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## ***4.11 VEGETATION; WILDLIFE; AND THREATENED, ENDANGERED, AND STATE SENSITIVE SPECIES***

### **INTRODUCTION**

This section describes a variety of plant and animal resources present in the study area and potential effects the alternatives may have on those resources. This section also describes measures proposed to mitigate identified adverse effects. For ease of discussion, plant and animal resources in the study area have been categorized as Vegetation; Wildlife; and Threatened, Endangered, and State Sensitive Species.

Public concerns expressed through the public involvement process regarding vegetation; wildlife; and threatened, endangered and state sensitive species include potential impacts to sensitive plant communities, ensuring wildlife is able to cross roads and highways safely, and effects on black-tailed prairie dogs. **Section 4.11.1.2, Section 4.11.2.2, and Section 4.11.3** address these concerns.

### **4.11.1 AFFECTED ENVIRONMENT**

This section describes the general ecological setting of the study area, including vegetation; wildlife; and threatened, endangered, and state sensitive species.

#### **4.11.1.1 OVERVIEW**

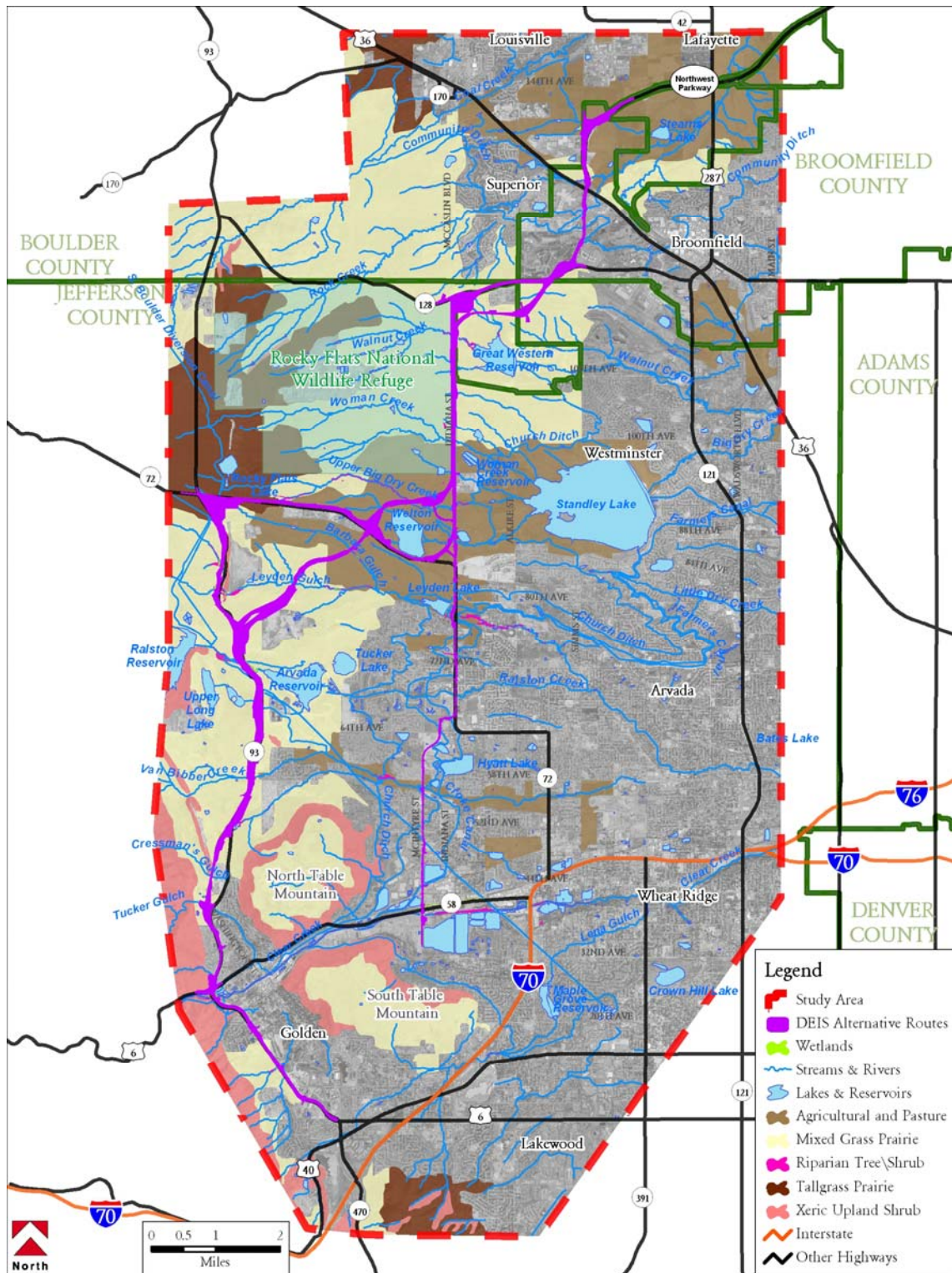
Urban development consisting of commercial and residential land uses dominates much of the eastern portion of the study area (see **Figure 4.11-1**). Undeveloped and protected lands dominate the areas adjacent to SH 93 in the western portion of the study area.

The study area contains several parks, golf courses, and publicly owned open space areas (see **Section 4.17**). Two Ponds National Wildlife Refuge and Standley Lake Regional Park are located in the central portion of the study area, and the Rocky Flats National Wildlife Refuge is located in the northwest portion.

Major drainages in the study area run in an easterly direction and include, from north to south, Coal Creek, Rock Creek, Walnut Creek, Woman Creek, Big Dry Creek, Barbara Gulch, Leyden Gulch, Van Bibber Creek, Ralston Creek, and Clear Creek (see **Figure 4.11-1**). The study area includes several lakes and small reservoirs, the largest of which is Standley Lake, followed by Great Western Reservoir, Arvada Reservoir, and Ralston Reservoir. Elevations in the region range between approximately 5,500 and 7,000 feet.



Figure 4.11-1 Vegetation Types-Study Area



Source: CDOW (1998 and 2001a), modified based on limited field reconnaissance.



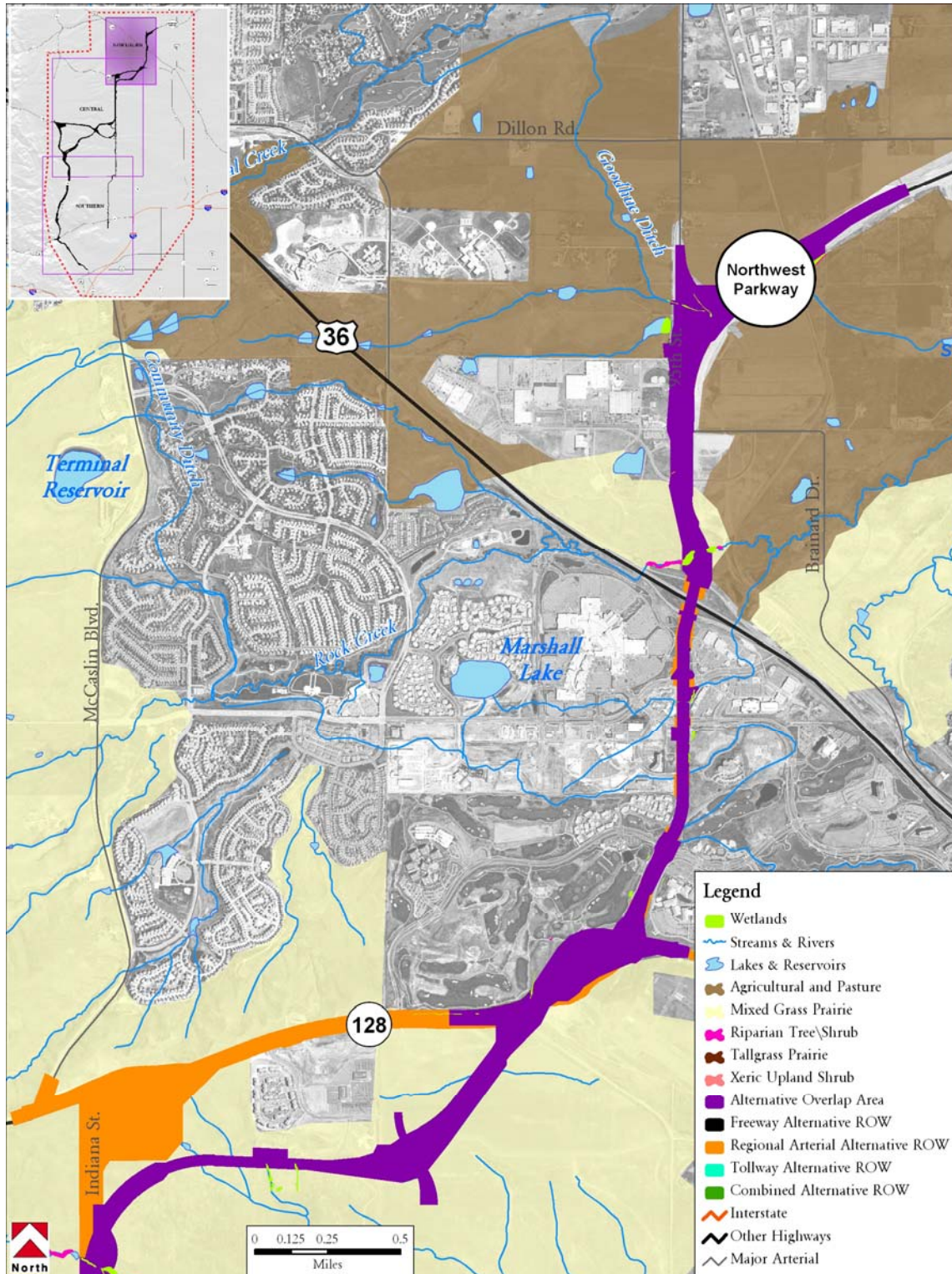
#### 4.11.1.2 VEGETATION

The following section provides a general description of the vegetation types in the study area. A detailed description of species expected to occur in the study area, including their scientific names, has been developed (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**).

Major vegetation communities of the study area are grasslands (tallgrass prairie, mixed grass prairie, agricultural and pasture lands), shrublands (xeric upland shrubland), riparian areas, and wetlands (see **Figure 4.11-2**, **Figure 4.11-3**, and **Figure 4.11-4**). With the exception of wetlands, these resources do not have specific regulatory protections. Wetlands and their associated riparian areas are discussed (see **Section 4.9**). Vegetation mapping is based on information from the Colorado Division of Wildlife (CDOW) with minor revisions based on vegetation field visits and wetland surveys conducted in summer 2005.

Overall, natural vegetation communities dominate the landscape in the west and north portions of the study area, and developed urban lands are most common in the east and south portions. Developed urban lands with landscaped lawns, forbs, shrubs, and trees are present in residential and commercial areas. Developed urban lands also contain some disturbed sites.

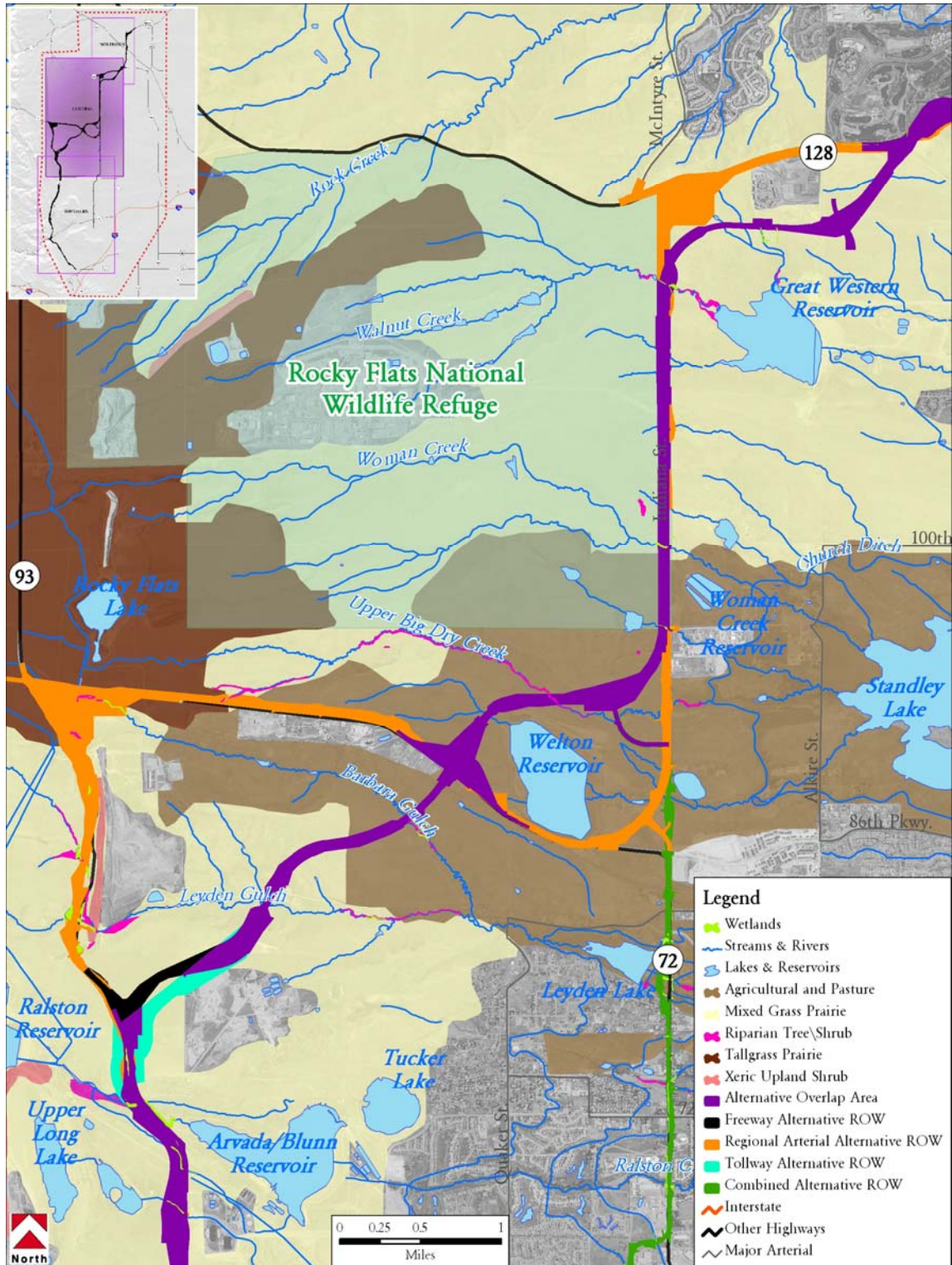
*Figure 4.11-2 Vegetation Types-Northern Portion*



Source: CDOW (1998 and 2001a), modified based on limited field reconnaissance.

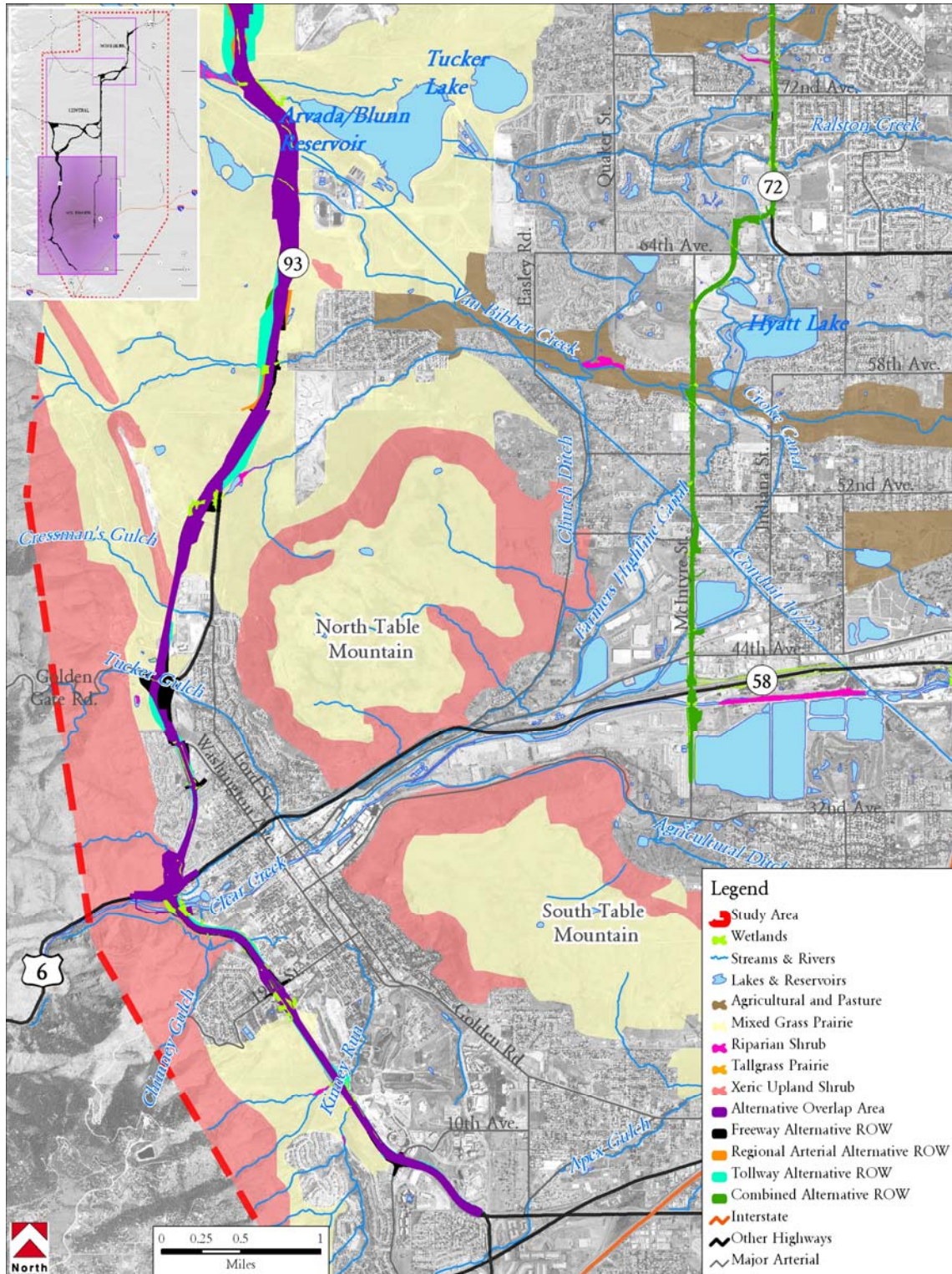


Figure 4.11-3 Vegetation Types-Central Portion



Source: CDOW (1998 and 2001a), modified based on limited field reconnaissance..

Figure 4.11-4 Vegetation Types-Southern Portion



Sources: CDOW (1998 and 2001a), modified based on limited field reconnaissance.





#### 4.11.1.3 GRASSLANDS

##### TALLGRASS PRAIRIE

The native tallgrass prairie community contains several plant associations that include combinations of big bluestem, little bluestem, and Indian ricegrass (CDOW, 2001a). Within the study area, the largest continuous block of tallgrass prairie is present on both sides of SH 93 north of SH 72. Portions of the tallgrass prairie community are located on Rocky Flats National Wildlife Refuge. The xeric tallgrass community in and around Rocky Flats National Wildlife Refuge is believed to be the largest example remaining in Colorado, and perhaps in North America (Essington et al. 1996). Smaller areas of tallgrass prairie are present in the Davidson Mesa area at the intersection of US 36 and SH 170 at the northern boundary of the study area and at Green Mountain Open Space at the southern boundary of the study area.

##### MIXED GRASS PRAIRIE

Mixed grass prairie is the most common vegetation type of the study area. Most of the open grasslands, as well as the flat summits of North and South Table Mountains, are mixed grass prairie communities (Kunze, 2004). Mixed grass prairie is a blend of tallgrass and shortgrass prairie species and is characterized by native western wheatgrass, blue grama, sidecoats grama, little bluestem, foxtail barley, Canada bluegrass, and green needlegrass.

##### AGRICULTURAL AND PASTURELANDS

Agricultural and pasturelands include areas that are currently, or were formerly irrigated for pastureland, hay meadows, or agricultural row crops. This community type also includes large areas of drylands, usually dominated by non-native grassland species. Historic use of dryland pasture was typically for grazing cattle or horses. Many of these areas are no longer used for agricultural purposes. Agricultural and pasturelands are generally located in the central and northern portions of the study area.

#### 4.11.1.4 SHRUBLAND AND WOODLAND

##### RIPARIAN AREAS

Riparian areas are scattered along most of the major streams and ditches. The riparian community forms a band between wetlands and uplands. This community type typically includes wild plum, chokecherry, golden currant, and hawthorn with an herbaceous understory in the drier sites and plains cottonwood and associated species in the wetter sites (CDOW, 1998; USFWS, 2004a; Westminster, 1996).

##### XERIC UPLAND SHRUBLAND

Dry, or xeric upland shrublands are mainly located in the southwest portion of the study area on the sideslopes of North and South Table mountains and the lower slopes of the Front Range foothills. Species of these shrublands include mountain mahogany, skunkbrush sumac, wax currant, snowberry, wild rose, and yucca.

#### 4.11.1.5 WETLANDS

Wetlands are present throughout the study area, but because they are federally regulated, unlike other plant communities, they are discussed in a separate section (see **Section 4.9**).

