

1 | Introduction

The consequences of roadways to wildlife have long been recognized. Roadways fragment wildlife habitats and act as barriers to food, shelter, and mating opportunities. Wildlife vehicle collisions (WVCs) result in direct mortalities to wildlife; on Colorado highways alone, **WVCs are estimated to kill two percent of big game animals and 9,000 mule deer annually** (Colorado Wildlife and Transportation Alliance, 2023). WVCs also pose serious risks to human life and property, with associated costs of **\$66.3 million annually in medical expenses in the state** (Colorado Wildlife and Transportation Alliance, 2023).

In recognition of the need to enhance wildlife connectivity, reduce wildlife mortality, and protect drivers and their property along its state highways, the Colorado Department of Transportation (CDOT) has committed to enhancing its network of wildlife crossing systems throughout Colorado. Wildlife crossing systems include underpasses and overpasses in combination with barriers (e.g., fencing, guardrails) strategically placed to promote the safe passage of wildlife across roadways. **The segment of Interstate (I) 25 between mile posts (MPs) 0 and 14 has been identified as a prioritization corridor for the implementation of wildlife crossing systems.** This segment of highway will be hereafter referred to as the “Raton Pass” segment, or “project corridor.” CDOT, with input from stakeholders including the Colorado Parks and Wildlife (CPW), Colorado State University (CSU) Pueblo, Trinidad, Las Animas County, Fishers Peak State Park, Colorado State Patrol (CSP), New Mexico Department of Game and Fish (NMDGF), the New Mexico Department of Transportation (NMDOT), and public citizens, is developing this Wildlife Prioritization and Implementation Study (study) to screen and prioritize locations in the project corridor for which to implement wildlife crossing systems, and to identify the top solutions to advance.

This study draws heavily on wildlife hotspot locations, or areas in the corridor with the highest number of WVCs, developed by collaborative research from the CSU Pueblo, CDOT, and NMDOT. The CSU Pueblo Study is being conducted in two phases: Phase 1 (MPs 0 – 11) and Phase 2 (MPs 11 – 14). Wildlife hotspot locations have already been identified for Phase 1, while Phase 2 is currently ongoing. This study will therefore also be conducted in the same two phases, concurrent with the CSU Pueblo Study. Corridor-wide solutions will be determined at the completion of Phase 2.

LOCATION

The project corridor begins at Raton Pass at the New Mexico border and extends north to Trinidad, Colorado (Figure 1). The area consists of shrubby foothills dominated by vegetation such as Ponderosa pine, oak shrubs, mountain mahogany shrubs, and herbaceous vegetation such as western wheatgrass and mountain muhly. The geology of the corridor is distinguished by rugged, flat-topped mesas; including most notably, the iconic, 9,623-foot Fishers Peak, which towers east of the highway at around MP 8. Several streams occur along the corridor, including McBride Creek, Joe Creek, Clear Creek, the Purgatoire River, and numerous dry and intermittent tributaries to these streams.

The southern portion of the corridor (generally south of MP 8.8) has low levels of human disturbance relative to the northern portion. In this southern portion, the 19,200-acre Fishers Peak property, which consists primarily of open space (soon to be developed into Fishers Peak State Park), spans the eastern side of I-25, while the Santa Fe Trail Ranch spans the western side of I-25. As the highway winds northward, the surrounding land use becomes increasingly more developed. The town of Starkville begins at around MP 8.8 on the west side of the highway, and Trinidad, which straddles both sides of the highway, begins at around MP 10.8. Medium- to high-density residential and commercial centers occur along the highway in this northern section of the corridor.

The land surrounding the project corridor includes sensitive ecological features such as habitat for the federally listed New Mexico Preble's meadow jumping mouse; nesting habitat for golden eagles, peregrine falcons, and other raptors; riparian habitats and wetlands; rare and native vegetation communities; and wildlife movement, winter range, foraging, and/or breeding habitat for species such as elk, mule deer, bobcats, mountain lions, and black bear.

