



US 36 CORRIDOR
Environmental Impact Statement

**BIOLOGICAL RESOURCES TECHNICAL
REPORT**

November 12, 2004

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US 36 Corridor

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US 36 CORRIDOR
Environmental Impact Statement

1.0 INTRODUCTION

This section addresses vegetation, wildlife, sensitive habitats, noxious weeds, fisheries and aquatic habitat, and special status species (threatened, endangered, and sensitive species). Two federally listed threatened species and rare natural communities (tallgrass prairies) occur east of Boulder and are the most important biological resources affected by the project. Other important resources are more widely distributed within the project area and include riparian woodland and riparian shrub habitat, prairie dog towns, and wildlife corridors.

Biological resources are managed under a number of laws and regulations. Regulations relevant to this project include the following:

- The National Environmental Policy Act of 1969 (NEPA) requires that federal agencies consider impacts to the environment, including biological resources, prior to approval or funding of any activity.
- The Endangered Species Act protects listed threatened or endangered species. Under Section 7 of the Act, the federal government is forbidden to take any action that is likely to jeopardize a listed species or to degrade its critical habitat.
- The Colorado Division of Wildlife (CDOW) has also established a list of state threatened or endangered species.
- The Fish and Wildlife Coordination Act requires early coordination with federal and state wildlife agencies for any project involving stream channel modifications.
- Management of noxious weeds is required under Federal Executive Order 13112 Invasive Species, State of Colorado Executive Order D 006 99-Development and Implementation of Noxious Weed Management Programs, and the Colorado Noxious Weed Management Act (Colorado Regulatory Statutes [CRS] 35-5.5-101-119 C.R.S (2003).
- Colorado Senate Bill 40 requires that CDOT consult with the Colorado Division of Wildlife on any project affecting CDOW jurisdictional streams, their banks, or tributaries.
- The Migratory Bird Treaty Act prohibits destruction or disturbance of active nests, egg, and young birds. This act applies to nearly all wild bird species, including raptors, waterfowl, rare and sensitive species, and neotropical migrants. Executive Order 13186 directs federal agencies to take certain actions to implement this act.
- Bald and golden eagles and their nests are protected under the Bald Eagle Protection Act
- Wetlands and other Waters of the US are protected under Section 404 of the Clean Water Act, and impacts must be avoided, minimized, or mitigated.

The following sections present a description of the existing biological resources of the study area, an analysis of impacts for each of the project packages (alternatives), as well as recommended mitigation to minimize impacts. The study area for the affected environment includes all lands within 3 miles of any of the alignment alternatives. Impacts are assessed for areas that will be



directly affected by the project or which are adjacent to it, or which may be affected indirectly (for example, impacts to aquatic resources downstream from the project area). The affected environment section provides a general description of biological resources, as well as more detailed descriptions of resources that are considered sensitive or that may have more than minor impacts from the project.

2.0 METHODS

Biological resource data were collected from existing sources (maps, databases, publications, and agency information) for all lands within 3 miles of the US 36 and BNSF Corridors (study area). This information was used to provide context and to assist in assessing indirect and cumulative effects. Federal, state, and local agencies that were contacted included the following:

- U.S. Fish and Wildlife Service
- Colorado Division of Wildlife
- Colorado State Parks Department, Natural Areas Program
- Colorado Department of Agriculture, Department of Plant Industry
- Colorado Natural Heritage Program (Colorado State University)
- Boulder County
- City of Boulder Open Space and Mountain Parks
- Denver Parks and Recreation Department, Natural Areas Program
- City of Louisville
- City of Westminster
- Jefferson County
- Broomfield County
- Boulder County Nature Association
- The Nature Conservancy

Reconnaissance-level field surveys were conducted in the project area, which includes all areas within 300 feet of proposed facilities, and provide the basis for assessing direct effects. Field studies were conducted by Jeff Dawson and/or Kim Sandoval from May - August 2004, including the following dates:

- | | |
|-------------------------------|---|
| April, 8, 9, 15 | Raptor nest surveys, habitat reconnaissance |
| May 12, 17-20, 24, 28, June 2 | Walk BNSF corridor to map riparian areas and prairie dog towns, record noxious weed occurrences by segment, evaluate habitats for threatened or endangered species, and evaluate wildlife crossings and corridors |

- | | |
|------------------|---|
| June 3, 4, 9, 10 | Walk/drive US 36 corridor, same activities |
| July 2 | Walk/drive new areas associated with intersections, same activities |
| July 15 | Visit station locations, same activities |
| August 4 | Evaluate occurrence of two federally threatened plant species and locations of mid-grass and tall grass prairie |
| August 18 | Visit Colorado butterfly plant occurrence with FWS and Westminster Open Space personnel |

Impacts were assessed by comparison of the activities and footprint of each of the alternatives to the biological resources described under the Affected Environment section. Direct impacts were quantified where possible by measuring acres of habitat loss within the footprint of the proposed facilities using GIS overlays. Other impacts that cannot be quantified, including indirect impacts, are described in terms of their mode of action and relative importance. Impacts are described by timing (construction versus operation), mode of action (direct/indirect), and duration of impact (short-term/long-term, where long-term means more than 3 years). The proposed mitigations are based on project-specific impacts, standard methods used by CDOT and other agencies to mitigate impacts, and actions recommended by wildlife management agencies and organizations.

3.0 AFFECTED ENVIRONMENT

3.1 VEGETATION

The study area is located at the western edge of the Great Plains. The natural vegetation of the area includes native prairie and riparian vegetation on the plains, and foothills and mountain grassland, xeric (dry) upland shrub, and ponderosa pine in the foothills west of Boulder. Most of the study area is occupied by agricultural land (irrigated or dryland) and by urban and developed areas in Denver, Boulder, Arvada, Broomfield, Westminster, Superior, Louisville, Lafayette and other communities. Narrow banks of riparian vegetation are present along a number of small streams and portions of the South Platte River. Wetlands also occur in many areas, and are described and evaluated in the Wetlands section.

A map of the general vegetation types within the study area was prepared using existing GIS data obtained from the Colorado Natural Diversity Information Source (NDIS 2004), including the Colorado Gap Analysis Land Cover Map for upland vegetation, and the CDOW Riparian and Wetland maps for riparian areas. URS biologists updated the habitats identified by Gap Analysis Map in the project to account for conversion of open lands to urban areas after the maps were GAP analysis maps were prepared. Additionally, URS biologists conducted field observations in the spring and summer of 2004 to map riparian woodland, riparian shrubland, and native prairie habitats in and adjacent to the areas of direct impact under the various alternatives.

The distribution of vegetation communities is presented in Plate 1, and is summarized in Table 3-1. The following descriptions of vegetation types are primarily taken from City of Boulder (2004) and NDIS (2004).

TABLE 3-1: DISTRIBUTION OF VEGETATION TYPES IN THE US 36 STUDY AREA

Segment	Primary Upland Vegetation Types	Primary Riparian Areas
Denver	Urban	South Platte River
Adams County	Urban	Clear Creek
Westminster	Urban, some irrigated and dryland agriculture	Big Dry Creek, Walnut Creek
Broomfield	Urban, some irrigated and dryland agriculture	None
Superior/Louisville	Urban, irrigated agriculture, native prairie	Rock Creek, Coal Creek
Boulder	Mostly urban, irrigated agriculture, and native prairie. Ponderosa pine, xeric upland shrub, foothills and mountain grassland occur only along foothills west of Boulder.	South Boulder Creek, Boulder Creek, Fourmile Canyon Creek, many ditches