#### 4.11.1.6 NOXIOUS WEEDS

In accordance with the Colorado Noxious Weed Act (35-5.5-101 through 119, C.R.S., revised 2003) and Executive Order 13112 – Invasive Species, CDOT in cooperation with FHWA now addresses noxious weeds at every level of project development, construction, and maintenance.



Noxious weeds are invasive, non-native plants introduced to Colorado by accident or that spread after being planted for another purpose. Areas with noxious weeds have lower economic and environmental value than similar areas with native species. The Noxious Weed Act recognizes that “certain undesirable plants constitute a present threat to the continued economic and environmental value of the lands of the state and if present in any area of the state must be managed.” The legislation places all public and private lands in Colorado under the jurisdiction of local governments to manage noxious weeds.

Under the Noxious Weed Act, the State of Colorado Noxious Weed lists are categorized by control priority:

- List A – High Priority: Rare noxious weeds and all county noxious weeds in dispersal conduits. List A species are targeted for eradication or suppression.
- List B – Medium Priority: Well-established noxious weeds with discrete statewide distributions. List B species are targeted for prevention of continued spread.
- List C – Low Priority: Extensive, well-established infestations for which control is recommended but not required. Local jurisdictions regulate management of List C species, and the state supports use of integrated weed management controls.

Noxious weeds addressed include species listed by the state of Colorado and CDOT that are also listed by Boulder County, Broomfield County, and/or Jefferson County. CDOT listed species are those marked for routine management by CDOT maintenance staff. The Boulder County and Jefferson County species addressed are drawn from each of the county’s websites (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**).

#### 4.11.1.7 GENERAL WILDLIFE

The following section presents a general description of wildlife in the study area, including mammals, birds, reptiles, and amphibians, and their habitat, with an emphasis on the more commonly occurring species. A detailed description of species expected to occur in the study area, including their scientific names, has been developed (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**).

The Northwest Corridor study area is located along the base of the eastern foothills of the Rocky Mountains. Because it is located where the foothills montane shrubland and the grasslands of the Great Plains meet, it supports a wide variety of wildlife species that depend on habitat in either or both ecosystems. The quality and connectivity of wildlife habitat in the study area is supported by the large expanses of protected open space or otherwise undeveloped land that preserves several habitat types as well as movement corridors between different habitat areas.

Wildlife movement is concentrated along riparian corridors. Existing roads and highways make movement of wildlife from one area to another more difficult, especially where they intersect riparian corridors. Existing culverts are too small to accommodate most wildlife species; as a result, individuals either do not cross the roadways, or cross and risk being hit by vehicles. Collisions with wildlife are a safety issue in the study area, especially along SH 93 (CDOW and City of Golden, 2005).

#### MAMMALS

The study area provides habitat that supports seasonal and year-round elk and deer use (see **Figure 4.11-5, Figure 4.11-6, Figure 4.11-7, Figure 4.11-8, Figure 4.11-9, Figure 4.11-10, Figure 4.11-11, and Figure 4.11-12**). The CDOW has identified and mapped important seasonal ranges and other use areas for deer, elk, and other wildlife (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**).



Elk are increasingly common in the foothills on the western edge of the study area, most of which serves as winter range (see **Figure 4.11-5**, **Figure 4.11-6**, **Figure 4.11-7**, and **Figure 4.11-8**). In 2005, elk use of the Rocky Flats National Wildlife Refuge continued to expand and much of the area is now a year-round elk range (Wedermeyer, 2005). Elk occasionally migrate onto the plains east of SH 93, and have been increasingly observed along Leyden Gulch and in Golden (USFWS, 2004a; CDOW and the City of Golden, 2005; Wedermeyer, 2005).

Mule deer are common throughout the study area and are known to occur within almost all available habitat types, including open grasslands, although they are most often found in upland or riparian shrublands (see **Figure 4.11-9**, **Figure 4.11-10**, **Figure 4.11-11**, and **Figure 4.11-12**). Like elk, mule deer are increasingly using more urbanized areas (CDOW and City of Golden, 2005; Wedermeyer, 2005).

White-tailed deer are less common than mule deer, and are known to occur along plains riparian corridors including Coal Creek, Rock Creek, and Clear Creek (CDOW, 2005a; see **Figure 4.11-9**, **Figure 4.11-10**, **Figure 4.11-11**, and **Figure 4.11-12**).

Carnivores common in the study area include the coyote, raccoon, red fox, and striped skunk (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**). These species are typically observed in open grasslands and in close proximity to riparian corridors. As with elk and deer, they are increasingly moving into urban areas, often creating conflicts with humans (CDOW and City of Golden, 2005).

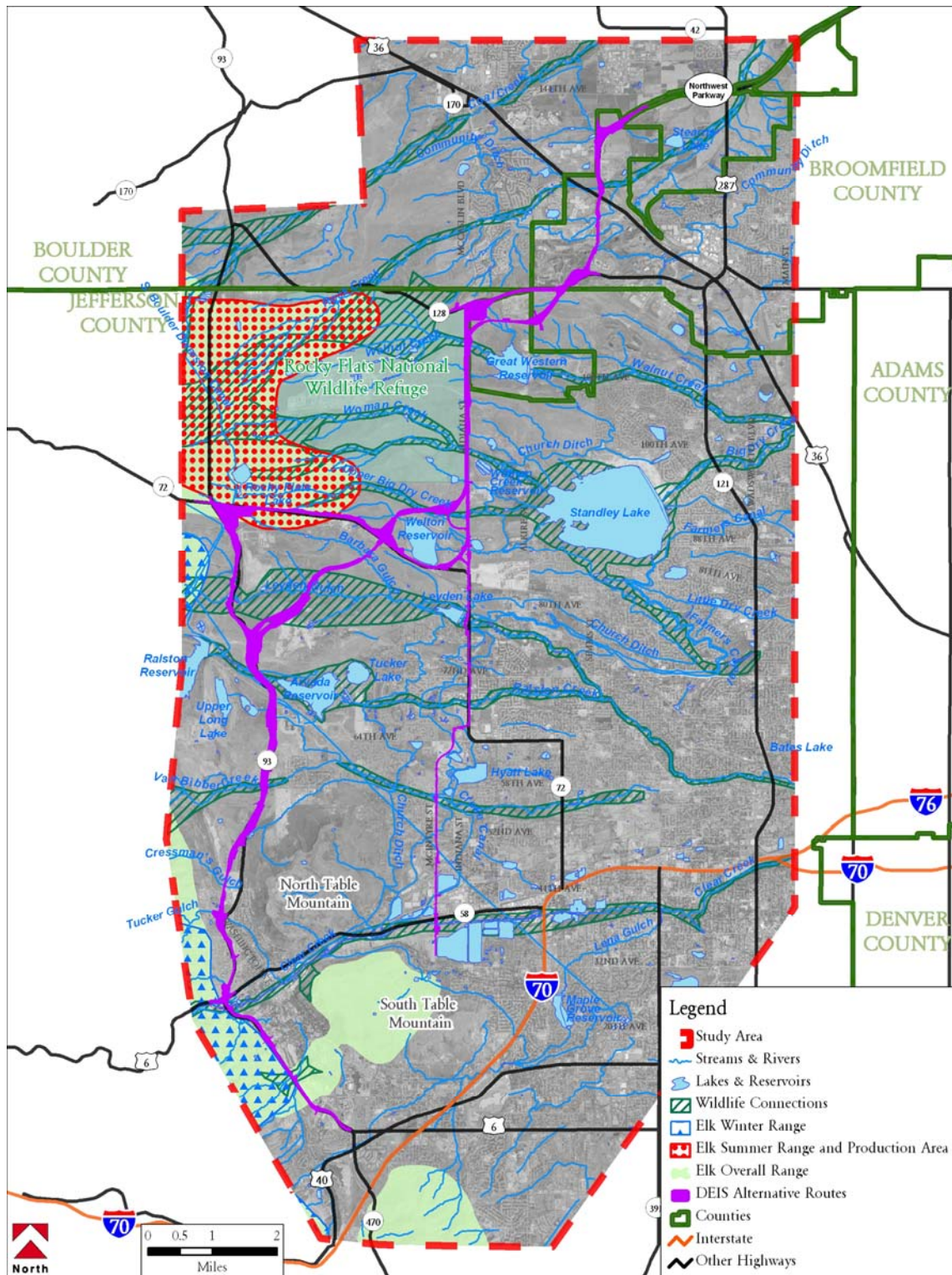
A variety of small mammals are found in various habitat types in the study area including both white- and black-tailed jackrabbits, eastern cottontail, black-tailed prairie dog, Mexican woodrat, meadow vole, prairie vole, and various mice and shrews (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**).

East-west movement of deer, elk, and other wildlife through the study area typically occurs along riparian corridors, but may also occur in open grassland areas (see **Figure 4.11-5**, **Figure 4.11-6**, **Figure 4.11-7**, **Figure 4.11-8**, **Figure 4.11-9**, **Figure 4.11-10**, **Figure 4.11-11**, and **Figure 4.11-12**). The most important movement corridors occur along Woman Creek, Walnut Creek, Leyden Gulch, Ralston Creek, and Clear Creek drainages and from the foothills west of US 6 to the Fossil Trace Golf Course, in the vicinity of Kinney Run. There is also a wide and diffuse deer movement corridor between White Mountain Ranch and North Table Mountain and a narrow deer crossing at SH 58 between North and South Table mountains (Wedermeyer, 2005).

The increased presence of elk in Golden has created many wildlife-human conflicts and has resulted in greater numbers of elk-vehicle collisions as the animals cross US 6 to reach the Fossil Trace Golf Course (CDOW and City of Golden, 2005). Deer mortalities along SH 93 and US 6 are common, particularly between Leyden Gulch and SH 72. Fewer deer than elk are hit at the Kinney Run/Fossil Trace crossing of US 6 (CDOW and City of Golden, 2005).

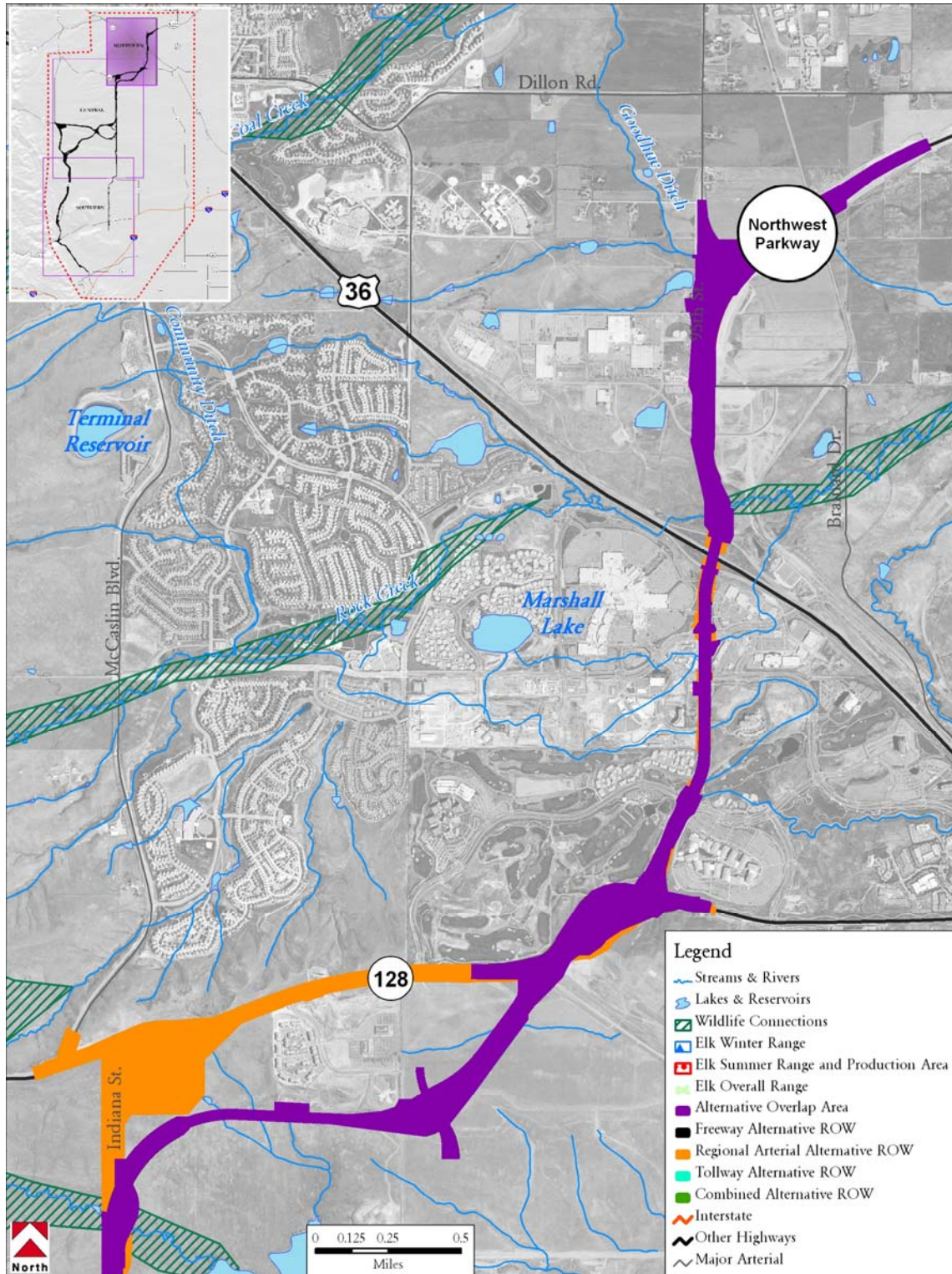


Figure 4.11-5 Elk Habitat-Study Area



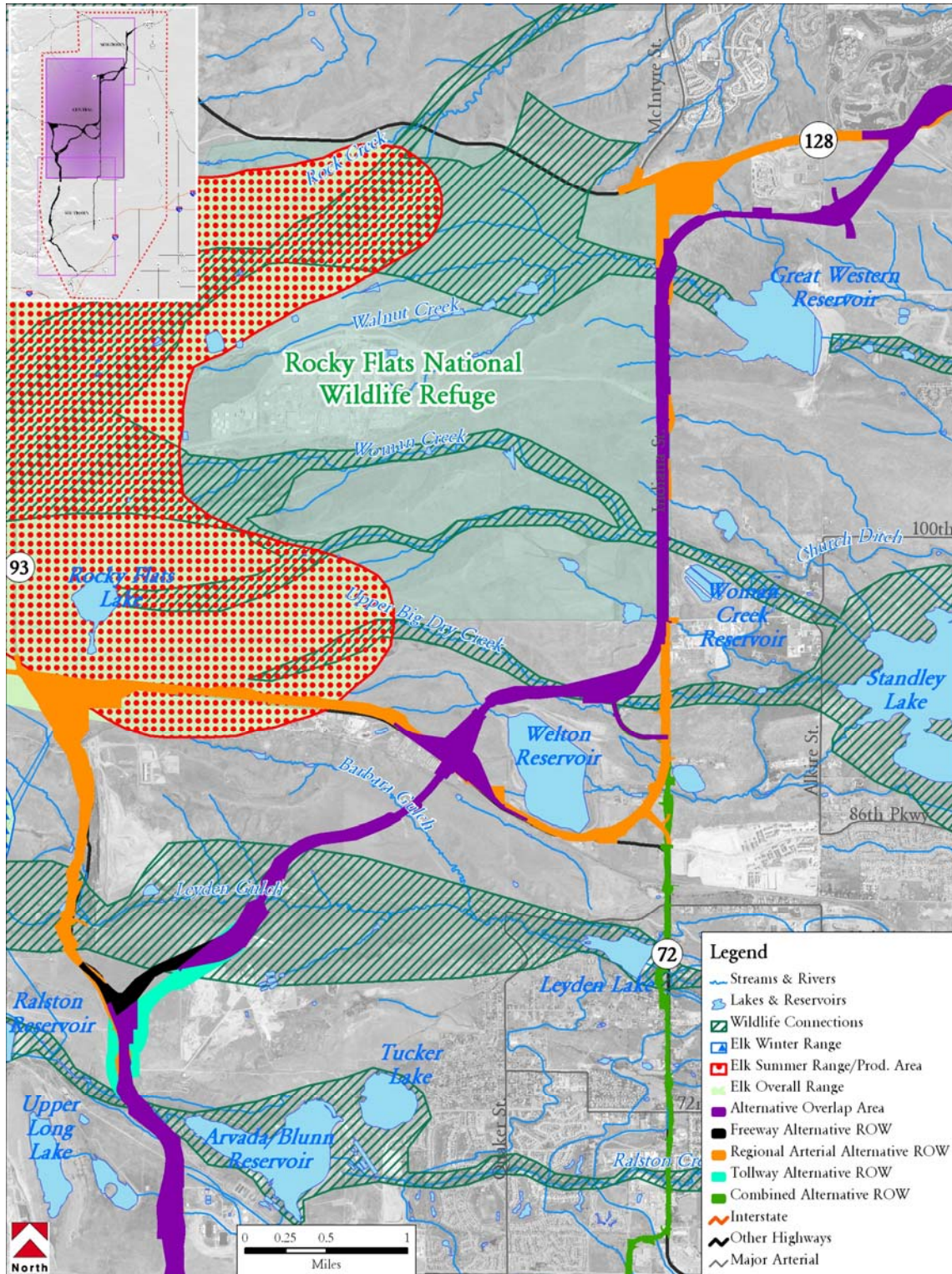
Source: CDOW (2005a) with site-specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists.

Figure 4.11-6 Elk Habitat-Northern Portion



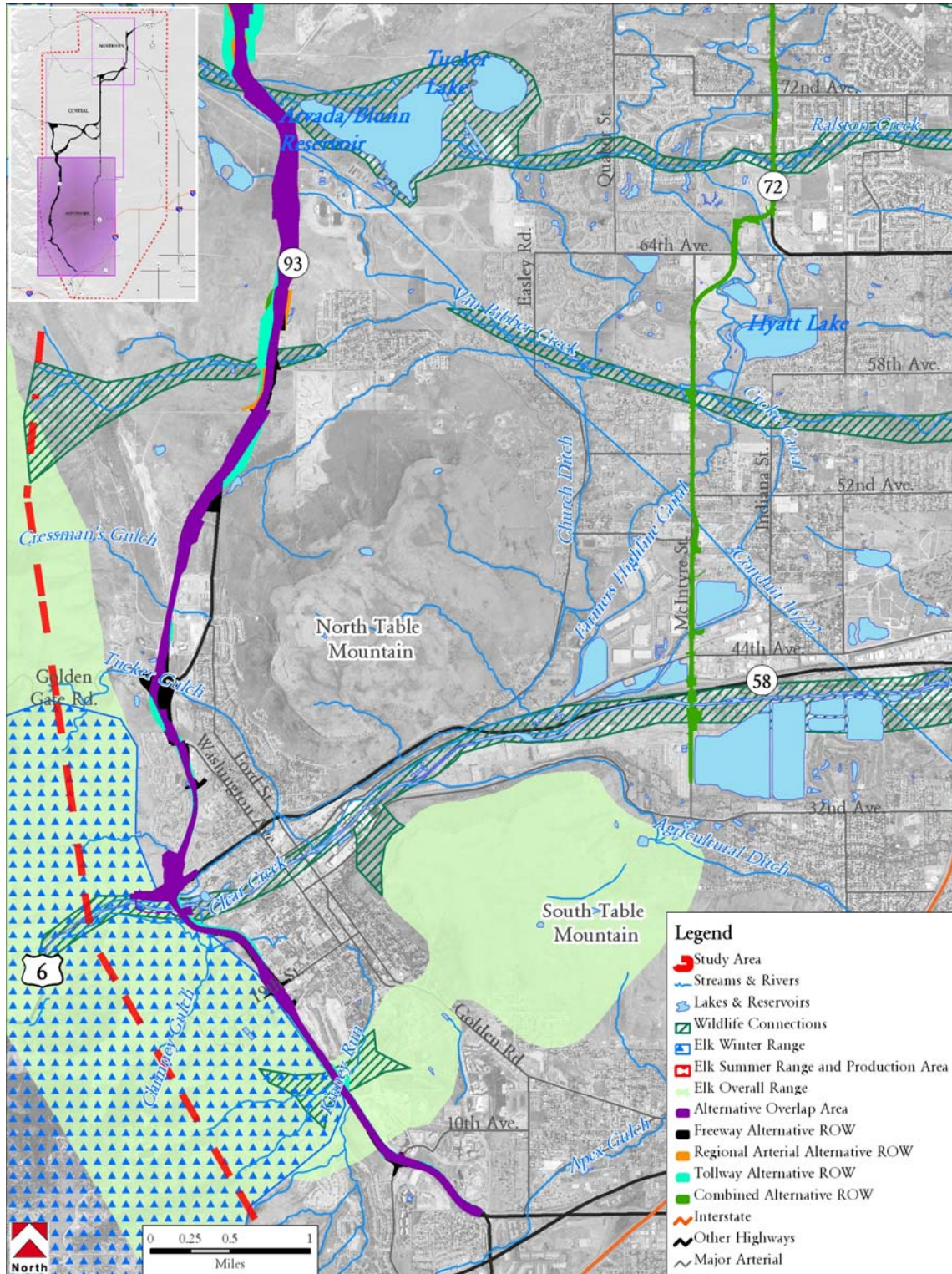
Source: CDOW (2005a) with site-specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists.