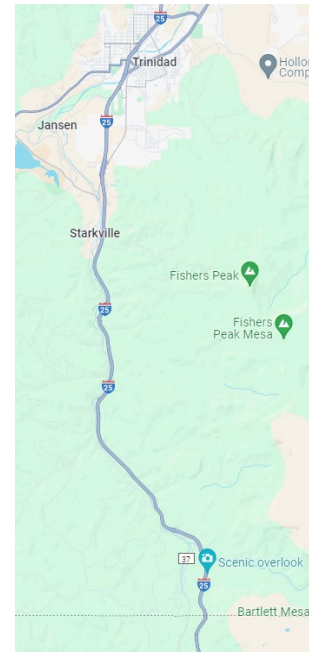


Figure 1: Map of Raton Pass

FEDERAL & STATE POLICY ACTIONS (cpw.state.co.us)

2022

Governor Polis signed SB22-151 Safe Crossing for Colorado Wildlife and Motorists Act on June 1, 2022.

2021

The Colorado Department of Natural Resources produced a Policy Report identifying potential policy, regulatory, and legislative opportunities to ensure the ongoing conservation of seasonal big game habitat and migration corridors. The Infrastructure Investment and Jobs Act was signed which includes a 5-year pilot program of \$350 million to construct wildlife road crossings.

2020

CPW completed the Big Game Winter Range and Migration Corridor Status Report addressing current population status, known threats to seasonal big game habitat and migration corridors, and identifying data and information gaps.

2019

Governor Polis signed Executive Order D-2019-011, Conserving Colorado's Big Game Winter Range and Migration Corridors.

The Colorado Parks and Wildlife Commission adopted a resolution reaffirming the Governor's Executive Order and supporting the federal funding opportunity.

CPW and CDOT signed a memorandum of understanding for collaboration in mitigating wildlife-vehicle collisions, identifying priority big game highway crossings in the state, and participation in and support of the multi-stakeholder Colorado Wildlife-Transportation Alliance (CWTA).

The Colorado Legislature showed support in advancing wildlife corridor conservation and habitat connectivity with the development of a bipartisan Colorado Habitat Connectivity Senate Joint Resolution 21-021 that unanimously passed through both chambers of the Legislature and was enacted in June 2019.

2018 & 2017

A pair of secretarial orders issued by the U.S. Department of Interior (DOI) directed federal land managers to work with states to protect big game species and their habitat within the region.