Native Prairie. Native prairie occurs primarily south of US 36 and west of Superior and Broomfield, and in the area north of Boulder in the vicinity of Mesa Reservoir, in Segments 4, 5, and 6. Most of the native prairie is midgrass prairie comprised of a mix of tall, mid, and short grass dominant species. Common species are little bluestem (*Schizachyrium scoparium*), western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), side-oats grama (*Bouteloua curtipendula*), and needle



and thread grass (*Hesperostipa comata*). Some portions of the native prairie are dominated by tall grass species. Tall grass prairies are considered to be rare in Colorado and are of local, statewide, and global significance. Locally, tall grass prairie represents a relatively small portion of the project area associated only with the South Boulder Creek drainage. Irrigated or sub-irrigated tallgrass areas within the South Boulder Creek floodplain are dominated by big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), yellow Indian grass (*Sorghastrum nutans*) and prairie cordgrass (*Spartina pectinata*). Little bluestem, big bluestem, side-oats grama, blue grama, and several dropseed species (*Sporobolus* sp.) are common in the xeric tallgrass areas. Wildlife that occurs in association with tallgrass prairie includes special status butterflies and birds such as grasshopper sparrow.

Foothills and Mountain Grassland. A relatively small parcel of foothills/ mountain grassland is located at the base of the Flatirons rock formations southwest of the Boulder urban area, in Segment 6. This grassland community is dominated by fescue species (*Festuca arizonica*, *F. thurberi*, and *F. idahoensis*), mountain muhly grass (*Muhlenbergia montana*), poverty oatgrass (*Danthonia parryi*) and sedge species (*Carex rossii* and *C. geyeri*). Other species include Gambel oak (*Quercus gambelii*), Rocky Mountain juniper (*Juniperus scopulorum*), yucca (*Yucca glauca*), and prickly pear (*Opuntia* spp.)

Xeric Upland Shrub. This type only occurs at the western edge of the study area in Segment 6. The xeric upland shrub community is dominated by mountain mahogany (*Cercocarpus montanus*). Other common species found within this community include: chokecherry (*Prunus virginiana*), common juniper (*Juniperus communis*), wax currant (*Ribes cereum*), Oregon grape (*Mahonia repens*), and kinnikinnick (*Arctostaphylos uva-ursi*).

Ponderosa Pine. The ponderosa pine community only occurs in the study area in the foothills west of Boulder in Segment 6. This community is dominated by non-logged ponderosa pine (*Pinus ponderosa*) forest and woodland. Forest density and understory vegetation is variable and dependent upon, slope, aspect, and elevation, although very dense stands tend to have sparse understory. Common understory species include poverty oatgrass, sunsedge (*Carex pensylvanica beliohila*), blue mist penstemon (*Penstemon virens*), wild onion (*Allium cernuum* and *A. textile*), mountain muhly, blue grama, and several needlegrass species.

Riparian Areas. Riparian habitats are those areas associated with streams and other water bodies that have distinctly different vegetation due to presence of surface or groundwater. Riparian habitats supports a higher diversity of wildlife year-round than any other habitat in the Front Range (Andrews and Righter 1992, NDIS 2004), and many of the species that occur exclusively occupy wetlands or riparian environments. Riparian habitats also provide corridors that link habitat patches and wildlife populations, allowing movement through urban matrix. Riparian habitat represents only about 5% of the land area in Colorado, but supports approximately 75-80% of the wildlife species (NDIS 2004). Riparian areas, especially along the Front Range, are at high risk for loss due to rapid development pressures.

The riparian habitat consists of riparian woodland, riparian shrub, and riparian herb (wetlands or including wetlands). The main riparian habitats along major drainages in the study area are provided in Table 3-2. Detailed maps of the occurrence of riparian habitats are provided at the end of this report, based on field observations in 2004.

TABLE 3-2: RIPARIAN HABITATS ALONG US36 AND BNSF CORRIDORS

Project Segment	Corridor	Name	Riparian Habitats Near Crossing ¹		
			Riparian Woodland	Riparian Shrub	Riparian Herb
Denver	BNSF	South Platte River			X
Adams	BNSF	Fisher Ditch	X	X	
Adams	BNSF	Clear Creek	X	X	X
Adams	BNSF	Little Dry Creek	X		X
Westminster	US 36	Niver Canal and Farmers Highline Canal	X		
Westminster	US36	Big Dry Creek	X	X	X
Westminster	BNSF	Big Dry Creek	X		X
Westminster	BNSF	Walnut Creek	X		X
Superior-Louisville	US36	Rock Creek			X
Superior-Louisville	BNSF	Rock Creek	X		X
Superior-Louisville	US 36	Coal Creek	X	X	X
Superior-Louisville	BNSF	Coal Creek	X	X	X
Boulder	US 36	South Boulder Creek	X		X
Boulder	BNSF	South Boulder Creek	X		X
Boulder	BNSF	Boulder Creek	X		X
Boulder	BNSF	Goose Creek			X
Boulder	BNSF	Wonderland Creek	X		
Boulder	BNSF	Fourmile Canyon Creek	X		

NOTES:

¹Riparian habitats within 500 feet of centerpoint of crossing.