Figure 4.11-7 Elk Habitat-Central Portion



Source: CDOW (2005a) with site-specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists.

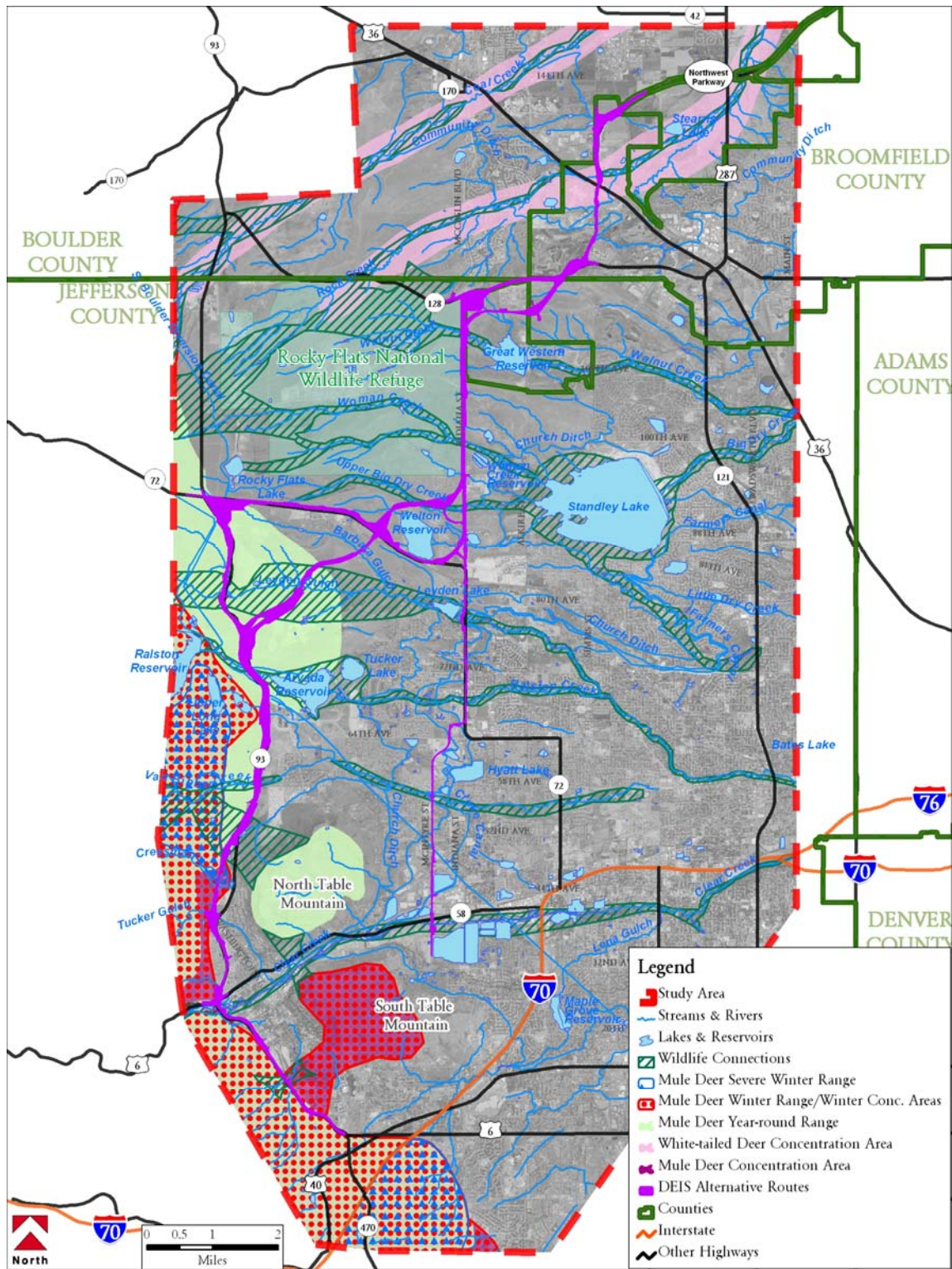
Figure 4.11-8 Elk Habitat-Southern Portion



Source: CDOW (2005a) with site-specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists.



Figure 4.11-9 Deer Habitat-Study Area

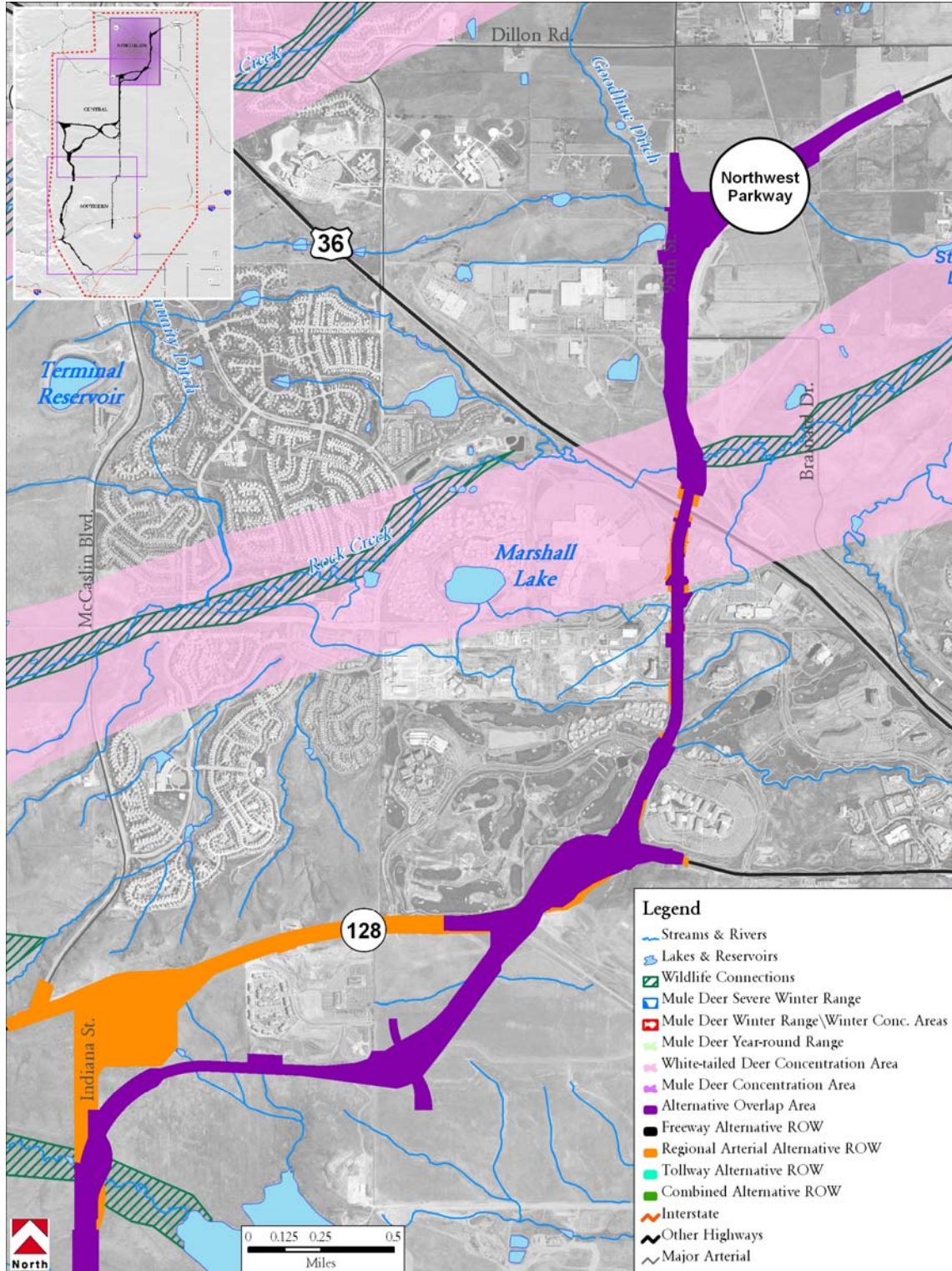


Source: CDOW (2005a) with site-specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists.



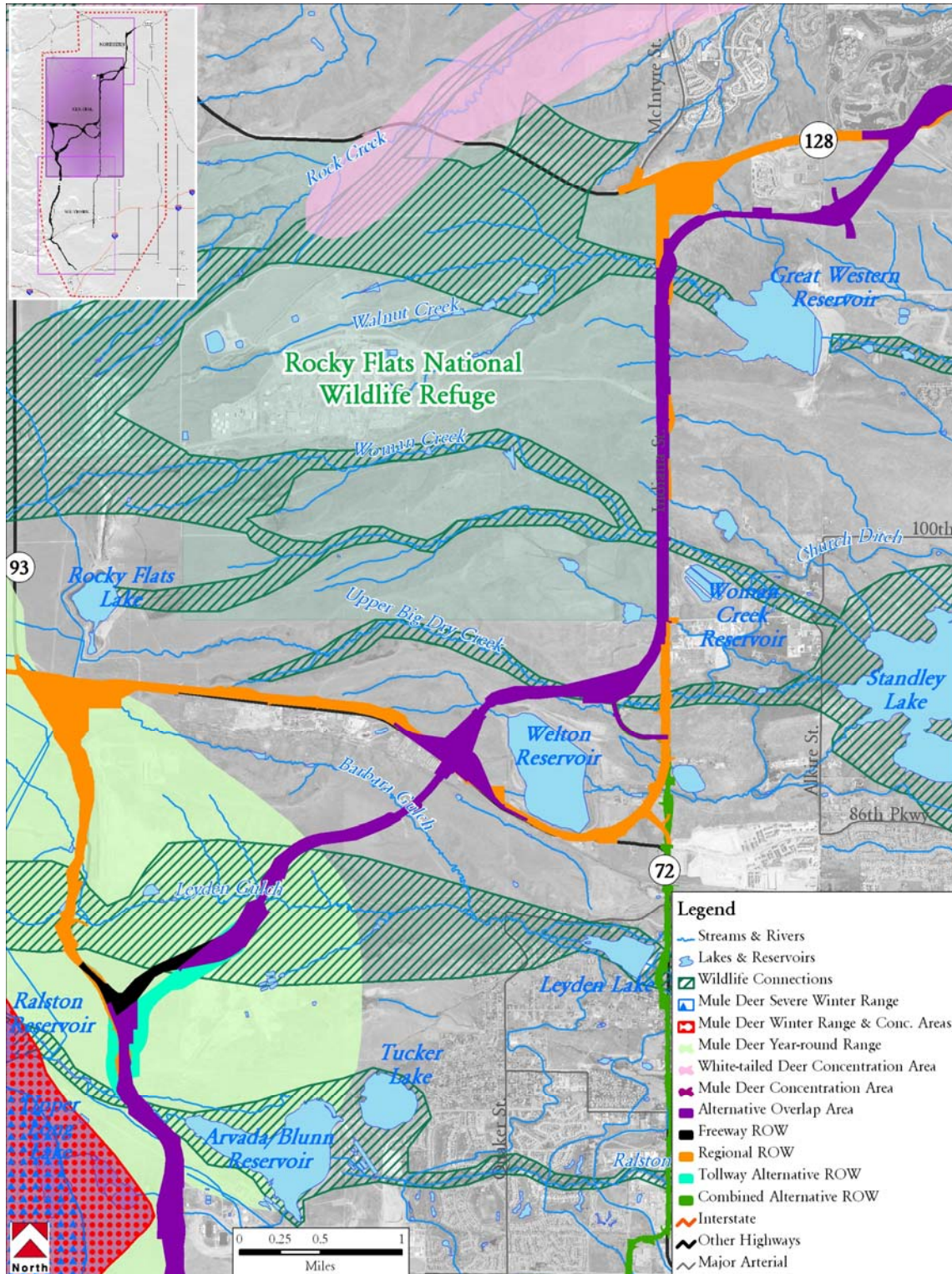


*Figure 4.11-10 Deer Habitat-Northern Portion*



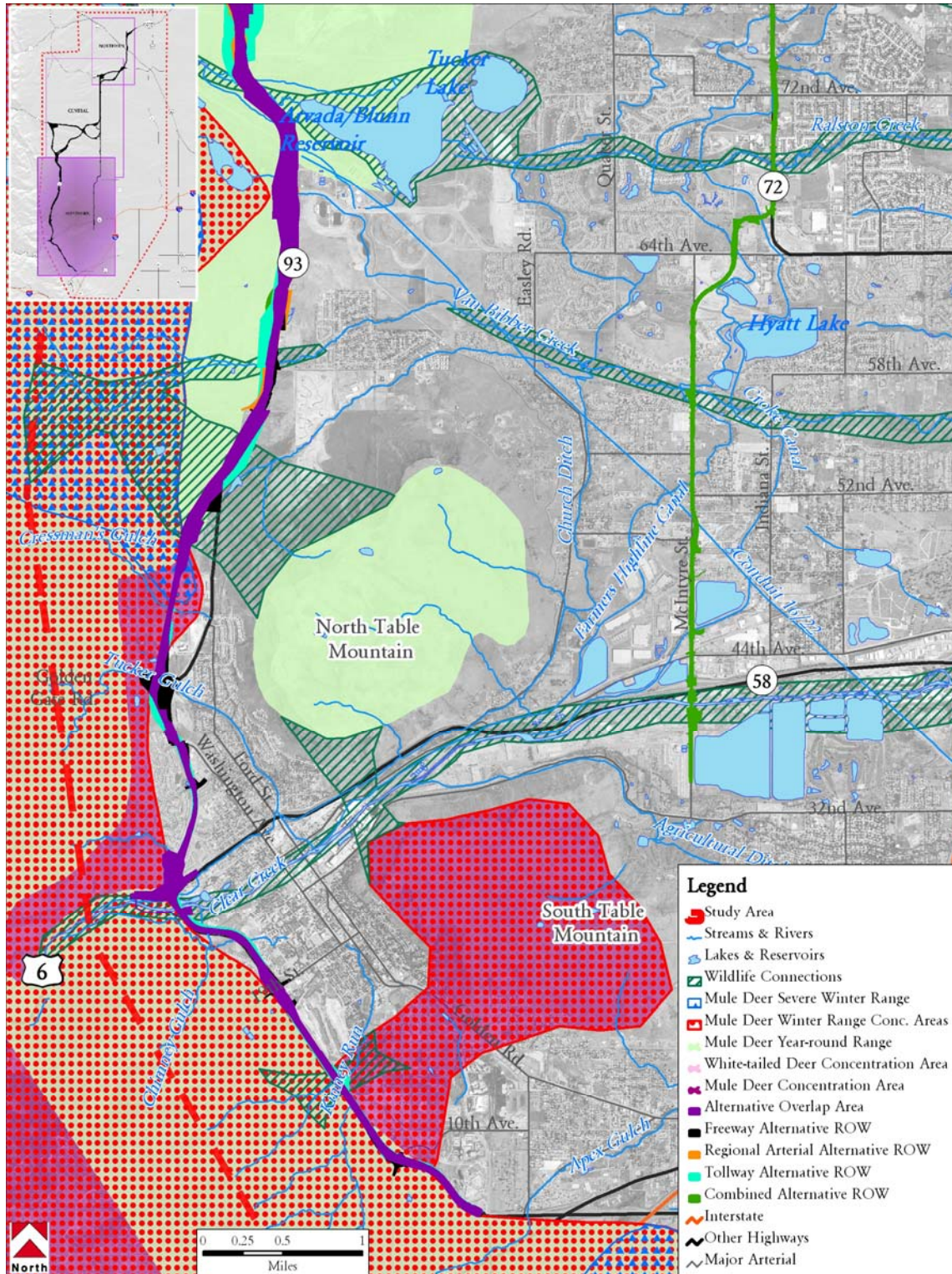
Source: CDOW (2005a) with site-specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists.

Figure 4.11-11 Deer Habitat-Central Portion



Source: CDOW (2005a) with site-specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists.

Figure 4.11-12 Deer Habitat-Southern Portion



Source: CDOW (2005a) with site-specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists.



## BIRDS

A wide variety of bird species use different habitat types in the study area for shelter, breeding, wintering, and foraging at various times during the year. Birds of prey, or raptors, commonly occurring include the red-tailed hawk, great horned owl, and American kestrel. Less common raptors include the golden eagle, peregrine falcon, and prairie falcon. An active bald eagle nest site and a roosting site are located on the northwest side of Standley Lake and several alternate nest sites for golden eagles are located on the cliffs rimming North and South Table mountains (Kunze, 2004; Posthumus, 2005) (see **Section 4.11.1.9**).

Songbirds are present in all habitat types including grasslands, shrublands, rocky outcroppings, and wetlands. Common species include western meadowlark, lark bunting, spotted towhee, black-capped chickadee, white-throated swifts, red-winged blackbirds, and American robin. Shorebirds such as the killdeer and the American avocet are common along the many lakes and ponds in the study area. Open water bodies provide nesting and foraging habitat for a variety of waterfowl species such as mallard, pintail, and Canada goose.

## REPTILES AND AMPHIBIANS

The diverse and relatively undisturbed habitats within the study area have the potential to support a wide variety of reptiles and amphibians. Common reptiles in grassland areas are likely to include the bullsnake, yellow-bellied racer, and prairie rattlesnake. The plains garter snake and western painted turtle are common to wetland and open water habitats. Other reptiles include the short-horned lizard in open grasslands and the fence lizard in shrubland habitats (Hammerson, 1999; USFWS, 2004a; Kilburn and White, 1992; CDOW, 2005b).

Amphibians likely to occur include the boreal chorus frog, bullfrog, northern leopard frog, Woodhouse's toad, plains spadefoot, and tiger salamander (USFWS, 2004a; CDOW, 2005b).

### 4.11.1.8 AQUATIC RESOURCES

A detailed description of fish species expected to occur in the project area, including their scientific names, has been developed (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**). The ditches, streams, and water bodies in the study area potentially support a wide variety of aquatic insects, snails, crayfish, and fish. These animals provide an important source of prey for fish, waterfowl, and mammal species (CDOW, 2003b; 2005c; and USFWS, 2004a).

A variety of fish species has been documented in the study area (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**). Some creeks and streams, such as Woman Creek, Walnut Creek, Rock Creek, Big Dry Creek, and Clear Creek, potentially support native fish species, including longnose dace, white suckers, and fathead minnows (USFWS, 2004a; CDOW, 2005c; Rosenlund, 2005). Redbelly and common shiner, both rare and declining native species, were reintroduced to Rock Creek at Rocky Flats National Wildlife Refuge in 2003 (USFWS, 2004a). These two species, as well as the Iowa darter, a state species of concern known to occur in the study area (CDOW, 2005c), are treated in greater detail (see **Section 4.11.1.10**).

Non-native sport fish such as rainbow trout, largemouth and smallmouth bass, and carp are common in the many lakes of the study area (Boulder County, 2002; USFWS, 2004a; Westminster, 1996; CDOW, 2005c). Rainbow trout, brown trout, and brook trout, all non-native species, are found in Clear Creek and downstream of Golden (CDOW, 2005c).

### 4.11.1.9 THREATENED AND ENDANGERED SPECIES

Several federally listed threatened and endangered species potentially occur in the study area (see **Table 4.11-1**). Federally threatened and endangered species are protected under the Endangered Species Act (ESA) of 1973 as amended (16 U.S.C. 1531 et seq.). A potential effect on a federally listed species or its habitat resulting from a project with a federal action requires consultation with the U.S. Fish and Wildlife Service (USFWS) under Section 7 of the ESA.



**Table 4.11-1 Federally Threatened or Endangered Species Potentially Occurring in the Northwest Corridor Study Area**

Common Name	Latin Name	Status
Colorado butterfly plant	<i>Gaura neomexicana coloradensis</i>	Threatened
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	Threatened
Bald eagle	<i>Haliaeetus leucocephalus</i>	Threatened
Black-footed ferret	<i>Mustela nigripes</i>	Endangered
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	Threatened

Note: Background information, habitat requirements, and distribution of the species listed in this table are described in detail in the subsections below.

Source: USFWS, 2005a.

In addition to species potentially present in the study area, the USFWS has determined that some federally listed species could potentially be affected by continued or on-going loss of water in the Platte River system (see **Table 4.11-2**). Project elements that could be associated with depletions of the Platte River system include detention ponds, dust abatement activities, and wetland mitigation.

**Table 4.11-2 Federally Listed Species with Potential to be Affected by Depletions to the Platte River System**

Common Name	Scientific Name	Likelihood of Occurrence in the Study Area	Federal Status
Whooping crane	<i>Grus americana</i>	Low	Endangered
Least tern	<i>Sterna antillarum</i>	Low	Endangered
Eskimo curlew	<i>Numenius borealis</i>	Low	Endangered
Piping plover	<i>Charadrius melodus</i>	Low	Threatened
Pallid sturgeon	<i>Scaphirhynchus albus</i>	Low	Endangered
Western prairie fringed orchid	<i>Platanthera praeclara</i>	Low	Threatened

Note: Background information, habitat requirements, and distribution of the species listed in this table are described in detail in the subsections below.

Source: USFWS, 2005a.