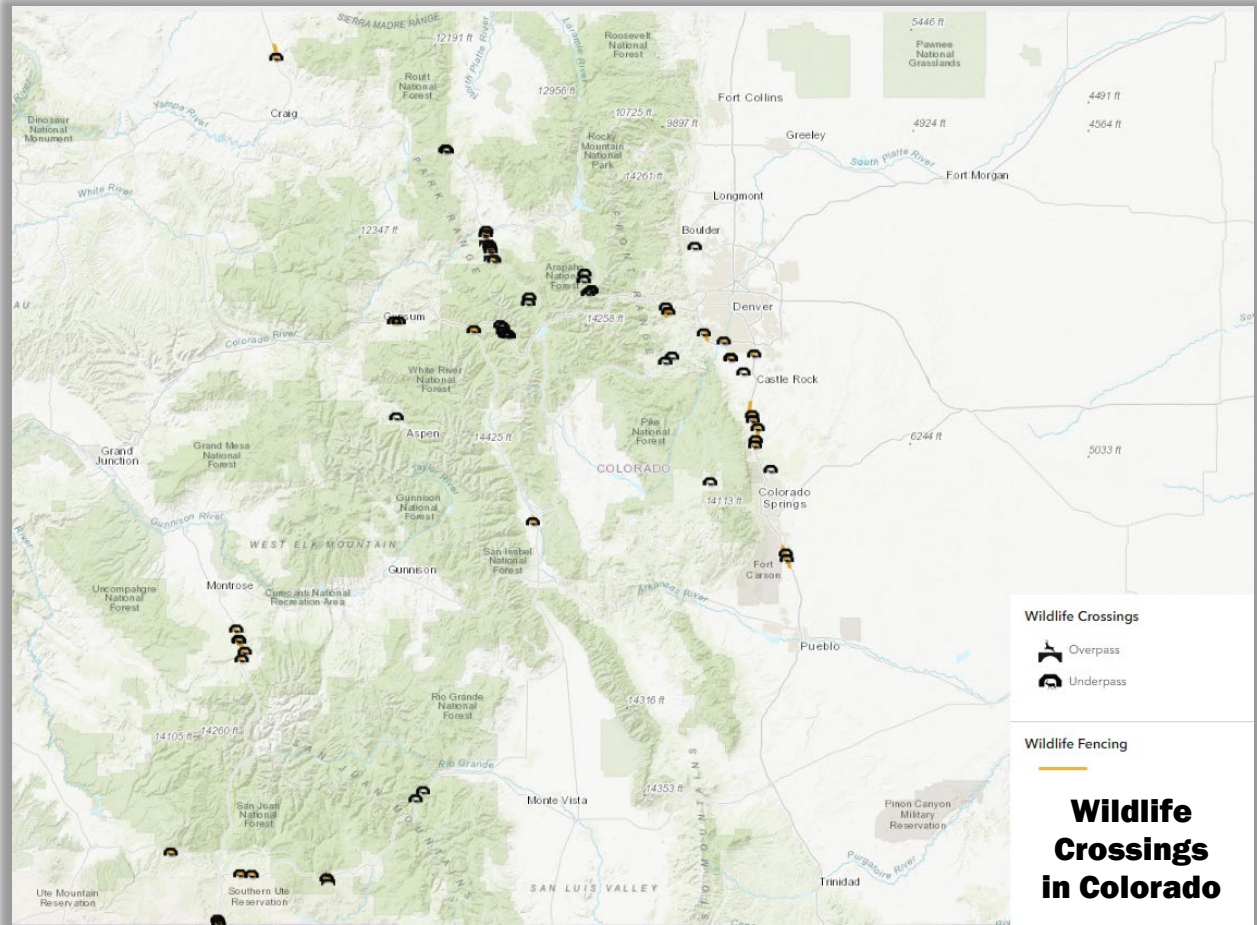


Figure 2: Wildlife Crossings in Colorado

2 | Project History

The Raton Pass segment of I-25 has long been recognized as a wildlife-highway conflict zone.

The high volumes and speeds of I-25, in combination with surrounding habitat suitable for a variety of wildlife species, results in collisions with wildlife species – most commonly elk, mule deer, and black bear – in this corridor. The need to implement wildlife crossing mitigation systems in the Raton Pass segment has been recently highlighted by two studies: the Eastern Slope and Plains Wildlife Prioritization Study (ESPWPS) and the CSU Pueblo Study.

EASTERN SLOPE & PLAINS WILDLIFE PRIORITIZATION STUDY

The ESPWPS was a collaborative effort between CDOT and CPW to prioritize wildlife-highway conflict areas and mitigation needs across the state to ensure the most effective use of mitigation funds. In April 2022, CDOT and CPW released the ESPWPS which included a decision-support framework and tools to guide mitigation implementation in the highest priority segments (Jacobs, 2022). To develop this framework, the team evaluated information on speed limits, current and future traffic volumes; CDOT WVC carcass data; CPW mule deer and elk global position system (GPS) collar data; CPW species activity mapping data; topography; land use; and other data to identify hotspot locations and model wildlife movement. The ESPWPS produced the following tools:

- ▶ A list of the top five percent priority segments for CDOT Regions 1, 2, and 4 to highlight the highway segments in each region where investments in wildlife crossing systems would have the greatest benefits for wildlife and motorists. **The ESPWPS identified I-25 between MPs 2.2 and 10.1 (Raton Pass) as a top five percent priority segment.**
- ▶ Wildlife-highway mitigation recommendations for the top 5 percent highway segments in CDOT Regions 1, 2, and 4. These recommendations were developed based on field surveys and the latest research on the effectiveness of different mitigation strategies. The ESPWPS identified 13 mitigation recommendations (potential projects) in the Raton Pass segment between MPs 2.2 and 10.1. Each of the ESPWPS mitigation recommendations were evaluated in this screening and prioritization study.
- ▶ Updated wildlife valuations and benefit-cost analysis (BCA) tool to determine the benefits and costs of wildlife crossing mitigation. The BCA tool can be used to inform where wildlife-highway mitigation is most cost effective, or to evaluate the benefits and costs of different mitigation strategies.