BNSF=Burlington Northern Santa Fe Railroad

Riparian Woodland. Riparian woodland habitat in the project area is generally dominated by cottonwood forest. Native riparian cottonwood habitat is a diminishing resource in the Front Range. It provides important wildlife habitat to raptors and small mammals, and as a result of land-use changes, native cottonwood habitat is being replaced by Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix ramosissima*) species throughout the West.

Native low-elevation riparian woodlands are dominated plains cottonwood (*Populus deltoides*), peach-leaved willow (*Salix amygdaloides*), and box elder (*Negundo aceroides*). Non-native, invasive species such as Russian olive, Siberian elm (*Ulmus pumila*), and green ash (*Fraxinus pennsylvanica*) are very common and are increasing. Other non-native species present includes crack willow (*Salix fragilis*). Foothill streams west of Boulder support water birch (*Betula occidentalis*), aspen (*Populus tremuloides*), and Douglas fir (*Pseudotsuga menzeisii*).

Based on the classification in the *Field Guide to the Wetland and Riparian Plant Associations of Colorado* (Carsey et al. 2003), the primary cottonwood types are plains cottonwood/smooth brome woodland,

plains cottonwood/wooly sedge woodland, and plains cottonwood-(peachleaf willow)/sandbar willow woodland. Information provided by CDOW Gap and Riparian Maps distinguished between cottonwood riparian forest and other riparian woodland. However, based on field observations, URS biologists categorized all cottonwood riparian forest and other riparian woodland habitats as riparian woodland due on the diversity of tree species at each riparian habitat.

Riparian Shrub. Shrub thickets along streams and creeks make up this community. The most common riparian shrub species in the project area is sandbar willow (*Salix exigua*). Most areas are dominated by sandbar willow, and are in the sandbar willow/barren ground shrubland or sandbar willow/mesic graminoid shrubland riparian associations (Carsey and others, 2003). Other Front Range riparian shrub species include leadplant (*Amorpha angustifolia*), hawthorn (*Crataegus macracantha* and *C. erythropoda*), skunkbrush (*Rhus trilobata*), snowberry (*Symphoricarpus occidentalis*) and chokecherry (*Prunus virginiana*). Most areas are dominated by sandbar willow, and are in the sandbar willow/barren ground shrubland or sandbar willow/mesic graminoid shrubland riparian associations (Carsey and others, 2003). Riparian shrub habitat supports Preble's meadow jumping mouse, a federally listed threatened species.

Riparian Herb. Riparian herb communities vary in composition depending upon the local hydrology and site history. They include mesic (moist) meadows, wet meadows, and marshes. Wet meadows and marshes are dominated by species such as cattails (*Typha* spp.), sedges (*Carex* spp.), rushes (*Juncus* spp.), creeping bentgrass (*Agrostis alba*), reed canarygrass (*Phalaris arundinacea*), and are described in greater detail in the Wetlands section. Moist and dry areas are dominated by mostly non-native grasses and forbs, such as smooth brome (*Bromus inermis*), timothy (*Phleum pratense*), Kentucky bluegrass (*Poa pratensis*), quackgrass (*Elymus repens*), Canada thistle (*Cirsium arvense*), and Indian hemp (*Apocynum cannabinum*). Many of these species are non-native and invasive.

Dry Land Cropland. This community includes non-irrigated croplands, dry land improved pastures, fallow lands, rural development, ranch and farm facilities and shelter belts. Common species found in this community include small grains, wheat, barley, and rye (NDIS 2004). This community is found in the central portion of the project area, in the rural areas within and surrounding the cities of Westminster and Broomfield, in Segments 3 and 4. A portion of dry lands crop community is also located northeast of Boulder near SH 119 and SH 52 in Segment 6.