**COLORADO BUTTERFLY PLANT**

Widely scattered populations of Colorado butterfly plant are present in Colorado, Nebraska, and Wyoming. It occurs in the transition zone between wetlands and upland prairie in sub-irrigated, alluvial soils of flat stream valleys at elevations of 5,000 to 6,000 feet (CNPS, 1989). Colonies are often found in low depressions or along bends in wide, active floodplains along meandering perennial stream channels a short distance upslope of the actual channel. Typical Colorado butterfly plant habitat is relatively open without dense or overgrown vegetation (65 Fed. Reg. 62302 [October 18, 2000]).



In Colorado, this species is known to have historically occurred in Larimer, Weld, Boulder, and Douglas counties (Spackman et al. 1997, Fertig 2000). It is currently found in Larimer, Weld, and Jefferson counties (Fertig 2000, Mayo 2007). The nearest known existing population occurs in Jefferson County on a parcel of City of Westminster open space. The population was introduced to the site in the late 1990s by the non-profit Nature Conservancy (Mayo 2007). The USFWS has not established official survey guidelines for the Colorado butterfly plant; however, wetlands associated with an intermittent or perennial stream with an active floodplain are considered potential habitat.

Surveys for Colorado butterfly plant and potential habitat were conducted in major stream drainages of the study area: Walnut Creek, Woman Creek, Big Dry Creek, Leyden Gulch, Ralston Creek, and Van Bibber Creek. A site on the north bank terrace of Clear Creek west of US 6, in the area where the stream valley widens at the mouth of Clear Creek Canyon, also was surveyed. The surveys were conducted from August 16 through August 20, 2004, during the potential early blooming period for the evening primrose. No populations of Colorado butterfly plant were present at any of the survey sites (see **Northwest Corridor Supporting Technical Document-Initial Wetlands Delineation**).

#### **UTE LADIES'-TRESSES ORCHID**

Ute ladies'-tresses orchid (*Spiranthes diluvialis*) is a perennial orchid that occurs at elevations below 6,500 feet in moist to wet alluvial meadows, floodplains of perennial streams, and around springs and lakes (CNPS, 1989). Widely scattered populations of Ute ladies'-tresses orchid are present in Colorado, Nebraska, Wyoming, Utah, Montana, Idaho, and Nevada. Once thought to be common in low elevation riparian areas in Colorado, Utah, and Nevada, currently only sixteen populations are reported to occur in Colorado, with most populations occurring along the Front Range. The primary threats to this species are loss or modification of habitat (57 Fed. Reg. 2051 [January 17, 1992]).

In Colorado, this species is known to occur in Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, El Paso, Jefferson, Larimer, Morgan, and Weld counties. Along the Colorado Front Range, Ute ladies'-tresses orchid habitat occurs primarily on moist, sub-irrigated or seasonally flooded valley bottoms, gravel bars, old oxbows, or floodplains bordering springs, lakes, and rivers at elevations from 4,500 to 6,800 feet (CNPS, 1989). Vegetation at sites where the orchid is found typically includes species found in wetlands or in moist areas.

The study area includes habitat in which Ute ladies'-tresses orchid is likely to occur as well as known orchid habitat (see **Figure 4.11-13**, **Figure 4.11-14**, **Figure 4.11-15**, and **Figure 4.11-16**). Surveys for Ute ladies'-tresses orchid and potential habitat were conducted at the following major stream drainages: Walnut Creek, Woman Creek, Big Dry Creek, Leyden Gulch, Ralston Creek, and Van Bibber Creek. The surveys were conducted from August 16 through August 20, 2004, during known blooming time for the orchid. Additionally, a habitat evaluation was conducted at an unnamed drainage north of Golden in December 2004. No populations of the orchid were present at any of the survey sites (see **Northwest Corridor Supporting Technical Document-Initial Wetlands Delineation**).

Previously known populations of Ute ladies'-tresses orchid are present in the Clear Creek floodplain area west of US 6 and east of I-70 in the Clear Creek Greenbelt Open Space (see **Figure 4.11-13**, **Figure 4.11-14**, **Figure 4.11-15**, and **Figure 4.11-16**). Because Ute ladies'-tresses orchid populations are present along Clear Creek, the entire Clear Creek corridor in the study area is considered habitat for the species.

#### **BALD EAGLE**

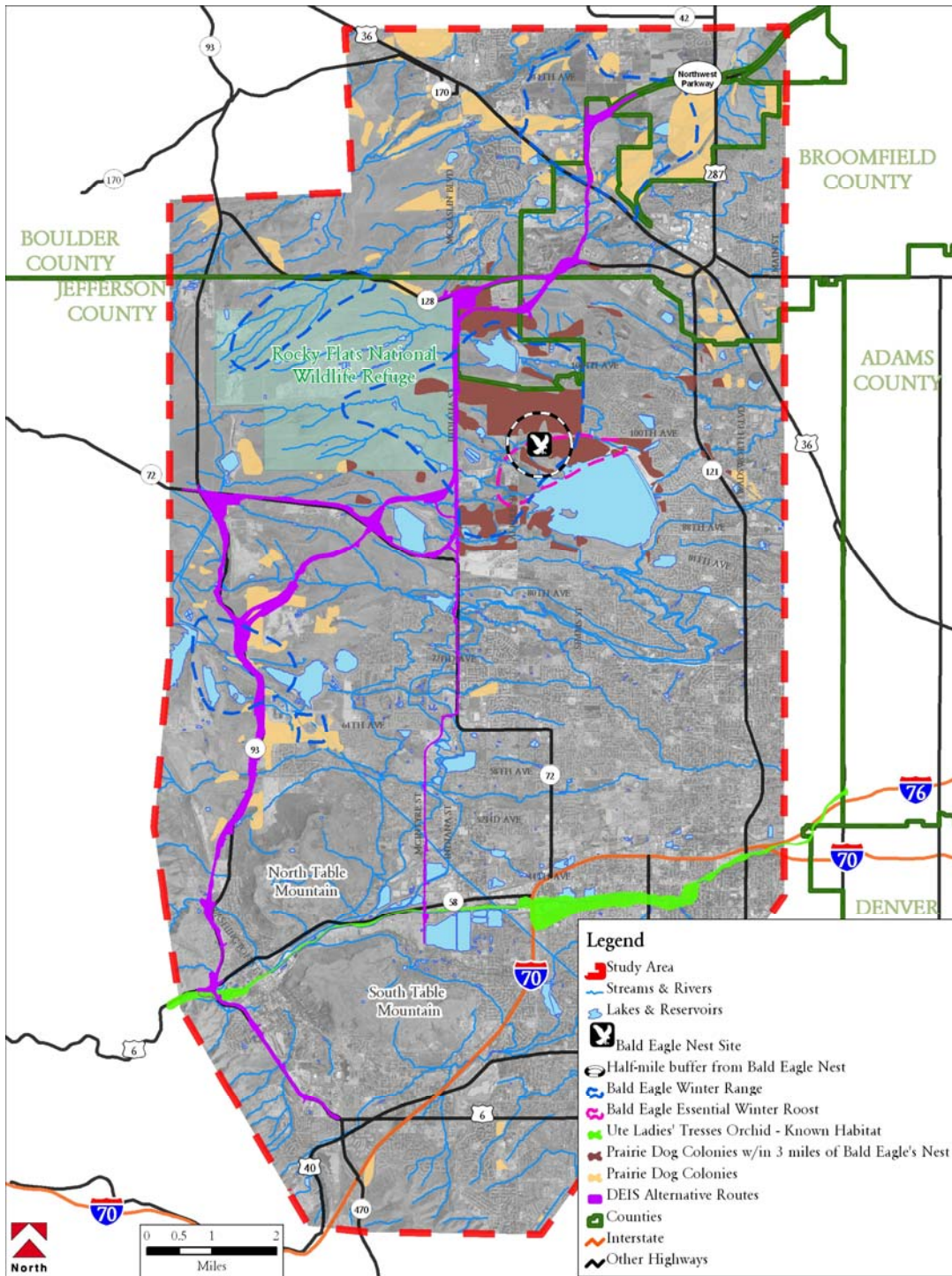
The bald eagle is a large North American raptor with a historical distribution throughout most of the United States. Bald eagles are primarily winter residents in Colorado, although nesting along the Colorado Front Range has increased in recent years (CDOW, 2004). Typical bald eagle nesting habitat consists of forests or wooded areas near lakes, reservoirs, or along rivers that contain many tall, aged, dying, and dead trees (Martell, 1992). "Essential" winter roosts are defined by the Northern States Bald Eagle Management Plan (USFWS, 1983) as areas that contain 15 or more bald eagles per night for two weeks or more, are used annually for at least two weeks by eagles from nearby breeding areas, or are used by bald eagles during

periods of extremely harsh weather. Several large cottonwoods provide perching and “essential” winter roost sites at Standley Lake and Great Western Reservoir (see **Figure 4.11-13**, **Figure 4.11-14**, **Figure 4.11-15**, and **Figure 4.11-16**).

Within the study area, an active bald eagle nest site is located in a grove of cottonwood trees on the northwest side of Standley Lake. The pair of bald eagles nesting at Standley Lake likely depends on fish and waterfowl associated with the lake and on prairie dog colonies to the north of the nest site as their primary food sources (RMBO, 2004). Prairie dogs probably constitute an important part of the diet for over-wintering bald eagles.



*Figure 4.11-13 Prairie Dog, Orchid, and Bald Eagle Habitat-Study Area*

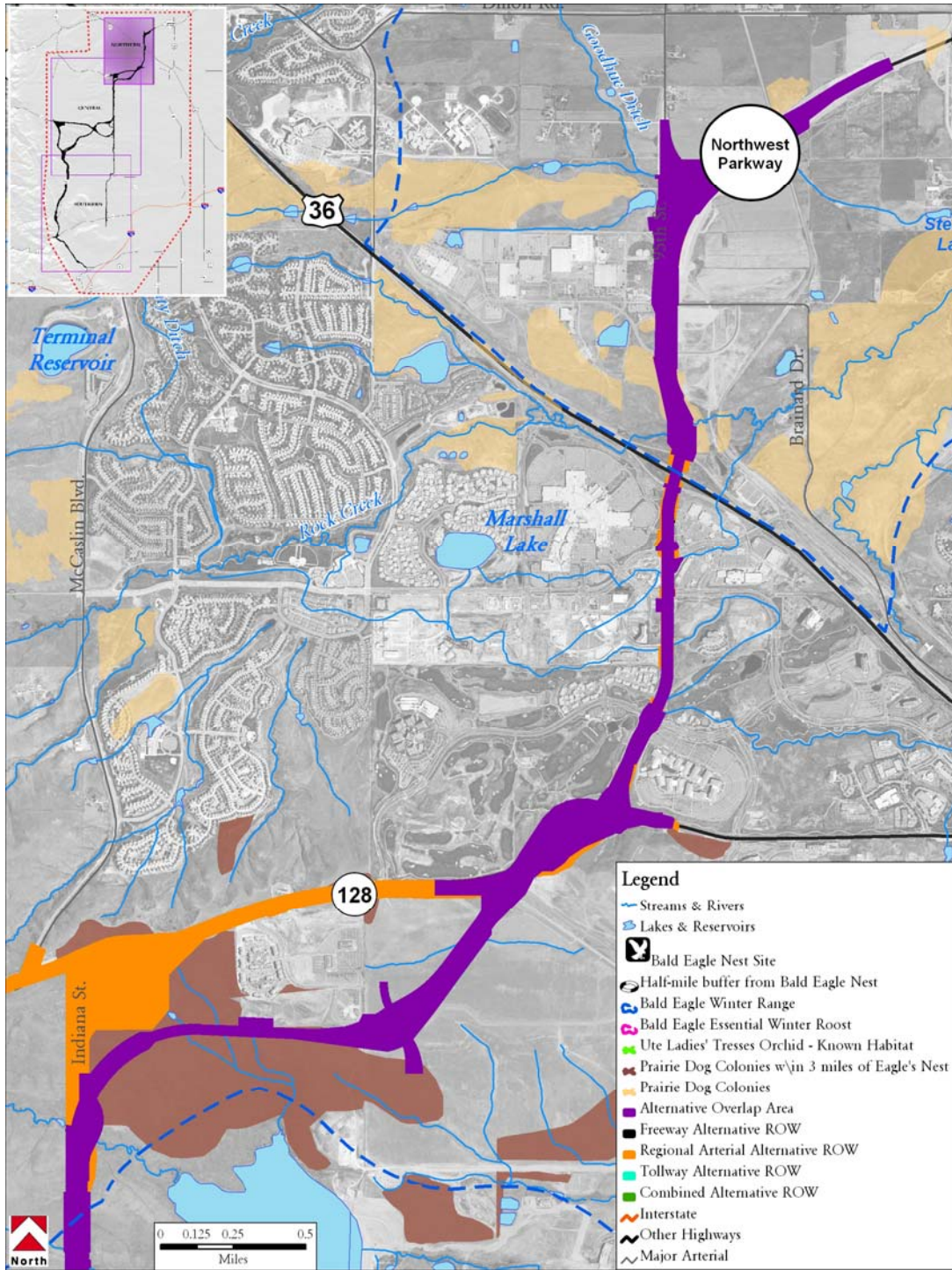


*Sources: Orchid Habitat developed by ERO Ecologists' knowledge of the area and combined with CNHP potential conservation areas. Wildlife data provided by CDOW (2004, 2005b), with specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists and field verification of accessible areas. Great Western Reservoir Prairie Dog Relocation Site provided by the City of Broomfield staff (Pritz 2005).*





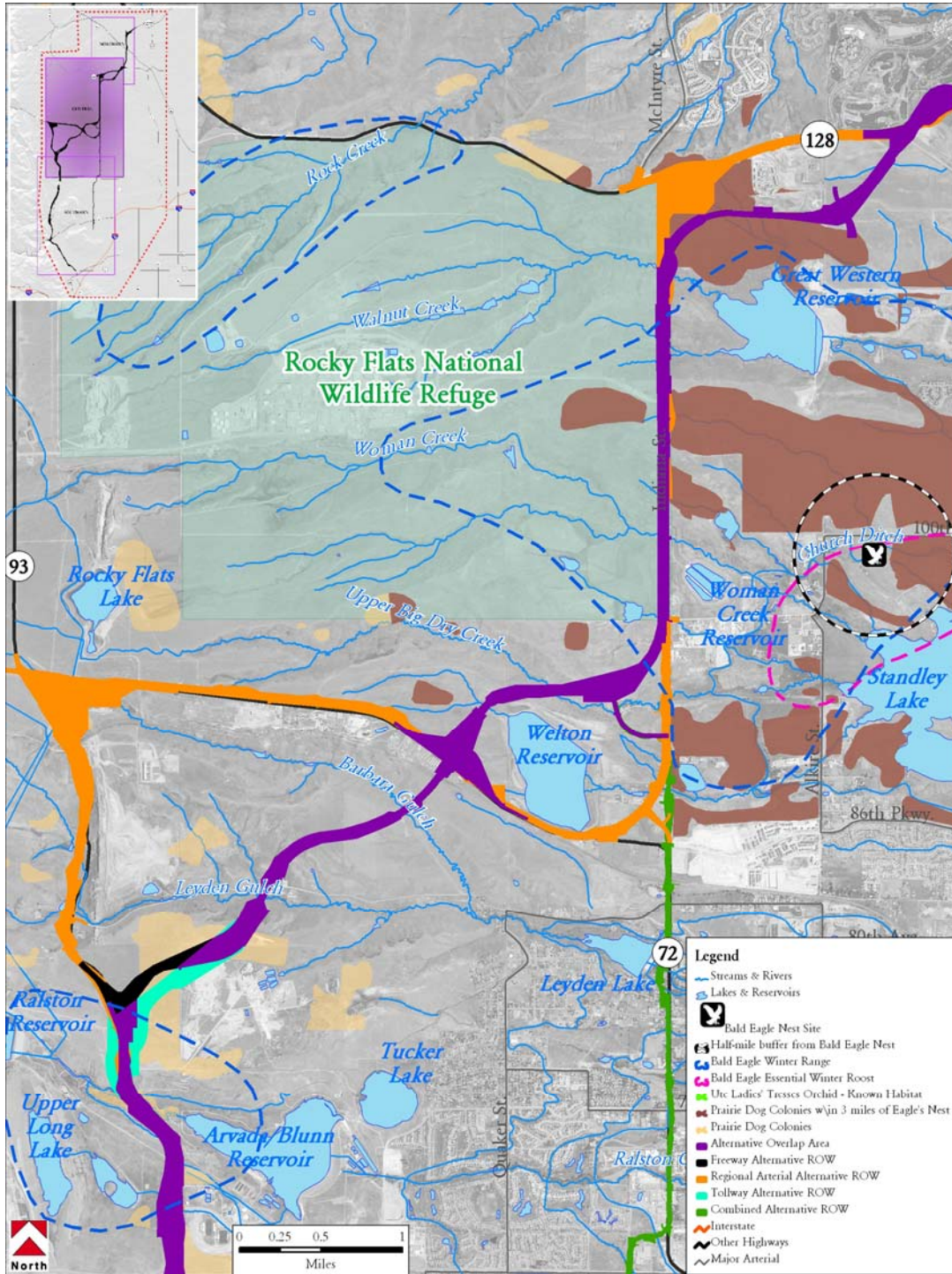
*Figure 4.11-14 Prairie Dog, Orchid, and Bald Eagle Habitat-Northern Portion*



*Sources: Orchid Habitat developed by ERO Ecologists' knowledge of the area and combined with CNHP potential conservation areas. Wildlife data provided by CDOW (2004, 2005b), with specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists and field verification of accessible areas. Great Western Reservoir Prairie Dog Relocation Site provided by the City of Broomfield staff (Pritz 2005).*



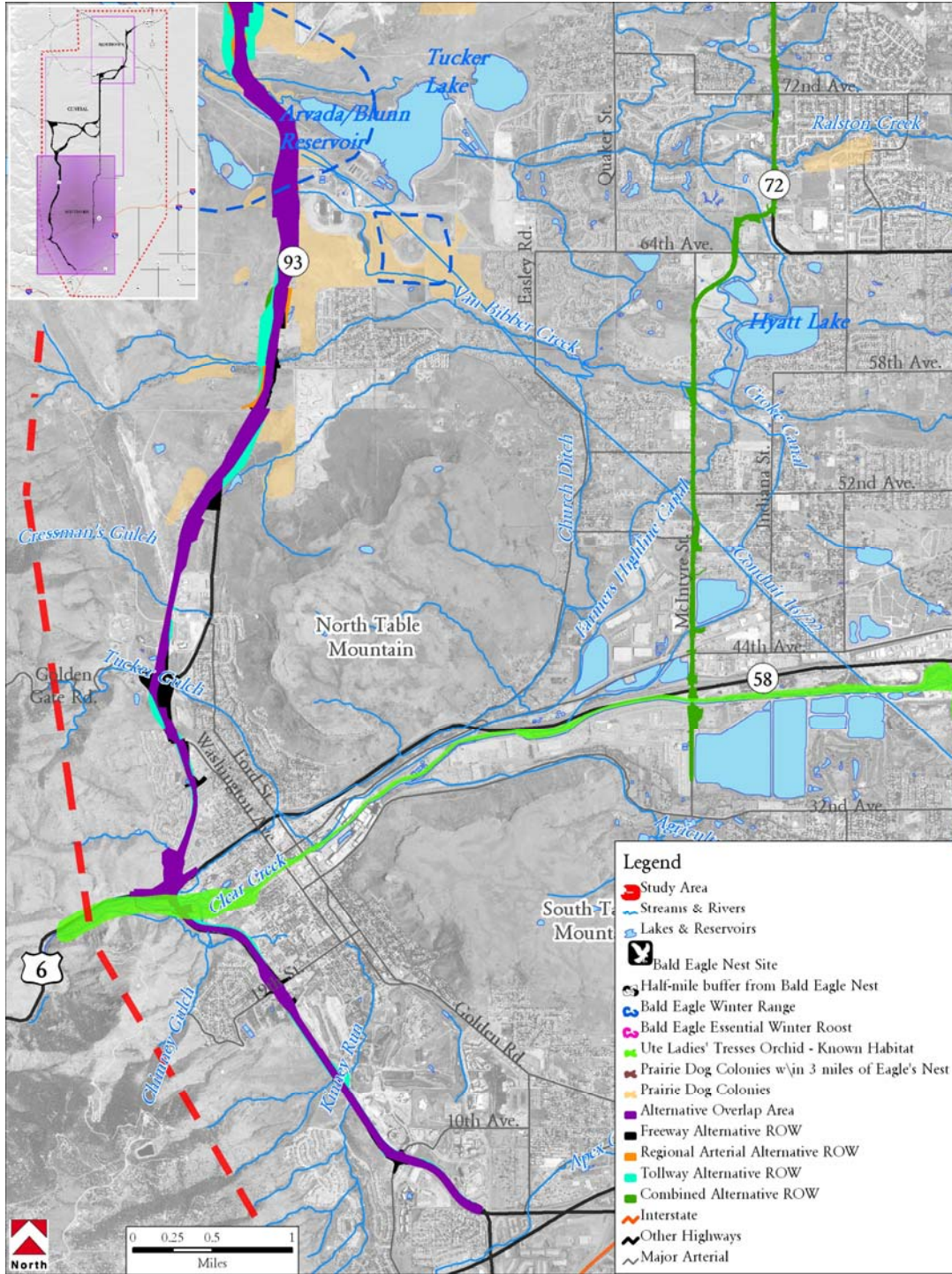
*Figure 4.11-15 Prairie Dog, Orchid, and Bald Eagle Habitat-Central Portion*



*Sources: Orchid Habitat developed by ERO Ecologists' knowledge of the area and combined with CNHP potential conservation areas. Wildlife data provided by CDOW (2004, 2005b), with specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists and field verification of accessible areas. Great Western Reservoir Prairie Dog Relocation Site provided by the City of Broomfield staff (Pritz 2005).*



*Figure 4.11-16 Prairie Dog, Orchid, and Bald Eagle Habitat-Southern Portion*



*Sources: Orchid Habitat developed by ERO Ecologists' knowledge of the area and combined with CNHP potential conservation areas. Wildlife data provided by CDOW (2004, 2005b), with specific modifications made by ERO based on consultation with CDOW, USFWS, and county wildlife specialists and field verification of accessible areas. Great Western Reservoir Prairie Dog Relocation Site provided by the City of Broomfield staff (Pritz 2005).*



### **BLACK-FOOTED FERRET**

The black-footed ferret is associated with black-tailed prairie dog colonies and depends on this species for food and shelter. Over the past century, prairie dog distribution has been substantially reduced due to habitat loss, plague, and poisoning practices, with the result that the black-footed ferret has become nearly extinct.