COLORADO STATE UNIVERSITY PUEBLO STUDY

CSU Pueblo, in collaboration with CDOT Region 2, NMDOT, and Clarkson University, launched a study to evaluate whether the NMDOT construction of wildlife fencing along I-25 in New Mexico north to

the Colorado border would increase WVCs on the Colorado side of the border. To answer this question, the team is comparing wildlife hotspots pre- and post-fence construction. Pre-fence hotspots were identified by conducting Monte-Carlo simulations in ArcGIS of carcass and WVC data from January 2009 to December 2019. The identification of post-fence hotspots is currently in progress.

The CSU Pueblo study identified 11 significant pre-fence hotspots between MP 1 and MP 11 (Phase 1). Phase 2 of the project (MP 11 – 14) is currently ongoing. The screening and prioritization approach to this study first evaluates solutions for each of the 11 hotspots identified in the CSU Pueblo Study. When Phase 2 of the CSU study is complete in the spring of 2024, hotspots identified in it for MPs 11 –14 will also be evaluated using the same process applied in this first phase of study.

3 | Existing Conditions

DATA COLLECTION

To support the decision-making process in the context of the above selection criteria, existing data pertaining to wildlife habitat and range, key environmental considerations, and infrastructure were collected, synthesized, and analyzed from the following data sources:

- ▶ **CDOT WVC Data and Heat Map** (CDOT, 2023). CDOT provided WVC data from January 2008 to September 2023 documenting known collisions along I-25 between MPs 0 and 12. Carcass data was collected by CDOT maintenance crews and CPW staff as they removed carcasses from roadways, and (starting in 2022) through the CPW app. CDOT also provided a heat map to identify locations where WVCs would be most likely to occur. The heat map is based on WVC data and topography around those areas.
- ▶ **CPWs Species Activity Mapping (SAM) Data** (CPW, 2023). SAM data is readily available data that displays wildlife habitat data for a variety of species, including but not limited to overall and potential range, winter or summer range, winter or summer forage, breeding range, etc. within Colorado's landscape.
- ▶ **CSU Pueblo Study Hotspot Data** (CSU Pueblo, 2023). The CSU Pueblo study identified 11 significant preference hotspots between MPs 1 and 11.
- ▶ **El Paso County Assessor's Data** (El Paso County, 2023). Assessor's data were used to identify existing and proposed developments along the project corridor, parks and recreational resources, I-25 right-of-way, and land ownership.
- ▶ **Fishers Peak Park Master Plan** (CPW, 2022). The Fishers Peak Park Master Plan was reviewed to identify existing and proposed development areas in the park (i.e., equestrian trails, the visitors' center, etc.).
- ▶ **U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI)** (USFWS, 2023). The USFWS NWI data were used to identify wetlands and riverine systems within and near the project corridor.
- ▶ **USFWS Information Planning and Consultation System (IPaC)** (USFWS, 2023). The IPaC was used to identify threatened and endangered species with the potential to occur within the project corridor.
- ▶ **Office of Archaeology and Historic Preservation (OAHP) COMPASS Database** (OAHP, 2023). The OAHP COMPASS database was used to identify previously identified historic and archaeological resources within a half mile of the project corridor.
- ▶ **CDOT Online Transportation Information System (OTIS)** (CDOT, 2023). The CDOT OTIS database was issued to identify the locations of drainage systems (concrete box culverts, corrugated metal pipes) and bridges in the project corridor.

WILDLIFE HABITAT & RANGE

Large Mammal Habitat

Habitat and range of animals was mapped to aid in determining where and when animals are likely near and crossing I-25. Ungulates and other large mammals known to occur near the project corridor include elk, mule deer, white-tailed deer, black bear, and mountain lion, and pronghorn. CPW SAM data were evaluated to identify habitat for these species within a half mile of the project corridor. Note that pronghorn are omitted, as no mapped pronghorn habitat occurs within a half mile of the project corridor.

