurnée, Grant E. and Greg A. Fentchel, 2009. Stream Corridor/Bioengineering Workshop. Presented at the Colorado Riparian Association (CRA) Sustaining Colorado Watersheds Conference. October 7 - 9, 2009. Vail, Colorado.

Gurnée, Grant E. and Scott J. Franklin, 2008. Section 404 Individual Permits: Negotiating the Application and Follow-up Process. Presented at the CLE International, Colorado Wetlands Conference. May 8 – 9, 2008. Denver, Colorado.

Gurnée, Grant E. and Julie, E. Ash, P.E., 2007. Edwards Eagle River Restoration Project. Presented at the Colorado Riparian Association (CRA) Sustaining Colorado Watersheds Conference. October 5 - 7, 2009. Breckinridge, Colorado.

Gurnée, Grant E. 2000. Natural Treatment Alternatives for Surface Discharges, Surface Runoff, and Mined Land Reclamation. Presented at the International Mining Technology Seminar. September 13 – 15, 2000. Belo Horizonte, Minas Gerais, Brazil.

Gurnée, Grant E. 1999. Wetland Mitigation: Considering Mitigation Requirements in the Project Planning Process. Presented at the Continuing Legal Education (CLE) Wetlands & Mitigation Banking Conference. October 21 & 22, 1999. Denver, Colorado.

Hoag, Chris, Hollis Allen, Craig Fischenich and Grant Gurnée. Assistant instructor for a Bioengineering Workshop sponsored by the U.S. Army Corps of Engineers Waterways Experiment Station and the U.S. Department of Agriculture – Aberdeen Plant Materials Center. September 1998. Carson City, Nevada.

Hoag, Chris and Grant Gurnée. 1998 Glancy Riparian Demonstration Project. Assistant instructor for a hands-on bioengineering workshop on the Carson River. September 1998 near Dayton, Nevada.

Gurnée, Grant E. 1998. Stream and Wetland Restoration Successes and Failures: The Good, the Bad, and the Ugly. Presented at the Colorado Riparian Association (CRA) Restoring the Greenline Conference. October 16, 1998. Salida, Colorado.

Gurnée, Grant E. 1998. Save Our Streams, Wetland Conservation and Sustainability Workshop. Lead Instructor of wetland assessment and restoration course presented with the Izaak Walton League. April 21 & 22, 1998. Boulder, Colorado.

Windell, Jay, and Grant Gurnée. 1998. Creation of a Stream, Riparian and Wetland Ecosystem: Tributary to the Roaring Fork River, Basalt, Colorado. Presented at the American Society of Civil Engineers, Wetlands Engineering & River Restoration Conference. March 23 – 27, 1998. Denver, Colorado.

Gurnée, Grant E. 1998. A Case Study: Department of Energy's Wetland Mitigation Bank at Standley Lake. Presented at the Continuing Legal Education (CLE) International, Colorado Wetlands Conference. January 27 – 29, 1998. Denver, Colorado.

Gurnée, Grant E. 1997. Wetland Mitigation: Design and Implementation via the Design/Build/Grow Process. Presented at the International Erosion Control Association, Erosion & Sediment Control Workshop. November 19, 1997. Northglenn, Colorado.

Gurnée, Grant E. and Gary Bentrup. 1996. Wetland and Riparian Protection Strategies. Presented at the Sierra Club, Regional Growth Strategies Conference, "New Perspectives and Strategies to Preserve Mountain Communities." February 16 – 17, 1996. Glenwood Springs, Colorado.

Gurnée, Grant E. 1994. How to Recognize and Deal with Wetland Regulation Issues. Presented at the Continuing Legal Education (CLE) International, 3rd Annual Western Agricultural and Rural Law Roundup. June 23-25, 1994. Fort Collins, Colorado.

AWARDS:

- Colorado Landscape Contractors Award, Sand Creek Enhancement Project – 2000

PROFESSIONAL ASSOCIATIONS:

- Association of State Wetland Managers (ASWM)
- Society of Wetland Scientists (SWS)
- Environmental Concern (EC)