Based on previously gathered data, the USFWS has established a Block Clearance area for parts of the Denver-Boulder metropolitan area where black-footed ferret surveys are not required. Because the Northwest Corridor study area is entirely within this exclusion area, the black-footed ferret is assumed by the USFWS to be absent.

### **PREBLE'S MEADOW JUMPING MOUSE**

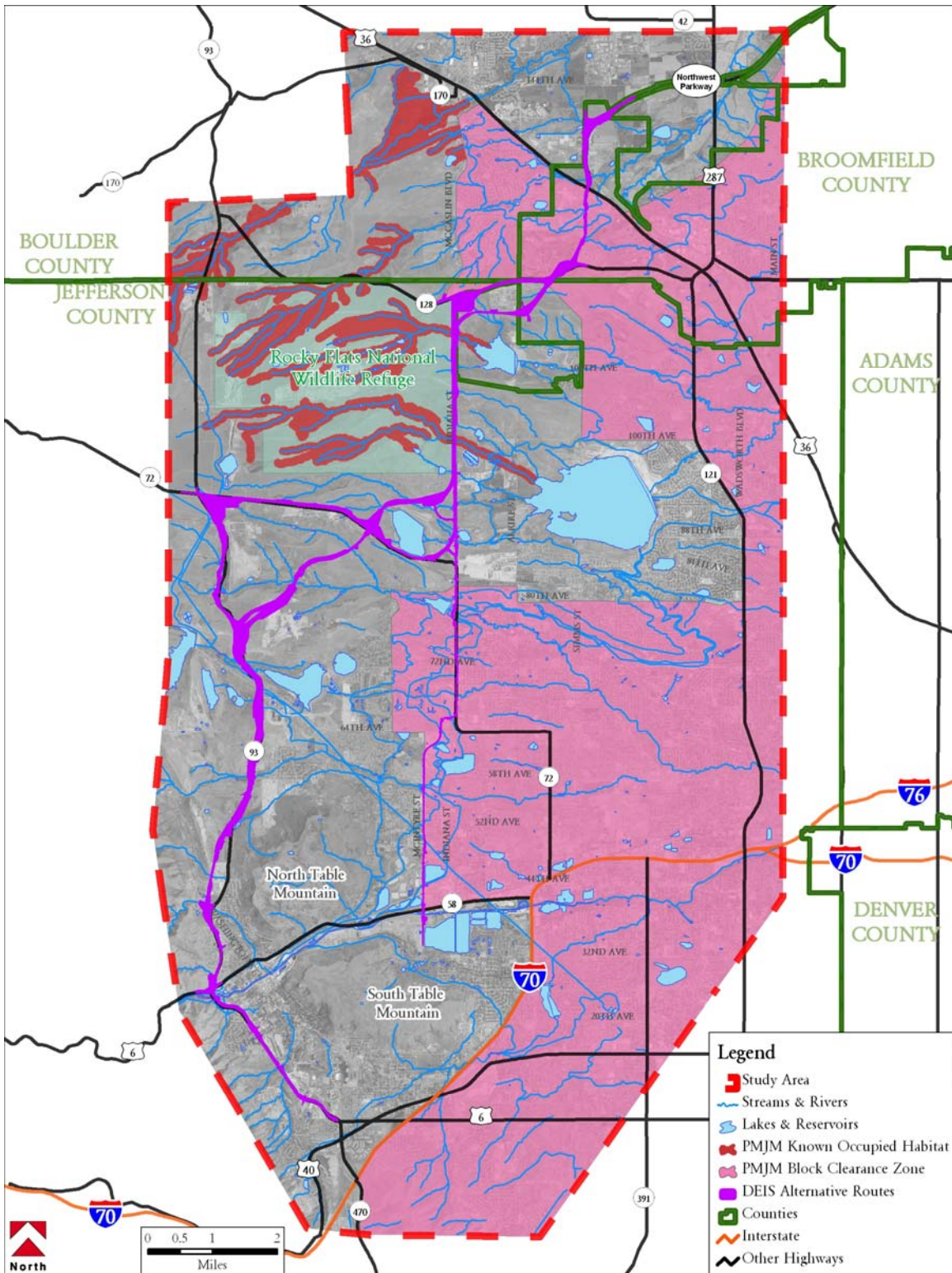
The Preble's meadow jumping mouse (Preble's) is listed as a threatened species. Typically, Preble's occur in low undergrowth consisting of grasses and forbs, in open wet meadows, in riparian corridors, where tall shrubs and low trees provide adequate cover, and in upland areas adjacent to wetlands and riparian areas (USFWS, 2004b; Meaney and Clippinger, 1995; Shenk and Sivert, 1999).

Preble's is known to occur along drainages in the northern half of the study area, including Rocky Flats National Wildlife Refuge (see **Figure 4.11-17**, **Figure 4.11-18**, **Figure 4.11-19**, and **Figure 4.11-20**). Occupied drainages include Coal Creek, Rock Creek, Walnut Creek, and Woman Creek. Portions of the study area are within the USFWS-designated Preble's Denver metropolitan area block clearance zone (Linner, 2004), which assumes Preble's to be absent (Carlson, 2000) (see **Figure 4.11-17**, **Figure 4.11-18**, **Figure 4.11-19**, and **Figure 4.11-20**).

The study team, in consultation with the USFWS, determined that Ralston Creek, Big Dry Creek, and Leyden Gulch contained adequate riparian vegetation and shrub cover to provide the best potentially suitable Preble's habitat (see **Figure 4.11-17**, **Figure 4.11-18**, **Figure 4.11-19**, and **Figure 4.11-20**). Presence or absence surveys following USFWS guidelines were conducted on each of these drainages from late August to mid-September 2004. No Preble's were captured during the surveys (ERO, 2004).

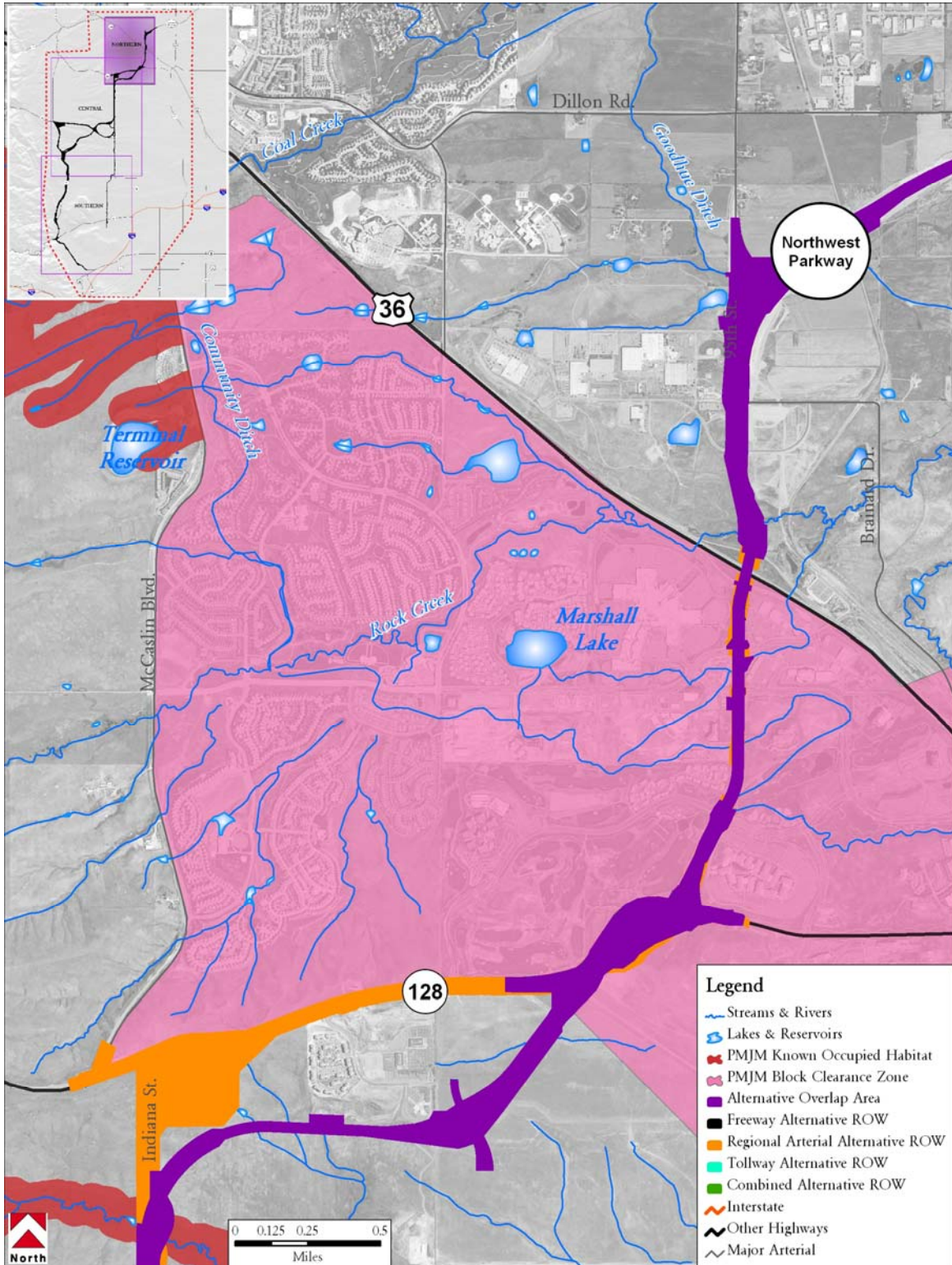
Based on the 2004 survey results, as well as past trapping surveys for other activities, it is unlikely that an undocumented population of Preble's is present in the Northwest Corridor study area.

Figure 4.11-17 Preble's Meadow Jumping Mouse Habitat-Study Area



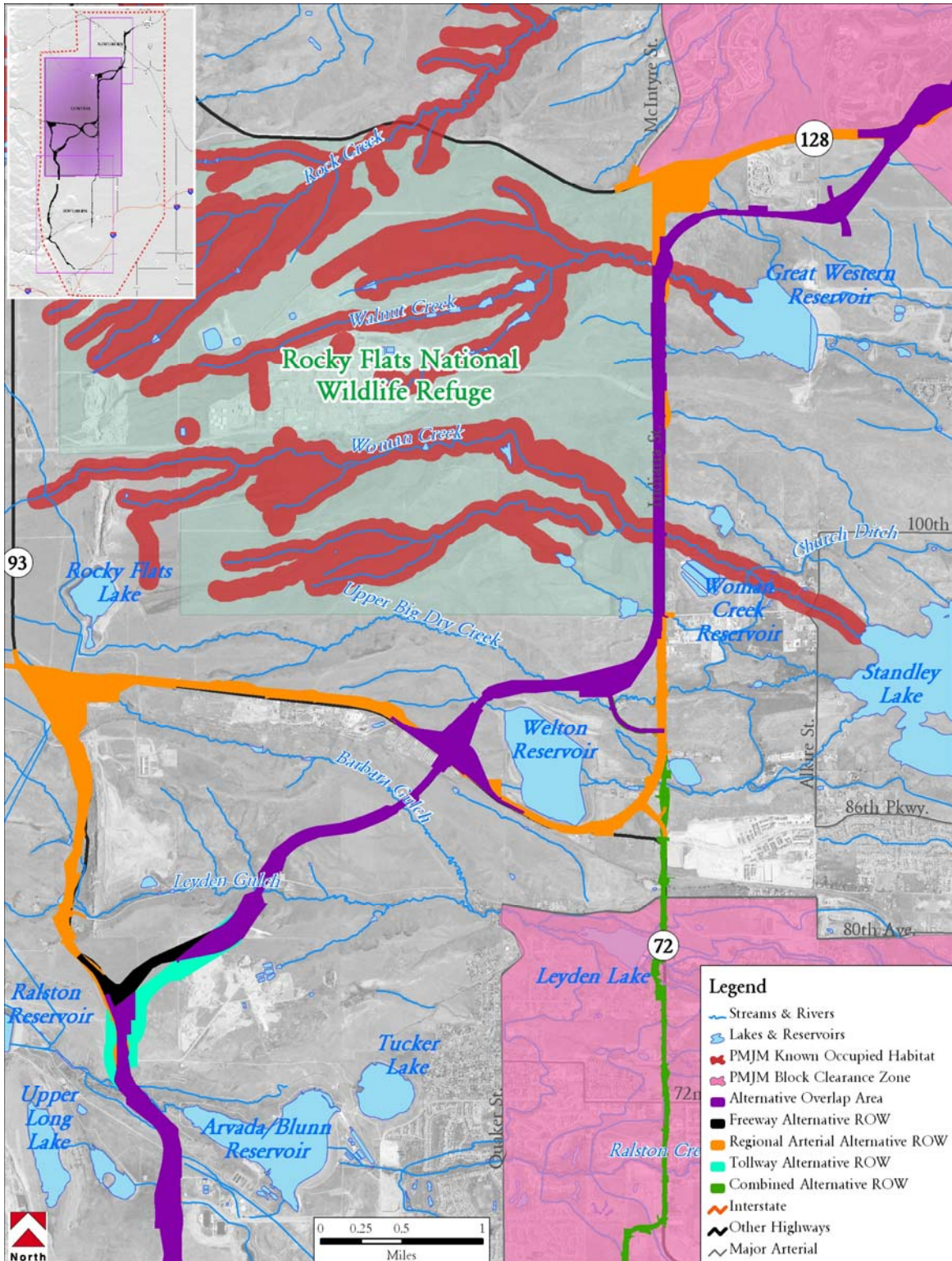
Source: CDOW (2001b) WRIS Occupied Preble's Habitat. Preble's Block Clearance Zone derived from the USFWS service database and from qualified survey permit holders.

*Figure 4.11-18 Preble's Meadow Jumping Mouse Habitat-Northern Portion*



Source: CDOW (2011b) WRIS Occupied Preble's Habitat. Preble's Block Clearance Zone derived from the USFWS service database and from qualified survey permit holders.

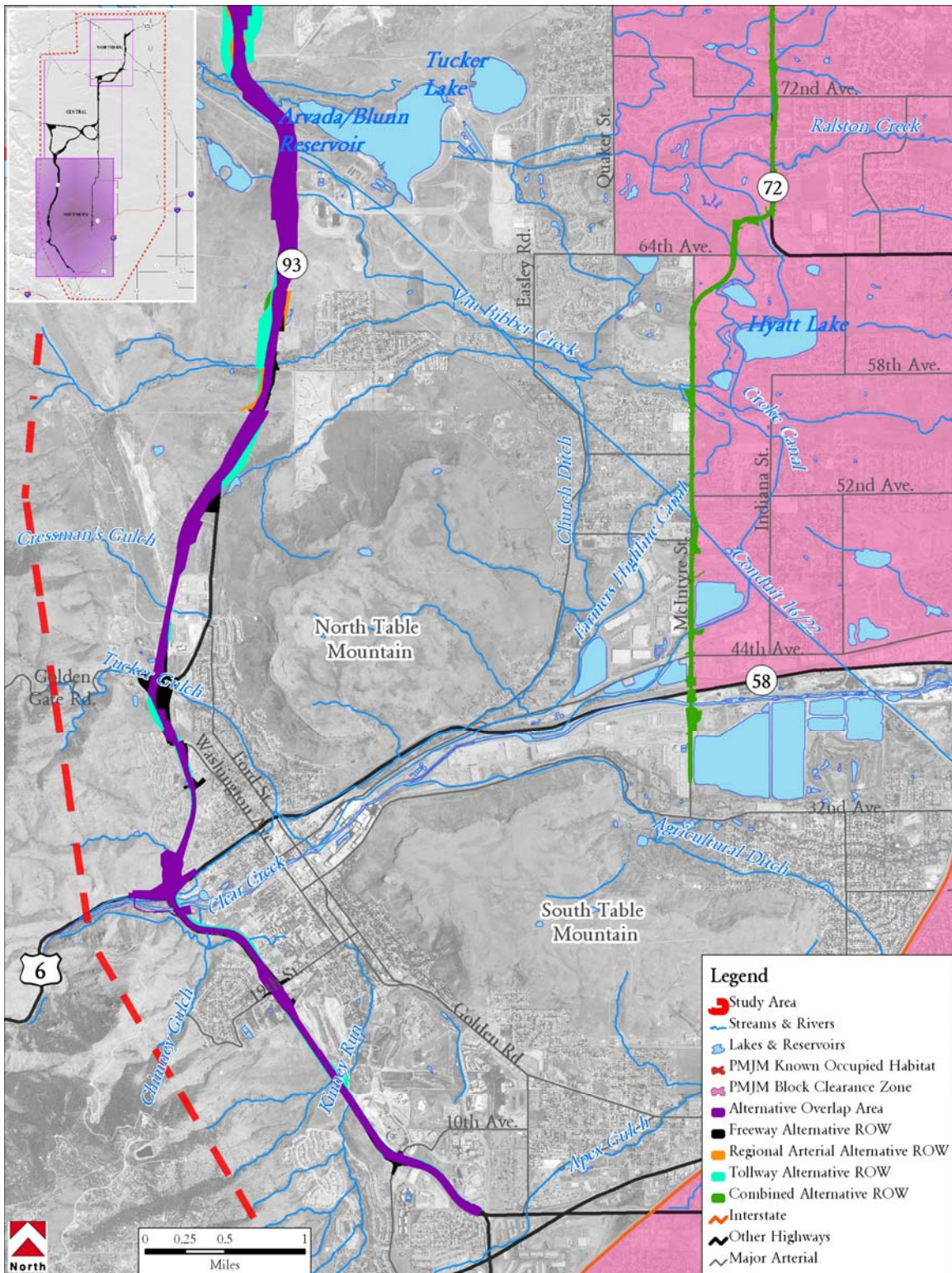
Figure 4.11-19 Preble's Meadow Jumping Mouse Habitat-Central Portion



Source: CDOW (2001b) WRIS Occupied Preble's Habitat. Preble's Block Clearance Zone derived from the USFWS service database and from qualified survey permit holders.



*Figure 4.11-20 Preble's Meadow Jumping Mouse Habitat-Southern Portion*



Source: CDOW (2011b) WRIS Occupied Preble's Habitat. Preble's Block Clearance Zone derived from the USFWS service database and from qualified survey permit holders.





### **PLATTE RIVER SPECIES**

Whooping crane, least tern, Eskimo curlew, piping plover, pallid sturgeon, and western prairie fringed orchid are species that rely heavily on habitat provided by the Platte River system. Whooping crane, least tern, Eskimo curlew, and piping plover may migrate through Colorado or may occasionally nest on wide, sandy shores of reservoirs, typically in eastern Colorado. Pallid sturgeon is a fish found in the Missouri and Middle Mississippi rivers. Western prairie fringed orchid is a plant species found in tallgrass prairie ecosystem habitats west of the Mississippi River.

The Northwest Corridor study area consists primarily of semi-arid grassland and residential and commercial development habitat unsuitable for the whooping crane, least tern, Eskimo curlew, piping plover, pallid sturgeon, or western prairie fringed orchid. Therefore, these species are not found. However, these species will be affected by depletions to the Platte River watershed basin.

#### **4.11.1.10 SPECIES OF STATE CONCERN**

Although not federally listed, eighteen wildlife species known to occur or potentially occurring in the study area have been listed by the CDOW as threatened, endangered, or of special concern (SC) in the state of Colorado, or have been described as rare, vulnerable, or imperiled in the state by the Colorado Natural Heritage Program (CNHP). A detailed description of these “species of state concern” expected to occur in the area, including their scientific names, has been developed (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**). Species and groups of species of particular interest are described below.

#### **BLACK-TAILED PRAIRIE DOG**

The black-tailed prairie dog is considered a candidate for listing in the state of Colorado and was, until recently, a federal candidate species for the ESA threatened list (69 Fed. Reg. 15951217 [August 18, 2004]). Because of its importance in the short and mesic grasslands ecosystems and because its numbers have declined due to loss of habitat, the black-tailed prairie dog is a Colorado species of special concern. It is CDOT policy to avoid and minimize impacts to prairie dogs and to attempt to relocate impacted individuals when possible (CDOT, 2005).