New Mexico Wildlife Crossing Mitigation

The New Mexico Wildlife Corridors Action Plan (Plan) was a collaborative effort between Daniel B Stephens & Associates, Inc. (DBS&A), NMDOT, and NMDGF, to identify hotspots in New Mexico for WVCs (DBS&A, 2022). The Plan identified a 26.5-mile segment of I-25 from the Colorado border to south of Raton as a “top ten” priority corridor for wildlife crossing solutions in New Mexico based on the number of crashes per mile (DBS&A, 2022). To address the need to protect wildlife as well as drivers and their vehicles in Raton, NMDOT completed 4.5 miles of wildlife exclusion fencing along I-25 from MP 450.5 to 455 in 2017. NMDOT is currently extending the wildlife crossing mitigation north toward the Colorado border, including construction of the state’s first arch culvert wildlife underpass at Raton Pass. Individuals from NMDOT are included as stakeholders in the development of this prioritization study.

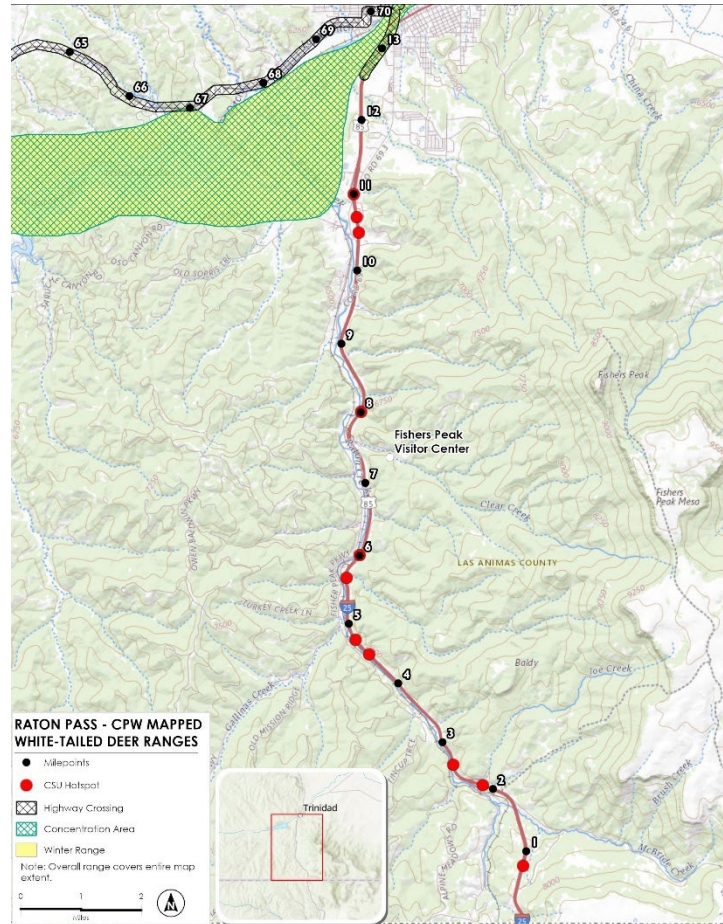


Figure 3 - Deer Habitat within a Half Mile of Project Corridor

KEY ENVIRONMENTAL CONSIDERATIONS

WVC Hotspots

Factors that drive wildlife to cross I-25 are likely diversity in habitats (i.e., other sources of food, water, and sanctuary) and mating and/or rearing purposes. Most species crossing I-25 likely concentrate their movements along stream/drainage systems. These systems typically provide

wildlife with water and better cover and sanctuary from weather and/or predators. Also, many of these species 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. Based on CDOT's WVC data, about 17 percent of the WVCs are elk, 54 percent are deer, and 20 percent are black bear. WVCs are high through the corridor but, in general, are highest between MPs 7 - 10 (CDOT, 2023).