Black-tailed prairie dogs are considered a “keystone” species because their burrowing and intense grazing activities provide food and shelter for many other grassland species, and have a large effect on community structure and ecosystem function (Power et al. 1996; CDOW, 2005b). Prairie dogs help provide habitat for other species by creating an inviting environment for other animals. Species such as black-footed ferret, burrowing owl, prairie rattlesnake, and mountain plover are closely linked to prairie dog burrow systems for food and cover. Prairie dogs provide an important prey resource for numerous predators including American badger, coyote, red fox, bald eagle, golden eagle, ferruginous hawk, and other raptors.

Prairie dogs are found throughout the northern half of the study area where suitable habitat exists (see **Figure 4.11-13, Figure 4.11-14, Figure 4.11-15, and Figure 4.11-16**).

#### **BURROWING OWL**

The burrowing owl, a state threatened (ST) species, is a small migratory owl that occupies sparsely vegetated areas on the plains during the summer breeding season. The owl is active during the day and uses abandoned prairie dog burrows for nesting and roosting.

Burrowing owls are typically present in Colorado until late October, when they migrate south to Mexico and Central America.



### **PLAINS SHARP-TAILED GROUSE**

The ground nesting plains sharp-tailed grouse historically was a resident of eastern Colorado. It is listed as endangered by the state. Reasons for the decline of sharp-tailed grouse include land cultivation, livestock grazing, fire control, weed infestations, and urban development (CDOW, 1992; USFWS, 2004a). Sharp-tailed grouse use different habitats seasonally and favor grassland and grassland–low shrub transition zones. Riparian areas and wooded draws provide important winter habitat.

In 2003, the CDOW, City of Boulder Open Space and Mountain Parks, and Boulder County Parks and Open Space initiated a sharp-tailed grouse reintroduction program on joint City-County open space lands north of SH 128 (USFWS, 2004a). The effort was unsuccessful due to the dispersal and mortality of individuals, and it is unlikely that any sharp-tailed grouse currently remain at the reintroduction site, although it is still considered potential habitat (Kunze and Thornburg, 2005; Stone, 2005). The CDOW has no plans to continue their reintroduction effort (Wedermeyer, 2005). Sharp-tailed grouse reintroductions are planned at Rocky Flats National Wildlife Refuge, but have been scheduled for after 2010 (Stone, 2005).

### **BUTTERFLIES**

Potential habitat for Aragos skipper, Ottoe skipper, Hops feeding azure, mottled dusky wing, cross-line skipper, and regal fritillary butterflies occurs in the study area. These butterflies are listed by the CNHP as either vulnerable throughout their range or imperiled statewide, with the exception of the rare regal fritillary, which is listed as critically imperiled statewide (CNHP, 2004). These species are associated with grasslands leading up to the foothills and with shrublands in the foothills.

### **REPTILES AND AMPHIBIANS**

The common garter snake is likely to be present in uplands and riparian areas, the midget faded rattlesnake in uplands, and the northern leopard frog in wetlands of the study area. All three species are listed as Species of Concern by the CDOW (2003a).

### **FISH**

In 2003, the common shiner (state threatened) and the northern redbelly dace (state endangered [SE]) were reintroduced at Rocky Flats National Wildlife Refuge at Lindsey Pond and in Rock Creek upstream of Lindsey Pond. The northern redbelly dace is reproducing and generally thriving at Lindsey Pond. The common shiner is probably also reproducing, although its population levels are much lower (Rosenlund, 2005). Although it is possible that the northern redbelly dace and the common shiner occasionally travel downstream, it is unlikely that they remain in this area because of the presence of other competing and predatory fish species (Rosenlund, 2005).

Iowa darters (state species of special concern) have been recorded at a few locations in the study area, including a manmade lagoon off of Walnut Creek in 1996, Ralston Creek east of SH 93 in 1999, and Clear Creek at the eastern edge of the study area in 2004 (CDOW, 2005c).

#### **4.11.1.11 WILDLIFE REFUGES AND CONSERVATION AREAS**

##### **ROCKY FLATS NATIONAL WILDLIFE REFUGE**

The Rocky Flats National Wildlife Refuge, located in the northwestern portion of the study area, was transferred from the Department of Energy to USFWS in summer 2007 (USFWS, 2004a; DOE, 2007) (see **Figure 4.11-1**). Rocky Flats National Wildlife Refuge encompasses about 6,200 acres of predominantly undisturbed grassland and shrubland habitat similar to those described for other undeveloped lands in the study area. Refuge vegetation communities of particular interest include the rare xeric tallgrass and tall upland shrubland communities.



Preble's meadow jumping mouse occurs along the major drainages of Rocky Flats National Wildlife Refuge (USFWS 2004b) (see **Figure 4.11-17** and **Figure 4.14-19**). Bald eagles also use Rocky Flats National Wildlife Refuge as a winter foraging area, especially where prairie dog colonies occur (see **Figure 4.11-13** and **Figure 4.11-15**). Rocky Flats National Wildlife Refuge supports a resident herd of about 160 deer, and an area along the western edge of the refuge is considered to be overall elk range used during winter, summer, and calving periods (USFWS, 2004a; CDOW, 2005a; Wedermyer, 2005). Other wildlife species occurring at Rocky Flats National Wildlife Refuge site are similar to those described for the Northwest Corridor study area.

#### **TWO PONDS NATIONAL WILDLIFE REFUGE**

The smallest urban unit in the National Wildlife Refuge System, Two Ponds is located in Arvada, southeast of the intersection of Kipling Street and 80<sup>th</sup> Avenue. Two Ponds covers 72.2 acres and is managed for the benefit of vanishing wetlands and native wildlife species (USFWS, 2005b). Two Ponds provides both breeding habitat and a migratory stopover for waterfowl. The pond and wetland habitats also support species such as dragonflies and damselflies, painted turtle, red-winged blackbird, and belted kingfisher. Mammals found at Two Ponds include mule deer, red fox, raccoons, and meadow voles.

#### **STANDLEY LAKE REGIONAL PARK**

Standley Lake Regional Park is located east of Indiana Street, south of the intersection of 100<sup>th</sup> Avenue and Simms Street in the central portion of the study area (see **Figure 4.11-1**). It was designated as a regional park in 1998 and is owned and managed by the City of Westminster.

Standley Lake is an artificial reservoir created in the middle of the short grass prairie, and includes prairie, lake, and wetland ecosystems that attract a variety of birds and mammals. Great blue herons and double-crested cormorants nest on the island in its western portion, as well as on the lake's northwestern shoreline. The western end of Standley Lake is managed for waterfowl and is closed to public boat access (Reddinger, 2005). An active bald eagle nesting and roosting site is located on the northwest side (see **Section 4.11.1.9**).

#### **PRAIRIE DOG RELOCATION AREAS**

The cities of Broomfield and Westminster have designated areas within their open space lands for prairie dog relocations. Relocation areas within Westminster include Colorado Hills Open Space and Standley Lake State Park. Broomfield has created an actively managed wildlife refuge area for prairie dog habitat at Great Western Reservoir.

Prairie dogs occur throughout much of the upland habitat surrounding Standley Lake, where they are considered a valuable component of the ecosystem (see **Figure 4.11-13**, **Figure 4.11-14**, **Figure 4.11-15**, and **4.12-16**).

Currently, the Great Western Reservoir site is Broomfield's only site available for prairie dog relocation and is at maximum capacity (Pritz, 2005) (see **Figure 4.11-13**, **Figure 4.11-14**, and **Figure 4.11-15**). Similarly, the Colorado Hills site is the only area open for prairie dog relocation in Westminster; all other areas previously designated by Westminster as potential prairie dog relocation sites are no longer available (Dahl, 2005).

### **4.11.2 ENVIRONMENTAL CONSEQUENCES**

This section presents a description of the potential direct impacts and indirect effects from the No Action Alternative and build alternatives on vegetation; wildlife; and threatened, endangered, and species of state concern. When possible, the acres of potentially disturbed important habitat and distances to sensitive areas were calculated for each alternative. Impact acreages are calculated for the entire right-of-way footprint; direct disturbance impacts may actually be smaller. A comparison of potential impacts among alternatives is presented and summarized (see **Section 4.11.2.7**).

#### **4.11.2.1 NO ACTION ALTERNATIVE**

Under the No Action Alternative, transportation improvements described in the build alternatives would not be implemented. As a result, there would be no direct loss of wildlife habitat or vegetation from either new



facilities or improvements to existing facilities. Current traffic patterns would continue, although traffic volumes would likely increase due to foreseeable residential and commercial development in and around the study area. Increases in traffic volume would likely increase the number of wildlife/vehicle collisions because there would be no improvements to road crossings at wildlife movement corridors.

Beneficial mitigation measures associated with the build alternatives would not be implemented in the No Action Alternative. For example, improvement of large mammal wildlife crossings at Ralston Creek and North Table Mountain would not be included in this alternative. Similarly, there would be fewer opportunities for improving small mammal, amphibian, and reptile movement under roadways. Although aquatic habitats would not be disturbed, aquatic species would be less likely to benefit from water quality improvement measures such as those associated with the build alternatives.

The bald eagle, Preble’s meadow jumping mouse, Ute ladies’-tresses orchid, and Colorado butterfly plant would not be directly or indirectly affected by the No Action Alternative. Habitat for these species would not be lost as a result of transportation improvements. However, opportunities for improving Preble’s movement under roadways would not be available under the No Action Alternative.

#### 4.11.2.2 IMPACTS COMMON TO ALL BUILD ALTERNATIVES

This section describes impacts that are common to all of the build alternatives, including direct impacts and indirect effects.

##### VEGETATION

Vegetation impacts for all vegetation types are very similar for the Freeway Alternative, Tollway Alternative, and Combined Alternative (Recommended Alternative). All build alternatives would result in the direct loss of habitat, both permanent and temporary; within the construction footprint (see **Table 4.11-3**). In addition to herbaceous vegetation, trees and shrubs likely would be removed during construction. The mixed grass vegetation community would be the most affected by road construction, followed by agricultural and pasture lands. With the exception of wetlands, riparian, and xeric tallgrass habitat types, the vegetation communities affected are commonly found along the Colorado Front Range.

*Table 4.11-3 Direct Impacts to Vegetation by Alternative*

Vegetation Type	Freeway Alternative	Tollway Alternative	Regional Arterial Alternative	Combined Alternative (Recommended Alternative)
Tallgrass prairie	0 acres	0 acres	81 acres	0 acres
Mixed grass prairie	482 acres	527 acres	414 acres	497 acres
Agricultural and pasture lands	212 acres	212 acres	136 acres	239 acres
Xeric upland shrubland	11 acres	11 acres	12 acres	11 acres
Riparian areas	9 acres	10 acres	8 acres	10 acres
Wetlands	15.6 acres	15.2 acres	20.9 acres	18.2 acres
<b>Total Vegetation Impact</b>	<b>730 acres</b>	<b>776 acres</b>	<b>671 acres</b>	<b>775 acres</b>

*Source: Northwest Corridor study team, 2005.*



## **NOXIOUS WEEDS**

The introduction of noxious weeds could occur in areas disturbed during construction. The new roadway alignments and more paved areas are likely to accelerate introduction of weed species into adjacent vegetation communities.

## **GENERAL WILDLIFE**

### **Mammals**

Movement of elk and deer between foothills habitat and habitat areas to the east would likely be disrupted by proposed transportation improvements at several elk and deer movement corridors (see **Figure 4.11-5**, **Figure 4.11-6**, **Figure 4.11-7**, **Figure 4.11-8**, and **Figure 4.11-9**), including:

- Big Dry Creek near Standley Lake
- Van Bibber Creek
- Between the foothills and Fossil Trace Golf Course along US 6

Nevertheless, specific design elements have been incorporated at Leyden Gulch, Ralston Creek, and North Table Mountain crossings to allow for elk and deer movement. The generally broad movement patterns of elk and deer would be redirected to funnel animals to proposed crossing structures. The Ralston Creek and North Table Mountain crossings would improve existing conditions by creating new, grade-separated crossings.

Following review by agency wildlife specialists (Wedermeyer et al., 2005); the current design of the North Table Mountain crossing may be of limited value as a movement corridor for elk and deer for the following reasons:

- Currently wildlife movement between North Table Mountain and habitat to the west of SH 93 occurs across a broad area; directing wildlife through a single, relatively narrow crossing would be difficult.
- The placement of the detention pond proposed for the Freeway Alternative, Tollway Alternative, and Combined Alternative (Recommended Alternative) could discourage movement through the crossing structure.
- The proposed frontage road to the east of the crossing could impede or discourage movement or contribute to wildlife mortality, although traffic volumes at this location are projected to range from similar to existing conditions (Tollway Alternative) to considerably less wildlife mortality than existing conditions (Freeway Alternative and Combined Alternative [Recommended Alternative]).

The dimensions of the new bridge proposed for build alternatives with new alignments at the Leyden Gulch crossing would be more than adequate to allow for elk and deer movement. None of the build alternatives, with the exception of the Regional Arterial Alternative, would improve the existing roadway at Leyden Gulch and SH 93 for wildlife movement. For the Freeway Alternative, Tollway Alternative, and Combined Alternative (Recommended Alternative), most additional traffic would be directed to the new alignment; thus, traffic volumes on SH 93 at Leyden Gulch are anticipated to be similar to the No Action Alternative levels for these alternatives. The Regional Arterial Alternative would include the replacement of the existing culverts with a double-cell box culvert at Leyden Gulch, which would allow for small mammal, but not elk and deer, movement under the roadway. CDOT is aware of concerns about wildlife collisions at Leyden Gulch and SH 93.

Although not designed specifically for wildlife movement, a bridge at Walnut Creek (Freeway Alternative, Tollway Alternative, and Combined Alternative [Recommended Alternative]) would allow for elk and deer passage. The existing bridge and streamside passage at Clear Creek would be maintained.



In order to better accommodate wildlife movement, dimensions of spans and road widths have been designed according to recommendations for elk and deer crossing structures (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**). These recommendations include using bridges where possible, maximizing culvert sizes, and providing a dry area or ledge in crossings shared with drainages.

To avoid wildlife/human conflict, it may be preferable not to maintain the movement corridor across US 6 toward the Fossil Trace Golf Course. The build alternatives would include an underpass at Kinney Run; this underpass would include a bike path and trail, features which tend to deter movement of elk and deer (see **Northwest Corridor Supporting Technical Document-Vegetation and Wildlife**). The dimensions of the Kinney Run underpass are not large enough to encourage elk and deer passage, although elk and deer movement under the roadway would still be possible. Smaller species would be more likely to cross under the roadway at Kinney Run.

Although all of these corridors are currently disrupted by existing roads, all of the build alternatives would likely result in higher traffic volumes and speeds, resulting in an increase in elk and deer mortality from collisions with vehicles.

Potential direct impacts of the build alternatives on other mammals include loss of habitat, especially wetlands, riparian, and grassland habitat; disruption of migration, dispersal, and other movement patterns, especially along riparian corridors, and increased mortality from collisions with automobiles. The installation of new, or the improvement of existing, crossings at Woman Creek, Walnut Creek, Ralston Creek, Cressman's Gulch, Tucker Gulch, and North Table Mountain would benefit these other mammals.

The build alternatives also would have indirect effects on mammals. Construction activity would likely cause most mammals to avoid construction areas during construction. Some species or individuals may permanently avoid areas following construction, while others would become acclimated to the new conditions. Potential long-term indirect effects include disturbance of wildlife due to illumination beyond the roadway and noise from the build alternatives. Increased light and noise may reduce the area of habitat used by wildlife adjacent to or near transportation improvements. The build alternatives would likely result in increased traffic, which could result in increased levels of ambient air pollution, potentially degrading habitat adjacent to the roadway.

### **Birds**

Raptors requiring large trees for nesting could be affected where the build alternatives would cross major drainages such as Clear Creek, Van Bibber Creek, and Leyden Gulch, which support large cottonwoods. Raptors would be affected where nest trees would be cut or where transportation improvements would be so close to nests that the raptors would abandon them. All of the build alternatives would result in losses of habitat supporting prey species such as prairie dogs and other small mammals.

Songbirds associated with mixed grassland, wetland, and riparian habitat types would be directly affected by the build alternatives through the loss of nesting, migratory, winter, and year-round habitat. Nests could be destroyed. Because grassland is the habitat most likely to be affected by the build alternatives, ground-nesting birds such as vesper sparrows, western meadowlarks, and horned larks would be particularly vulnerable to impacts.

Indirect effects of the proposed alternatives could include behavioral disturbance caused by encroachment of structures or activities into the "comfort zone" of birds. Depending on the type and extent of encroachment, some behavioral disturbance can be temporary as birds adapt to a changed environment. A songbird and raptor nest survey should be conducted prior to construction to identify the location and vulnerability of nests in the vicinity and mitigation measures, as outlined in **Section 4.11.3**, should be developed for any nests found.

### **Reptiles and Amphibians**

Reptiles and amphibians would be directly impacted by the build alternatives through the loss and fragmentation of wetlands, open water, grassland, and shrubland habitat. However, measures designed to mitigate effects to wetlands, Ute ladies'-tresses orchid, and Preble's would also benefit reptiles and



amphibians through the restoration and enhancement of wetland habitat and the replacement of existing culverts with larger or more numerous culverts or with bridges. In addition, reptiles and amphibians occupying wetlands and riparian areas could be impacted by contaminants in runoff that enters streams or other water bodies.

### **AQUATIC RESOURCES**

Disturbance of habitat during the construction phase of the build alternatives could temporarily impact aquatic species potentially present in the area. In many places, such as at Walnut Creek, Woman Creek, Big Dry Creek, Van Bibber Creek, Cressman's Gulch, Tucker Gulch, and Kinney Run, stream habitat would be modified, and potentially improved, through the replacement of existing culverts with larger or more numerous culverts or bridges or through construction of storm water quality facilities.

De-icing chemicals in roadway runoff could affect aquatic species if the effectiveness of water quality measures is compromised by structural failure or inadequate maintenance. Runoff during unusual periods of high precipitation that exceed storm water detention capacities could scour the streambed or deposit sediment and physically impact habitat for aquatic species.

### **THREATENED AND ENDANGERED SPECIES**

Construction of a build alternative could potentially impact threatened and endangered species within the study area. The potential impacts to these species are discussed.

#### **Colorado Butterfly Plant**

Given that no known populations occur in or near the study area and that the nearest population is introduced, the proposed project is unlikely to adversely affect the Colorado butterfly plant. However, based on the quality of potential habitat present, final presence/absence surveys are recommended prior to construction at Leyden Gulch east of SH 93, Ralston Creek, and Clear Creek.

#### **Ute ladies'-tresses Orchid**

Within one year prior to construction, final presence/absence surveys for Ute ladies'-tresses orchid will be performed at Leyden Gulch east of SH 93, Ralston Creek, and Clear Creek. Assuming that the known Clear Creek population of Ute ladies'-tresses orchid and any other populations observed during preconstruction surveys are protected during construction as a No Work Zone, the build alternatives would have no direct impacts on Ute ladies'-tresses orchid. If preconstruction surveys for the species identify a population immediately downstream of construction, the build alternatives could have an adverse indirect effect on the species. There would be an indirect effect if construction permanently changed groundwater conditions supporting the population and the area became too dry to support the species. A downstream population would also be indirectly effected if flows in the creek were altered by construction and downstream scouring occurred that removed all or part of the population.

#### **Black-footed Ferret**

The Northwest Corridor study area is included in the block clearance area, where the black-footed ferret is assumed to be absent. Thus, the build alternatives would have no effect on the black-footed ferret.

#### **Preble's meadow jumping Mouse**

The build alternatives would impact habitat occupied by Preble's at Walnut Creek and Woman Creek. Approximately 15 acres of known Preble's habitat would be impacted as a result of all of the build alternatives except the Regional Arterial Alternative, which would impact approximately 17 acres. A portion of the impacted areas would be revegetated and restored. Although disturbed during the construction phase, existing movement corridors (culverts) at Walnut Creek and Woman Creek would be enlarged for all build alternatives as appropriate, to provide increased opportunities for dispersal by Preble's. In addition to direct impacts to their habitat, the build alternatives could result in mortality of individual Preble's during construction. The build alternatives would likely have an adverse effect on the species in the short term due to habitat disturbance and possible mortality, but in the long term, improved movement corridors may have a beneficial effect.



**Bald Eagle**

The CDOW has issued recommendations for buffer zones around bald eagle nests and winter roost sites, with seasonal restrictions on activities conducted in the vicinity of nest sites within the buffer zones (Craig, 2002) (see **Figure 4.11-13**, **Figure 4.11-14**, **Figure 4.11-15**, and **Figure 4.11-16**).

None of the build alternatives would encroach upon the established nest or winter roost buffers. The footprint of all build alternatives is over one mile from the Standley Lake nest, which is well beyond the one-half-mile disturbance buffer.

The build alternatives would pass through bald eagle winter range in the north and central portions of the study area and along the west edge of winter range spread between Great Western Reservoir and Standley Lake. Direct impacts to bald eagle winter range are similar for all build alternatives and range from 227 acres (Regional Arterial Alternative) to 351 acres (Tollway Alternative) of habitat lost or temporarily disturbed (see **Table 4.11-4**).

The build alternatives would result in the disturbance, degradation, or elimination of prairie dog colonies that provide an important food source for both nesting and overwintering bald eagles. According to the USFWS, all active prairie dog colonies within 15 miles of a nest can be considered potential foraging habitat for the eagles, although the most important foraging habitat is likely within 3 miles of a nest (USFWS, 2004c). Direct impacts to prairie dog habitat within a 3-mile radius of the Standley Lake nest are very similar among build alternatives, ranging from 33 to 52 acres of habitat disturbed (see **Table 4.11-4**).

**Table 4.11-4 Direct Impacts to Preble’s Meadow Jumping Mouse, Bald Eagle, and Prairie Dog Habitat**

Habitat Type	Acres Directly Impacted			
	Alternative			
	Freeway	Tollway	Regional Arterial	Combined (Recommended Alternative)
Preble’s meadow jumping mouse	15	15	17	15
Bald Eagle Winter Range	319	351	227	272
Prairie Dog within 3 miles of Bald Eagle nest	33	33	52	35

*Source: Northwest Corridor study team, 2005.*

To the north of the Standley Lake eagle nest, the natural topography would provide a visual and noise barrier between the build alternatives and the nest; however, a portion of the build alternatives would be visible from the nest facing west. However, as stated above, the build alternative footprints are well beyond the one-half-mile disturbance buffer. Although they often avoid areas of high human use for nesting, foraging, perching, and roosting bald eagles have shown a wide range of sensitivity to human disturbance (Stalmaster and Newman, 1978; Knight and Knight, 1984; Martell, 1992; Beuhler et al., 1991; McCarigal et al., 1991). In some areas bald eagles may be becoming increasingly tolerant of human development (Therres et al., 1993). However, the presence of transportation improvements could disrupt or change current bald eagle use of surrounding foraging habitat.





Because the build alternatives are beyond current disturbance buffers, it is unlikely the alternatives would have an adverse effect on bald eagle nesting or roosting. It is possible that bald eagle movement patterns through the study area would be affected by construction noise or activity, or that foraging behaviors would be changed by the reduction in black-tailed prairie dog habitat available in the study area, but these effects would be unlikely to be great.

#### **PLATTE RIVER SPECIES**

Given the absence of suitable habitat, the build alternatives would have no direct impact on the whooping crane, least tern, Eskimo curlew, piping plover, pallid sturgeon, or western prairie fringed orchid.

With regard to possible water losses to the Platte River system, potential project elements that could result in depletions include detention facilities, dust abatement activities, and wetland mitigation. As currently proposed, these elements would not result in depletions for the following reasons:

- Detention facilities would be dry facilities and would release detained water within 40 hours; therefore, they would not result in discernable water loss via evaporation.
- Water used for dust abatement would be obtained from municipal sources that have previously undergone depletion consultations.
- Wetland mitigation would be at a 1:1 ratio; therefore, there would not be water loss via transpiration.

Because the proposed build alternatives would not result in depletions to the Platte River, they would have no effect on threatened and endangered Platte River species.

#### **SPECIES OF STATE CONCERN**

##### **Black-tailed Prairie Dog**

Prairie dogs are found throughout the northern half of the study area where suitable habitat exists. All the build alternatives would result in both temporary and permanent losses to prairie dog habitat. The Tollway Alternative would result in the greatest direct impacts to prairie dog habitat (approximately 120 acres), while the Regional Arterial Alternative would impact the fewest acres (91). The majority of impacts on prairie dogs would occur east of Indiana Street and south of SH 128 (see **Figure 4.11-13**). The build alternatives, except the Regional Arterial Alternative, would result in direct impacts to approximately 12 acres of Broomfield's Great Western Reservoir prairie dog relocation area, causing both permanent and temporary losses, as well as fragmentation of habitat.

##### **Burrowing Owl**

Potential habitat for the burrowing owl in the study area essentially overlaps with prairie dog habitat; thus, the owl could be directly affected by the loss of habitat associated with the build alternatives. Burrowing owl surveys would be conducted prior to construction to determine their presence in potentially affected habitat. Mitigation measures outlined would be developed for any nesting burrowing owls found in the surveys (see **Section 4.11.3.2**)

##### **Plains Sharp-tailed Grouse**

The sharp-tailed grouse is considered extirpated from the area (DOE, 1997; Wedermyer, 2005; Stone, 2005). No further reintroduction efforts are planned in Boulder or Jefferson counties before 2010 (Wedermyer, 2005; Stone, 2005); therefore, no direct impacts to sharp-tailed grouse from the build alternatives are anticipated.

##### **Butterflies**

All of the previously described butterflies could be affected by the build alternatives, through loss and fragmentation of tallgrass (Regional Arterial Alternative), mixed grass, shrubland, and riparian habitat, where host plants and nectar sources occur. In addition, increased traffic volumes and speeds from the proposed alternatives could result in increased mortality of these butterflies.



### **Reptiles and Amphibians**

The common garter snake, the midget faded rattlesnake, and the northern leopard frog could be impacted by the build alternatives through loss or fragmentation of habitat resulting from construction and increased mortality from traffic. However, stream habitat potentially occupied by the garter snake and the northern leopard frog would be improved in some places through the replacement of existing culverts with larger or more numerous culverts or free-spanning bridges. Measures designed to mitigate effects to wetlands, Ute ladies'-tresses orchid, and Preble's would also benefit reptiles and amphibians through the restoration and enhancement of wetland habitat.

### **Fish**

As previously mentioned, Rock Creek below Lindsey Pond is beyond the target area for the northern redbelly dace and the common shiner reintroductions. Since these species are probably not present in Rock Creek downstream of Lindsey Pond (Rosenlund, 2005), the build alternatives would not be likely to affect the northern redbelly dace and common shiner. Although habitat for the Iowa darter does not occur within the construction footprint, increased siltation of stream habitat resulting from construction activities could temporarily affect downstream habitat. Runoff from the build alternatives could also result in reduced water quality and altered stream hydrology, which could degrade habitat for the Iowa darter downstream of the construction zone.

### **WILDLIFE REFUGES**

All of the build alternatives would be within a 300-foot right-of-way corridor along the eastern boundary of the Rocky Flats National Wildlife Refuge. In the Rocky Flats National Wildlife Refuge Comprehensive Conservation Plan and Environmental Impact Statement (USFWS, 2004a), the USFWS determined that the transfer of a 300-foot-wide corridor designated for transportation improvements would not adversely affect the management of the refuge.

While none of the build alternatives would directly affect refuge resources, they do have the potential to result in indirect effects. Adjacent soil disturbance could exacerbate existing problems with noxious weeds at Rocky Flats National Wildlife Refuge, which could further impact native plant communities and wildlife habitat throughout the Refuge. A larger or faster roadway along the Indiana Street corridor would increase the barrier effect for a variety of wildlife species, although improved culverts at Woman Creek (all build alternatives) and Walnut Creek (Regional Arterial Alternative) would allow for passage of smaller mammals. Although not designed specifically for wildlife movement, a bridge at Walnut Creek (Freeway Alternative, Tollway Alternative, and Combined Alternative [Recommended Alternative]) would allow for elk and deer passage. Increased noise and light along the Indiana Street corridor could disturb or alter the behavior and productivity of some wildlife species on the Refuge. These indirect effects would be focused on the eastern boundary of Rocky Flats National Wildlife Refuge and would not impair its use or management as a wildlife refuge.

Broomfield's Great Western Reservoir Open Space would be affected by three of the four build alternatives. As previously described, about 12 acres of black-tailed prairie dog colonies in the area would be impacted by construction of a new stretch of roadway in all but the Regional Arterial Alternative. These impacts would reduce the acreage available for relocating prairie dogs, but the remaining area would remain capable of supporting viable prairie dog colonies and would not be affected. Broomfield would continue to manage the site as a black-tailed prairie dog relocation area.

The build alternatives would have no direct impact on Two Ponds National Wildlife Refuge, Standley Lake Regional Park, or Colorado Hills Open Space.

#### **4.11.2.3 FREEWAY ALTERNATIVE**

Compared to the other build alternatives, this alternative would have the second most impacts to bald eagle winter range (319 acres). Overall prairie dog habitat impacts (104 acres) from the Freeway Alternative would be intermediate between the Tollway Alternative and the Regional Arterial Alternative. The Freeway



Alternative would have the same impacts to prairie dog habitat within three miles of the Standley Lake bald eagle nest as the Tollway Alternative (33 acres), which is lower than the other build alternatives. The Freeway Alternative results in the loss or temporary disturbance of 15 acres of occupied Preble's habitat.

New overpass and bridge structures would improve habitat for aquatic species and amphibians and allow for small mammal passage at Tucker Gulch, Cressman's Gulch, Barbara Gulch, Big Dry Creek, Van Bibber Creek, Woman Creek, and Walnut Creek. Although not designed specifically for wildlife movement, bridges at Big Dry Creek and Walnut Creek would allow for elk and deer passage.

#### **4.11.2.4 TOLLWAY ALTERNATIVE**

The Tollway Alternative would have the greatest direct impacts to bald eagle winter range (351 acres) and prairie dog overall range (120 acres) of all the build alternatives. Impacts to prairie dog habitat within three miles of the Standley Lake bald eagle nest (33 acres) are the same as those for the Freeway Alternative, which are lower than the other alternatives. The Tollway Alternative results in the loss or temporary disturbance of 15 acres of occupied Preble's habitat.

New overpass and bridge structures would improve habitat for aquatic species and amphibians and allow for small mammal passage at Tucker Gulch, Cressman's Gulch, Barbara Gulch, Big Dry Creek, Van Bibber Creek, Woman Creek, and Walnut Creek. Although not designed specifically for wildlife movement, bridges at Big Dry Creek and Walnut Creek would allow for elk and deer passage.

#### **4.11.2.5 REGIONAL ARTERIAL ALTERNATIVE**

The Regional Arterial Alternative would impact 81 acres of remnant tallgrass prairie, which supports sensitive butterfly species, but fewer acres of agricultural and pasture lands than the other alternatives. Overall, the Regional Arterial Alternative would have the least impact on vegetation.

Impacts specific to the Regional Arterial Alternative include the loss or temporary disturbance of:

- 17 acres of Preble's habitat, approximately 2 acres more than the other alternatives
- 52 acres of prairie dog overall habitat, which is the highest of all build alternatives
- 227 acres of bald eagle winter range, which is the least of all build alternatives
- The Regional Arterial Alternative would not impact the prairie dog relocation area at Great Western Reservoir

Because travel speeds on the Regional Arterial Alternative would be lower than for the other build alternatives, the slope, or grade of the road can be steeper. Using steeper road grades generally results in fewer and smaller areas of cut-and-fill slopes. The steeper grades possible in the Regional Arterial Alternative mean that approaches to stream crossings would be steeper and the crossings themselves would be lower and shorter. The lower and shorter crossings would primarily consist of concrete box culverts as opposed to the free-span bridges in the other build alternatives. The smaller stream crossing structures proposed in the Regional Arterial Alternative would provide more limited opportunities for improved stream habitat and wildlife movement relative to other alternatives. Box culverts at Tucker Gulch, Cressman's Gulch, Van Bibber Creek, and Woman Creek would be double-cell, rather than the multi-cell culverts proposed for the other build alternatives. Similarly, the other build alternatives include bridges at Barbara Gulch, Big Dry Creek, and Walnut Creek, whereas culverts are proposed at these locations for the Regional Arterial Alternative. However, as opposed to the other build alternatives, the Regional Arterial Alternative would include the replacement of culverts currently existing under SH 93 with larger box culverts at Leyden Gulch.



#### **4.11.2.6 COMBINED ALTERNATIVE (RECOMMENDED ALTERNATIVE)**

The Combined Alternative (Recommended Alternative) would have the second most impacts to vegetation (775 acres).

The Combined Alternative (Recommended Alternative) would directly impact 272 acres of bald eagle winter range and 35 acres of prairie dog habitat within three miles of the Standley Lake bald eagle nest. This alternative would also impact the Great Western Reservoir prairie dog relocation area. Additionally, the Combined Alternative (Recommended Alternative) would directly impact approximately 116 acres of overall prairie dog habitat, which is nearly as much as for the Tollway Alternative. The Combined Alternative results in the loss or temporary disturbance of 15 acres of occupied Preble's habitat.

New overpass and bridge structures would improve habitat for aquatic species and amphibians and allow for small mammal passage at Tucker Gulch, Cressman's Gulch, Barbara Gulch, Big Dry Creek, Van Bibber Creek, Woman Creek, and Walnut Creek. Although not designed specifically for wildlife movement, bridges at Big Dry Creek and Walnut Creek would allow for elk and deer passage.

#### **4.11.2.7 SUMMARY OF IMPACTS**

Impacts to vegetation; wildlife; and threatened, endangered, and state sensitive species from the No Action Alternative and the build alternatives are described below (see **Table 4.11-5**, **Table 4.11-6**, and **4.11-7**).

Impacts common to all alternatives are presented; impacts from each build alternative are described only if unique to that alternative.



*Table 4.11-5 Summary of Impacts to Vegetation*

Alternatives	Vegetation
No Action Alternative	No change in vegetation communities
All Build Alternatives	All build alternatives would result in the direct loss of habitat, both permanent and temporary, within the construction footprint. In addition to herbaceous vegetation, trees and shrubs likely would be removed during construction. The mixed grass vegetation community would be the most affected by road construction, followed by agricultural and pasture lands.
Freeway Alternative	Impacts to 730 acres of overall vegetation.
Tollway Alternative	Greatest impacts to overall vegetation (776 acres). Greatest impacts to mixed grass prairie (527 acres).
Regional Arterial Alternative	Least impacts to overall vegetation (671 acres). Only alternative that would impact xeric tallgrass prairie (81 acres). Least direct impacts to agricultural and pasture lands (136 acres) and mixed grass prairie (414 acres) compare to the other alternatives.
Combined Alternative (Recommended Alternative)	Impacts to 775 acres of overall vegetation and has the greatest impacts to agricultural and pasture lands (239 acres).
Alternatives	Important Vegetation (Tallgrass Prairie)
No Action Alternative	No change in vegetation communities
All Build Alternatives	—
Freeway Alternative	No impacts to remnant tallgrass prairie. Approximately 15.6 acres of direct wetland impacts.
Tollway Alternative	No impacts to remnant tallgrass prairie. Approximately 15.2 acres of direct wetland impacts.
Regional Arterial Alternative	Only alternative to impact remnant tallgrass prairie (81 acres). Approximately 20.9 acres of direct wetland impacts.
Combined Alternative (Recommended Alternative)	No impacts to remnant tallgrass prairie. Approximately 18.2 acres of direct wetland impacts.
Alternatives	Noxious Weeds
No Action Alternative	No change from current conditions
All Build Alternatives	Potential for acceleration of weed species invasion of mixed grass prairie and agricultural and pasture land areas.
Freeway Alternative	—
Tollway Alternative	—
Regional Arterial Alternative	—
Combined Alternative (Recommended Alternative)	—



*Table 4.11-6 Summary of Impacts to Wildlife*

<b>Alternatives</b>	<b>Big Game</b>
<b>No Action Alternative</b>	Continued expansion of elk and deer to urban areas, resulting in increased wildlife-vehicle collisions and wildlife-human conflicts.
<b>All Build Alternatives</b>	Potential increase in mortality from collisions with vehicles. Further disruption of elk and deer east-west movement at Big Dry Creek near Standley Lake, Van Bibber Creek, and between the foothills and the Fossil Trace Golf Course. In some cases this may reduce collisions with cars. Improved wildlife crossings at Ralston Creek and North Table Mountain.
<b>Freeway Alternative</b>	Same as other build alternatives.
<b>Tollway Alternative</b>	Same as other build alternatives.
<b>Regional Arterial Alternative</b>	Same as other build alternatives.
<b>Combined Alternative (Recommended Alternative)</b>	Same as other build alternatives.
<b>Alternatives</b>	<b>Other Mammals</b>
<b>No Action Alternative</b>	Same as above. No change to wildlife habitat.
<b>All Build Alternatives</b>	Losses of wetlands, riparian, and grassland habitat; disruption of migration, dispersal, and other movement patterns, especially along riparian corridors; and increased mortality from collisions with automobiles. Improved small mammal crossings at Walnut Creek, Woman Creek, Cressman's Gulch, and Tucker Gulch. Improved crossings at Ralston Creek and North Table Mountain. Indirect effects include disturbance from highway lighting and noise; increased levels of ambient air pollution; and habitat degradation.
<b>Freeway Alternative</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would allow for small mammal passage.
<b>Tollway Alternative</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would allow for small mammal passage.
<b>Regional Arterial Alternative</b>	Similar to other build alternatives. Existing culverts would remain at Rock Creek. Larger box culvert installed at Leyden Gulch would allow for small mammal passage.
<b>Combined Alternative (Recommended Alternative)</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would allow for small mammal passage.
<b>Alternatives</b>	<b>Birds</b>
<b>No Action Alternative</b>	No direct impacts or indirect effects. No change to migratory bird or raptor habitat.
<b>All Build Alternatives</b>	Losses of prey-supporting habitat. Loss of nesting, migratory, winter, and year-round habitat. Potential behavioral disturbance induced by encroachment of structures or activities into nesting territory. Migratory bird and raptor surveys to be conducted prior to construction.
<b>Freeway Alternative</b>	Same as other build alternatives.
<b>Tollway Alternative</b>	Same as other build alternatives.
<b>Regional Arterial Alternative</b>	Same as other build alternatives.
<b>Combined Alternative (Recommended Alternative)</b>	Same as other build alternatives.



<b>Alternatives</b>	<b>Reptiles and Amphibians</b>
<b>No Action Alternative</b>	No direct impacts or indirect effects. No change in habitat.
<b>All Build Alternatives</b>	Loss and fragmentation of wetlands, open water, grassland, and shrubland habitat. Measures designed to mitigate effects to wetlands, Ute ladies'-tresses orchid, and Preble's, such as restoration and enhancement of wetland habitat; upgrading of existing culverts; and construction of bridges would also benefit reptiles and amphibians. Potential impacts from contaminants in highway runoff.
<b>Freeway Alternative</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would improve amphibian habitat.
<b>Tollway Alternative</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would improve amphibian habitat.
<b>Regional Arterial Alternative</b>	Similar to other build alternatives. Existing culverts would remain at Rock Creek. Larger box culvert installed at Leyden Gulch would allow for amphibian passage.
<b>Combined Alternative (Recommended Alternative)</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would improve amphibian habitat.
<b>Alternatives</b>	<b>Aquatic Resources</b>
<b>No Action Alternative</b>	No direct impact or indirect effects. No change in aquatic habitat.
<b>All Build Alternatives</b>	Temporary habitat disturbance during the construction phase. Habitat improvements through replacement of many existing culverts with larger culverts, free-spanning bridges, or construction of storm water quality facilities. Potential physical or chemical impacts from roadway runoff; these impacts will be mitigated with stormwater best management practices (BMPs) (see <b>Section 4.8</b> ).
<b>Freeway Alternative</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would improve aquatic habitat.
<b>Tollway Alternative</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would improve aquatic habitat.
<b>Regional Arterial Alternative</b>	Similar to other build alternatives. Existing culverts would remain at Rock Creek. Larger box culvert installed at Leyden Gulch.
<b>Combined Alternative (Recommended Alternative)</b>	Similar to other build alternatives. New overpass and bridge structures at Big Dry Creek and Van Bibber Creek would improve aquatic habitat.