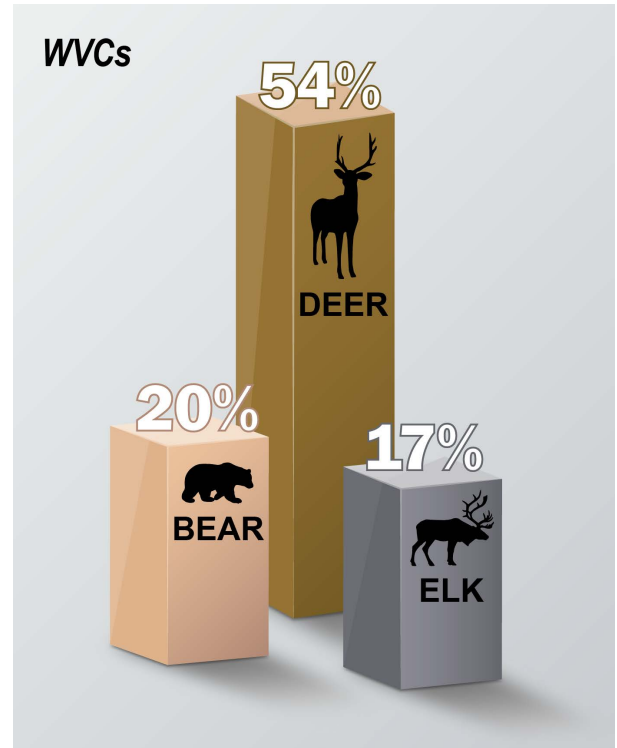


Figure 4 – WVCs

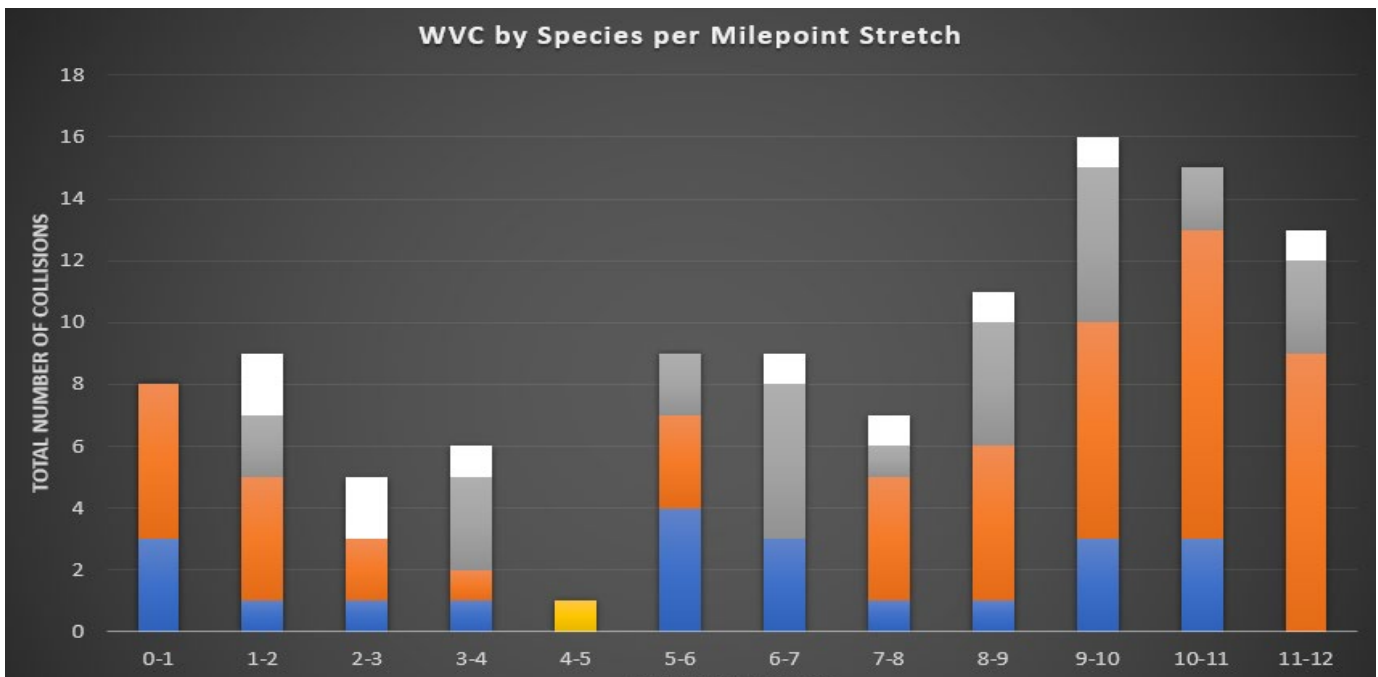


Figure 5 – WVC by Species per Milepoint Stretch

Aquatic Resources

Aquatic resources, including wetlands and riverine systems, provide a number of important ecological, societal, and economic benefits, including serving as habitat for a wide variety of plant and animal species, contributing to flood control, and/or improving water quality in the watershed. Federal and state regulations that protect aquatic resources in Colorado include Section 404 of the Clean Water Act, Executive Order 11990 Protection of Wetlands, and Colorado Senate Bill 40. The screening and prioritization for wildlife crossing systems will consider consultation, permitting, and/or mitigation requirements for potential impacts to aquatic resources. The presence of waters of the U.S., including wetlands (WOTUS) at a crossing location does not pose a fatal flaw; however, if a WOTUS will be impacted, a U.S. Army Corps of Engineers (USACE) permit may be required and mitigation for impacts will be needed. This is an additional consideration for the ease of implementing wildlife crossing mitigation measures.

The project corridor occurs within the Purgatoire River watershed, and water ultimately flows to the Arkansas River. There are 17 streams mapped by the NWI within the project corridor ROW. Named streams include Raton Creek, McBride Creek, Joe Creek, Gallinas Creek, Turkey Creek, Clear Creek, and the Purgatoire River. The remaining streams are unnamed tributaries to the above-named streams. There are six potential wetlands within the ROW mapped on the NWI. Five are associated with Raton Creek and one is associated with the Purgatoire River. There are likely other small wetlands that are not mapped by NWI that occur within drainages and other depressional areas along the corridor.

Cultural Resources

Cultural resources shape the identity, history, and diversity of societies, and include historic and archaeological resources. Historic resources are defined as any prehistoric or historic district, site, building, structure, or objects, included in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Common historic resources along roadway such as I-25 include buildings, the roadways themselves, railroads, irrigation ditches and canals, sewers, bridges, and culverts. Archaeological resources include artifacts, features, or sites that provide evidence of past human culture or activities and are included in, or eligible for inclusion in, the NRHP. Historic and archaeological resources are protected under federal and state laws including Section 106 of the NHPA, Section 4(f) of the Department of Transportation Act, the Colorado Register of Historic Places Act, and the State Antiquities Act. Impacts to cultural resources would require consultation with the State Historic Preservation Office and potentially additional mitigation measures. An adverse effect to cultural resources could require a lengthy consultation process involving agencies at both the state and federal level.

The OAHF COMPASS database search indicated that within a half mile of the project corridor there are at least 15 cultural resources listed in the NRHP. In addition, there are likely numerous potentially eligible historic resources (i.e., structures over 50 years old) in the area that have not yet been evaluated. Proposed wildlife crossing solutions that require ROW acquisition may have to go

through consultation, permitting, and/or mitigation if historic or archaeological resources are present.

Threatened & Endangered Species

Federally threatened and endangered species are species determined by the USFWS, in collaboration with experts in the scientific community, to be on the verge of extinction. The Endangered Species Act (ESA) is administered by the USFWS and protects federally listed plant and animal species with the goal of ensuring their long-term survival. In accordance with Section 7(a)(2) of the ESA, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed ESA-listed species and their critical habitats. At the state level, CPW assigns special statuses to species determined to be at risk. The Colorado Non-Game, Endangered, and Threatened Species Conservation Act, regulated by CPW, provides some protection within the state for listed species and establishes the State's intent to protect endangered and threatened species.

The IPaC database search indicated that six species listed under the ESA have the potential to occur within the project corridor based on the overall range for each species: the gray wolf (*Canis lupus*; Endangered), New Mexico meadow jumping mouse (endangered), Mexican spotted owl (threatened), piping plover (threatened), Southwestern willow flycatcher (endangered), Rio Grande cutthroat trout (candidate), and monarch butterfly (candidate).