*Table 4.11-7 Summary of Impacts to Threatened, Endangered, and State Sensitive Species*

<b>Colorado Butterfly Plant</b>	
<b>Alternatives</b>	<b>Colorado Butterfly Plant</b>
No Action Alternative	No direct impacts or indirect effects. No change in habitat.
All Build Alternatives	No known populations occur in or near the study area. Pre-construction surveys for Colorado Butterfly Plant recommended at Leyden Gulch east of SH 93, Ralston Creek, and Clear Creek.
Freeway Alternative	Same as other build alternatives.
Tollway Alternative	Same as other build alternatives.
Regional Arterial Alternative	Same as other build alternatives.
Combined Alternative (Recommended Alternative)	Same as other build alternatives.
<b>Ute ladies'-tresses Orchid</b>	
<b>Alternatives</b>	<b>Ute ladies'-tresses Orchid</b>
No Action Alternative	No direct impacts or indirect effects. No change in habitat.
All Build Alternatives	Within one year prior to construction, surveys for Ute ladies'-tresses orchid are recommended at Leyden Gulch east of SH 93, Ralston Creek, and Clear Creek. Direct impacts unlikely assuming that No Work Zones are established where Ute ladies'-tresses orchid populations occur. A downstream population would be indirectly affected if construction permanently changes groundwater or scour patterns
Freeway Alternative	Same as other build alternatives.
Tollway Alternative	Same as other build alternatives.
Regional Arterial Alternative	Same as other build alternatives.
Combined Alternative (Recommended Alternative)	Same as other build alternatives.
<b>Black-footed Ferret</b>	
<b>Alternatives</b>	<b>Black-footed Ferret</b>
No Action Alternative	No direct impacts or indirect effects. No change in habitat.
All Build Alternatives	Assumed absence. No direct impacts or indirect effects. No change in habitat.
Freeway Alternative	Same as other build alternatives.
Tollway Alternative	Same as other build alternatives.
Regional Arterial Alternative	Same as other build alternatives.
Combined Alternative (Recommended Alternative)	Same as other build alternatives.
<b>Preble's meadow jumping Mouse</b>	
<b>Alternatives</b>	<b>Preble's meadow jumping Mouse</b>
No Action Alternative	No direct impacts or indirect effects. No change in habitat.
All Build Alternatives	Approximately 15 acres of known Preble's habitat lost as a result of all the build alternatives except the Regional Arterial Alternative, which would impact approximately 17 acres. Possible increased mortality of individual Preble's during construction. A portion of the impacted areas would be revegetated and restored. Structures specifically designed to facilitate Preble's movement will be incorporated into culvert design as appropriate, culverts upgraded at Walnut Creek and Woman Creek.
Freeway Alternative	Approximately 15 acres of known Preble's habitat lost.
Tollway Alternative	Same as Freeway Alternative.
Regional Arterial Alternative	Greatest impacts to Preble's habitat (17 acres), approximately 2 acres more than the other alternatives.
Combined Alternative (Recommended Alternative)	Same as Freeway Alternative





Alternatives	Bald Eagle
No Action Alternative	No direct impacts or indirect effects. No change in habitat.
All Build Alternatives	Loss or temporary disturbance of 227 acres (Regional Arterial Alternative) to 351 acres (Tollway Alternative) of bald eagle winter range. The footprint of all build alternatives is over one mile from the Standley Lake nest. Loss or temporary disturbance of 33 to 52 acres of prairie dog habitat within a 3-mile radius of the Standley Lake nest. Potential disruption of current bald eagle foraging use of surrounding habitat.
Freeway Alternative	Loss of 319 acres of bald eagle winter range and 33 acres prairie dog habitat within 3 miles of the Standley Lake bald eagle nest. Approximately 12 acres of Great Western Reservoir prairie dog relocation area directly impacted.
Tollway Alternative	Greatest impacts to bald eagle winter range (351 acres). Loss of 33 acres prairie dog habitat within 3 miles of the Standley Lake bald eagle nest. Approximately 12 acres of Great Western Reservoir prairie dog relocation area directly impacted.
Regional Arterial Alternative	Least impacts to bald eagle winter range (227 acres). Greatest loss of prairie dog habitat within 3 miles of the Standley Lake bald eagle nest (52 acres).
Combined Alternative (Recommended Alternative)	Second lowest impacts to bald eagle winter range (272) acres. Impacts 35 acres of prairie dog habitat within three miles of the Standley Lake bald eagle nest, which is only 2 acres more than Freeway Alternative and Tollway Alternative. Approximately 12 acres of Great Western Reservoir prairie dog relocation area directly impacted.
Alternatives	Platte River Species
No Action Alternative	No direct impacts or indirect effects. No change in habitat.
All Build Alternatives	No depletions to South Platte. No direct impact or indirect effects on whooping crane, least tern, Eskimo curlew, piping plover, pallid sturgeon, or western prairie fringed orchid.
Freeway Alternative	Same as other build alternatives.
Tollway Alternative	Same as other build alternatives.
Regional Arterial Alternative	Same as other build alternatives.
Combined Alternative (Recommended Alternative)	Same as other build alternatives.
Alternatives	Species of State Concern
No Action Alternative	No direct impact or indirect effects. No change in habitat.
All Build Alternatives	Loss or disturbance of between 91 acres (Regional Arterial Alternative) and 120 acres (Tollway Alternative) of prairie dog habitat. Direct impacts to Broomfield's Great Western Reservoir prairie dog relocation site. Burrowing owl surveys to be conducted prior to construction. Mitigation measures outlined in <b>Section 4.11.3</b> would be developed for any nesting burrowing owls found as a result of surveys. No direct impacts to sharp-tailed grouse are anticipated. Loss and fragmentation of butterfly-supporting habitat and increased mortality of sensitive butterfly species. Loss or fragmentation of amphibian and reptile habitat and increased mortality from traffic. Stream habitat improved in some places through the replacement of existing culverts with larger culverts or bridges. Potentially degraded Iowa darter habitat downstream of the construction zone; these impacts will be mitigated with stormwater BMPs (see <b>Section 4.8</b> ).



Alternatives	Species of State Concern (continued)
Freeway Alternative	Second lowest impacts to prairie dog habitat (104 acres).
Tollway Alternative	Greatest impacts to prairie dog habitat (120 acres).
Regional Arterial Alternative	Fewest impacts to prairie dog habitat (91 acres).
Combined Alternative (Recommended Alternative)	Second highest impacts to prairie dog habitat (116 acres).
Alternatives	Wildlife Refuges
No Action Alternative	No direct impacts or indirect effects. No change in habitat.
All Build Alternatives	No direct impacts to Rocky Flats National Wildlife Refuges. Indirect effects to Rocky Flats National Wildlife Refuge could include increased infestations of noxious weeds, increased noise and light disturbance, and an increased barrier to wildlife movement eastward. However, the USFWS does not want to encourage the movement of large mammals.
Freeway Alternative	Direct impacts to 12 acres of Broomfield’s Great Western Reservoir prairie dog relocation site.
Tollway Alternative	Direct impacts to 12 acres of Broomfield’s Great Western Reservoir prairie dog relocation site.
Regional Arterial Alternative	No direct impacts to Broomfield’s Great Western Reservoir prairie dog relocation site.
Combined Alternative (Recommended Alternative)	Direct impacts to 12 acres of Broomfield’s Great Western Reservoir prairie dog relocation site.

### 4.11.3 SUGGESTED MITIGATION

This section describes recommendations for reducing or mitigating the build alternatives’ impacts to vegetation and wildlife, and presents possible mitigation opportunities. Whenever possible, mitigation measures to reduce or avoid impacts to wildlife and vegetation have been incorporated into the build alternatives. This includes avoiding sensitive habitat, maintaining the existing alignment, using best management practices to control erosion and improve drainage, promptly revegetating disturbed areas, and installing wildlife-crossing structures. Mitigation measures developed in coordination with the appropriate resource agencies should also be considered.

#### 4.11.3.1 NO ACTION ALTERNATIVE

Activities described under the No Action Alternative would not include mitigation measures specifically directed at impacts to resources addressed in this study. Project-specific mitigation measures could be included for project-specific impacts.

#### 4.11.3.2 MITIGATION MEASURES COMMON TO ALL BUILD ALTERNATIVES

##### VEGETATION

To mitigate for direct impacts to vegetation, all disturbed areas not permanently impacted by the build alternatives should be replanted as soon as possible following construction with drought tolerant, native grasses and wildflowers appropriate for replacement of the impacted vegetation type. A specific native tallgrass vegetation mix should be used in areas of impacted tallgrass prairie. Reestablishing native species as quickly as possible also helps to reduce indirect effects to adjacent undisturbed areas by reducing the establishment and spread of noxious weeds and by reducing erosion. Although specific BMPs to be used in the project area would not be determined until final design, mitigation measures should include (unless more stringent CDOT revegetation guidelines are in place at the time of construction) the following mitigation measures:



- All disturbed areas should be appropriately revegetated with native vegetation, or protected from erosion by erosion control BMPs.
- Site-specific soil amendments should be developed to aid in the successful reestablishment of native vegetation.
- Removed trees and large shrubs should be replaced on a 1:1 basis with native species.
- Where temporary or permanent seeding operations are not feasible due to seasonal constraints (e.g., summer and winter months), mulch and mulch tackifier should be applied to protect soils from erosion.
- Erosion control blankets should be used on steep (3:1 or greater), newly seeded slopes to control erosion and to promote the establishment of vegetation.
- To prevent trapping birds and other animals, the netting of temporary erosion control blankets should consist of natural fibers.
- Work areas should be limited as much as possible to minimize construction impacts to vegetation.

Mitigation measures designed to address specific vegetation communities as they relate to other biological resources are presented below.

#### **NOXIOUS WEEDS**

Prior to construction, all appropriate weed surveys of the project area should be conducted and a Noxious Weed Management Plan approved by CDOT should be implemented. Mapping and management should include species on Colorado lists A and B, the CDOT list, and county lists (Colorado Department of Agriculture, 2005; CDOT 2006). Beyond normal BMPs, such as native seeding and use of certified weed-free mulch, no additional control efforts would need to be implemented for List C species.

#### **GENERAL WILDLIFE**

The construction of crossing structures designed to maintain or improve wildlife movement corridors would minimize impacts to elk and deer. The Ralston Creek corridor, for example, provides an excellent opportunity for this type of mitigation. Currently, Ralston Creek passes under SH 93 through a culvert that is adequate for the passage of flows from Ralston Creek, but creates a barrier for wildlife. The build alternatives would include the construction of 500-foot-long bridges for the northbound and southbound lanes, which would be 70 to 90 feet above the existing creek. The existing SH 93 alignment would be rebuilt on a new bridge structure spanning about 200 feet. Approximately 20 feet of earth would be removed below the existing grade to allow for wildlife crossing.

Specific designs for improved wildlife crossings should be developed during final design of the recommended alternative, but possible mitigation measures and recommendations for the design of elk and deer crossing structures are summarized below.

To maximize use of movement corridors by wildlife, bridge spans and culverts should have the following features:

- A minimum height of 6 feet.
- A minimum “openness ratio” of 0.75. The openness ratio is defined as the height of the structure multiplied by the structure width and divided by the structure length.
- Shrubs, vegetative cover, and fencing placed at bridge underpass openings to attract wildlife and provide a funnel effect.
- For structures that periodically convey water, such as those at Leyden Gulch and Ralston Creek, ledges or shelves to provide passage alternatives during high water.
- Separate crossings for recreation trails and wildlife to avoid human disturbance to wildlife.
- Lighting designed to avoid illuminating bridge or culvert openings.



- Minimal roadside vegetation.
- Measures in place to reduce traffic noise.

The wildlife corridor northwest of North Table Mountain does not occur along a large drainage, ridgeline, or other topographic feature and construction of a bridge or culvert at this location would be more difficult than at other wildlife corridors. The build alternatives include plans for bridges for both the northbound and southbound lanes to accommodate wildlife movement to and from North Table Mountain. The bridges would span a small drainage east of existing SH 93. The spans would be approximately 200 feet and the openings between the bottoms of the bridges to the ground would be about 15 to 20 feet. Agency wildlife specialists have raised concerns about the presence of a proposed water quality detention facility and a frontage road to the east of the alignments that may hinder movement of deer and elk. These concerns should be considered prior to construction.

Fencing a minimum of 8-feet high should be erected to minimize vehicle collisions with wildlife, especially elk and deer. The location and extent of the fencing would be determined during final design and in consultation with CDOT and CDOW habitat biologists. Structures such as one-way ramps would be placed at regular intervals along the corridor to allow animals that may get inside the fence to exit the road corridor. Measures would be taken to ensure that fences are maintained.

To reduce human-wildlife conflict, wildlife use of the movement corridor at Kinney Run to the Fossil Trace Golf Course would be discouraged. Designing an underpass that would deter elk and deer movement eastward, while allowing them to return to the west side of the roadway, would minimize movement to the golf course and reduce wildlife/vehicle collisions.

Structures built to maintain elk and deer movement corridors and to minimize movement across the roadway would also benefit other mammals. Mesh fencing could overlay the lower portions of the wildlife fencing to direct smaller species to wildlife crossings and prevent them from crossing roadways, reducing the risk of mortality.

Mitigation measures such as constructing culverts with features to ensure dry passage opportunities, such as shelves or parallel culverts, would benefit small mammals. Opportunities for the installation of such features are provided at the Walnut Creek, Woman Creek, Rock Creek, Ralston Creek, and Leyden Gulch crossings. Specific mitigation measures for impacts to small mammals would be developed in coordination with CDOT and CDOW wildlife biologists.

To reduce visual impacts on wildlife from the build alternatives, final designs should include lighting plans that minimize glare and illumination beyond the right-of-way.

## **BIRDS**

Migratory birds and their eggs and nests are protected under the Migratory Bird Treaty Act (MBTA). With the exception of house sparrow, rock dove (common or feral pigeon), and European starling, all wild birds commonly found in the United States are protected by the MBTA, even species such as magpie and great horned owl that tend to be present throughout the year. All active nests are protected, including those in the trunks of trees, on the ground, and underground.

To avoid impacting active migratory bird nests, construction activities and vegetation removal should be conducted outside of the breeding season (April 1 to August 31), whenever possible. If construction must occur during the breeding season, nest surveys should be conducted, and nesting deterrents, such as netting under bridges and culverts, should be installed before April 1, prior to construction and nesting. If active nests are found during pre-construction surveys, they should be left undisturbed and No Work Zones should be established around the nests until the breeding season is over or until fledging has occurred.

CDOW has developed recommended buffer zones and seasonal restrictions for disturbance within certain distances of nest sites of several raptor species (Craig, 2002). The USFWS typically considers implementing the CDOW buffers and seasonal restrictions for raptors as compliance with the MBTA.



A raptor nest survey should be conducted prior to construction to identify those near the build alternatives. Once nests have been identified, CDOT, CDOW, and USFWS would assess which nests would be directly impacted by removal and which nests would likely be rendered unproductive because of the proximity of the proposed improvements. The assessment of nest productivity would take into account circumstances such as landforms and surrounding land uses that might warrant making nest-specific modifications to buffer distances. Construction within buffers would be limited to non-nesting seasons. If disturbing raptor nests is unavoidable, mitigation measures should include constructing artificial nests in suitable habitat or enhancing prey habitat. For nests vulnerable to disturbance, mitigation measures such as the construction of alternative nest sites should be implemented prior to construction. When possible, alternative nest sites should be located in the same nesting territory. Specific mitigation measures for impacts to nesting raptors should be developed in coordination with the CDOW and the USFWS prior to construction.

In addition to mitigation measures associated with raptors, CDOT policy on other migratory birds should be implemented prior to construction. According to CDOT guidelines, project activity should be avoided during the breeding season, defined as:

- The earliest known date, based on eyewitness or the Colorado Breeding Bird Atlas (most recent edition, currently 1998) information of nest construction and the latest known date of fledged young of the species assumed to be present; or
- In the absence of survey or habitat information, between April 1 and August 31.

Installing nesting deterrents to prevent nesting before April 1 and removing the deterrents no more than 24 hours before starting construction, is an acceptable alternative to prohibiting construction activity during the breeding season.

#### **REPTILES/AMPHIBIANS**

Mitigation measures described for wetlands and small mammals, such as mitigating wetland impacts on site when possible and accommodating small mammal movement with culverts and bridges would also benefit reptiles and amphibians. Additionally, mesh fencing overlaying the lower portions of the wildlife fencing would minimize the number of reptiles and amphibians crossing roadways. Measures should be implemented to minimize and avoid impacts to water quality, which would reduce potential impacts to amphibians.

#### **AQUATIC RESOURCES**

To offset temporary impacts to aquatic species from habitat disturbance, aquatic habitats would be restored following construction. Incorporating the following design measures would mitigate potential impacts to aquatic species, including native fish:

- Maintaining riffle and pool complexes
- Maintaining natural stream bottoms
- Burying culverts partially below grade and covering the bottoms with gravel or sand
- Minimizing the slope of culverts
- Increasing culvert size wherever possible
- Installing culverts without teeth or any other features that would impede fish movement

To avoid siltation and sedimentation caused by erosion of disturbed soil, erosion control measures should be implemented, such as immediately reseeding disturbed areas after construction and, if necessary, applying mulch and mulch tackifier to stabilize slopes.

CDOT's water quality BMPs should be applied and would include installing mechanisms to collect, contain, and treat roadway runoff prior to discharge. Mitigation measures designed to offset impacts to wetlands and Preble's, including habitat replacement and enhancement and replacing existing culverts with larger or more numerous culverts or bridges, would also improve fish habitat.



## **THREATENED AND ENDANGERED SPECIES**

### **Colorado Butterfly Plant**

Potential Colorado butterfly plant habitat within the construction footprint, including Leyden Gulch east of SH 93, Ralston Creek, and Clear Creek should be surveyed during the flowering season just prior to construction. In the unlikely event Colorado butterfly plant is found within the construction footprint, specific conservation measures should be developed in coordination with the USFWS. Conservation measures could include avoiding impacts by establishing a No Work Zone or, in the event of unavoidable impacts, enhancing adjacent or off-site habitat.

### **Ute ladies'-tresses Orchid**

Potential Ute ladies'-tresses orchid habitat within the construction footprint including Walnut Creek, Woman Creek, Big Dry Creek, Ralston Creek, Van Bibber Creek, Clear Creek, and Leyden Gulch should be surveyed according to USFWS protocol during the flowering season just prior to construction. If Ute ladies'-tresses orchid is found within the footprint, specific conservation measures should be developed in coordination with the USFWS. Conservation measures could include avoiding impacts by establishing a No Work Zone or, in the event of unavoidable impacts, enhancing an adjacent or off-site habitat. Potential indirect effects to downstream populations should be avoided by designing project elements to maintain existing groundwater and stream flow conditions.

### **Bald Eagle**

For unavoidable impacts to bald eagle foraging areas in black-tailed prairie dog colonies, individual prairie dogs should be relocated when possible.

An alternative to relocating prairie dogs from impacted areas to non-impacted habitat could be to enhance habitat for alternative bald eagle prey species such as rabbits, waterfowl, and fish. Given the difficulty in finding available prairie dog relocation sites, and the effect of plague on the reliability of prairie dogs as a prey source, this approach may be more beneficial to bald eagles in the long term.

Lighting plans should be developed during final design to reduce the impacts of roadway lighting on the nest and, where practical, berms would be used to screen the roadway.

### **Preble's meadow jumping Mouse**

A number of conservation measures should be implemented during final design to minimize impacts to Preble's and to enhance or create habitat. Design measures to minimize impacts include developing a lighting plan to avoid and minimize lighting glare and illumination beyond the right-of-way in Preble's habitat, designing drainage crossings with the smallest footprint of disturbance possible, and accommodating Preble's movement in drainage crossing designs in known occupied and high-potential habitats.

CDOT should also employ measures to minimize impacts to known occupied habitat during construction such as stockpiling construction materials in bare areas where possible, rather than on top of existing vegetation; informing construction workers why it is important to limit impacts to vegetated habitat outside of the work area; and supervising work on a daily basis to ensure compliance with mitigation.

Specifics of the conservation measures should be developed in coordination with the USFWS during final design and prior to construction. Documentation of the final conservation measures should include plans and specifications for creation/enhancement of Preble's habitat.



## SPECIES OF STATE CONCERN

### **Black-tailed Prairie Dog**

In areas where avoidance of prairie dog colonies is not possible, suitable prairie dog relocation sites should be indentified and approved removal methods should be coordinated with CDOW (CDOT, 2005). To help determine adequate mitigation measures, an assessment of habitat quality and number of individual prairie dogs should be conducted for prairie dog colonies that would be directly impacted by construction. Prairie dogs would only be removed in areas where they might be directly impacted. Prairie dogs would likely recolonize some areas temporarily disturbed during construction.

### **Burrowing Owl**

Prairie dog colonies should be surveyed for burrowing owls prior to any work that would disturb them between March 1 and October 31. Prairie dog removal and construction should be scheduled to occur outside the burrowing owl breeding season. If burrowing owls were found within the construction footprint, nests should be left undisturbed during construction.

### **Butterflies**

No mitigation measures are specifically recommended for state-listed butterflies; however, implementing BMPs such as using native seed mixes including grasses and forbs commonly occurring in butterfly habitat to revegetate areas disturbed as a result of construction would help minimize impacts to these butterflies. Additionally, as outlined in the Colorado Short Grass Prairie Initiative, retaining or restoring historic water regimes in conjunction with wetland mitigation would be beneficial for state-listed butterflies.

### **Reptiles and Amphibians**

Wetlands, Ute ladies'-tresses orchid, and Preble's impact mitigation measures, including habitat replacement/enhancement and the replacement of existing culverts with larger or more numerous culverts or with bridges, would also mitigate potential impacts to sensitive reptiles and amphibians. If possible, installing mesh fencing on the lower portions of elk and deer fencing would reduce the numbers of reptiles and amphibians crossing roadways.

## 4.11.4 SUMMARY

Because of its location at the interface of the foothills and the plains, the study area contains a variety of important plant and animal communities, including populations of three species listed as threatened under the Endangered Species Act. As a result, alternatives that include improvements to existing roads or construction of new road alignments would have a greater impact on vegetation; wildlife; and threatened, endangered, and state sensitive species than would a similar project in a more developed or less diverse part of the Denver metropolitan area.

The build alternatives evaluated in this study would generally have the same types of direct impacts and indirect effects on plant and animal resources. There is no build alternative that would have substantially greater impacts on most natural resources than the other build alternatives. There are some differences in magnitude of impacts to specific resources between the build alternatives, but they do not substantially differentiate the alternatives. The Regional Arterial Alternative would impact the least acres of vegetation in general, but would be the only build alternative to impact remnant tallgrass prairie. The Regional Arterial Alternative would also impact the most acres of Preble's meadow jumping mouse habitat, but it would have the least impact on overall black-tailed prairie dog habitat. The Tollway Alternative would have the most impact to bald eagle winter range and overall black-tailed prairie dog habitat. Because of their similar impacts, the suggested mitigation measures would be similar for all build alternatives.

Even with mitigation measures, the build alternatives and associated cumulative effects would result in long-term changes in elements of the plant and animal resources in the study area by changing dispersal patterns, creating environments more favorable to some species than to others, and enlarging the footprint of the human environment.



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