Based on the habitat observed during field reconnaissance and on aerial imagery, the New Mexico meadow jumping mouse and the Mexican spotted owl have the potential to occur within the project corridor. Proposed wildlife mitigation strategies determined to have the potential to impact these species may need to go through permitting and/or apply mitigation to avoid impacts and remain in compliance with the ESA.

INFRASTRUCTURE

I-25

I-25 and frontage roads occur to the west and east of the interstate between MPs 0 and 14. Frontage roads west of the interstate occur at approximately MPs 2.1 – 3.3, MPs 5.0 – 5.6, and MPs 8.2 – 11.0, and frontage roads east of the interstate occur at approximately MPs 1.6 – 2.1 and MPs 8.5 – 11.0. Locations where frontage roads occur were generally considered as less desirable locations for wildlife crossings during the screening and prioritization process, as these locations would typically require longer under- or overpasses. Longer underpasses are less favorable to animals (particularly ungulates) as they tend to be darker. Longer under and overpasses are also generally less desirable from a constructability, feasibility, and cost perspective.

Railroad

The BNSF railroad parallels I-25 for several miles. In locations where it is close to the interstate, it can be a constraint that would need a longer under- or overpass.

Interchanges

Interchanges along the project corridor include Exits 2, 6, 8, 11, 13a, 13b, and 14. The interchanges at Exits 2, 6, and 8 have very low levels of traffic, whereas the interchanges at Exits 11, 13a, 13b, and 14 have higher levels of traffic associated with Starkville and Trinidad. The use of Exits 2, 6, and 8 as wildlife crossings was considered because they have very low volumes of traffic.

Drainage Structures

Drainage structures (i.e., concrete box culverts, corrugated metal pipes) were identified in the CDOT OTIS database. Currently, there are few structures within the study area large enough to be used by ungulates. Some medium-to-small sized culverts in the area may provide safe passage for bears and other smaller mammals (e.g., coyotes, rabbits, mice). Although bears are large mammals, they frequently use smaller structures for passage. There is the potential for existing culverts to be upsized to enlarge the opening there to provide an opportunity for animals to use them as crossings.

Planned & Existing Development

LAND OWNERSHIP

Land ownership information was pulled from the Las Animas County Assessor's website. Potential wildlife crossing solutions that would require additional transportation ROW could be more difficult to implement than those that do not require additional ROW as they would require negotiation with the property owner and additional cost to buy the ROW needed for the crossing.

FISHERS PEAK STATE PARK

The 19,200-acre Fishers Peak State Park (FPSP) located between MPs 0 and 10 on the eastern side of the interstate began as a partnership between CPW, The Nature Conservancy, Trust for Public Lands, Great Outdoors Colorado, and the City of Trinidad and is managed by the CPW. A Master Plan has been developed for the FPSP which establishes, in order of increasing human disturbance and activity levels, "Protection", "Natural", "Passive Recreation", and "Development" Management Zones. Protection Zones are considered prime habitat to be largely protected for wildlife use. Within Protection Zones, some habitat areas will require seasonal closures to protect critical breeding periods, including elk calving areas in the southern parts of the FPSP. Conversely, Development Zones are proposed for higher levels of human use, and will include public roads, trailheads, the visitors' center, developed camping, skills courses, cabins, and higher density trail developments. These proposed management zones were considered during the screening and prioritization process. Areas in the Development Zones with particularly high levels of human use, such as the

Visitors Center, were considered less compatible locations to advance wildlife crossing solutions than areas proposed for lower levels of human disturbance.

SANTA FE TRAIL RANCH

The existing 18,600-acre Santa Fe Trail Ranch, which consists of a pockmark of gravel roads and low-density residences surrounded by open space, spans the western side of I-25 between MPs 0 and 8.5. The Santa Fe Trail Ranch is covenant protected, private community, in which all lots are presently platted in sizes of 35 acres or greater to preserve ranching use and atmosphere. Human activity levels in the Santa Fe Trail Ranch are relatively low; therefore, this area was generally not considered a negative factor during the screening and prioritization process.