Irrigated Cropland. The irrigated crop community includes any irrigated agricultural area including associated farm or ranch facilities. Row crops are common to this community, and species such as corn and beans are typical. Irrigated pastures and hayfields are also common within this community. Irrigated croplands are generally found in the northern half of the project area, surrounding much of the cities of Boulder, Louisville, Lafayette, and Broomfield, in Segments 4, 5, and 6.

Urban or Built-up Land. This cover type includes cities, towns, moderate- to high-density residential areas, shopping centers, industrial and commercial complexes, and transportation, utility, and communication facilities. Much of the land is non-vegetated and covered by structures or pavement. Vegetation in urban areas typically consists of street trees and shrubs, residential lawns, irrigated turf, and small landscaped areas consisting of both native and non-native, ornamental plant species. Urban or built-up land occupies the majority of the southern portion of the study area (Denver through Broomfield), as well as Superior- Louisville and Boulder segments.

Surface Water. The study area includes a large number of ponds and lakes, of which the largest are Boulder Reservoir, Valmont Reservoir, Baseline Reservoir, and Marshall Lake in the Boulder segment, and Standley Lake in the Westminster segment. Many of these water bodies support wildlife species, including fish and waterfowl.

3.2 WILDLIFE

3.2.1 General Wildlife Habitats

The vegetation communities described in Section 3.1 Vegetation, provide habitats for a variety of wildlife. Each of the habitat types is discussed here in the context of wildlife that occurs within them. Grazing, farming, recreation, urban and suburban development, roads, and water development and management affect the quality of habitat and diversity and abundance of wildlife in the project area. Plate 1 shows locations of these habitats within the project area, and Table 3-3 identifies common species associated with each habitat.

Native Prairie. Native prairie occurs primarily in Segments 4, 5, and 6. The majority is mostly mid-grass prairie, though a small portion in South Boulder is tallgrass. Tall grass prairies are significant due to their scarcity and wildlife that occur in association with them, which includes butterflies and birds, such as grasshopper sparrow. Black-tailed prairie dogs inhabit native prairie and a variety of other species can be found in association with prairie dog colonies. In summer, the greatest diversity of birds utilizes native prairie, these species include horned lark, western meadowlark, Swainson's hawk, and around prairie dog towns - ferruginous hawk, bald eagles (in winter) and burrowing owls (Andrews and Righter 1992). Grasslands provide cover for ground-nesting birds for protection while nesting and rearing young.

Foothills and Mountain Grassland. Foothills and mountain grassland occurs in Segment 6 at the base of the Flatirons rock formations in southwest Boulder. A variety of wildlife occupies this habitat including bear, mountain lions, mule deer, elk, birds, raptors, rodents, and lagomorphs, among others. Many species of rodents inhabiting grassland areas live underground such as mice, voles, gophers, and ground squirrels.

Xeric Upland Shrub. This habitat occurs in Segment 6 on the western border of the project area, west of US 36. The xeric upland shrub habitat provides food resources and cover for a variety of birds, which feed on the foliage and fruit of juniper, chokecherry, and currants.

Ponderosa Pine. Ponderosa pine woodland occurs only in Segment 6 in the foothills west of Boulder. This area is fairly open ponderosa pine woodland that provides food and shelter for bats, chipmunks, squirrels, and porcupines (Fitzgerald et al. 1994). A variety of birds utilize ponderosa pine forest including pygmy nuthatch, Stellar's jay, western bluebird, chipping sparrow, and wild turkeys, among others (Andrews and Righter 1992).

Riparian Areas. Riparian and wetland habitats occur along the majority of creeks and rivers within the project area. Riparian habitat supports higher diversity of the wildlife year-round than any other habitat in the Front Range (Andrews and Righter 1992, NDIS 2004), and many of the species that



occur exclusively inhabit wetlands or riparian environments. In the essentially urbanized US 36 project area, riparian habitats provide corridors that link habitat patches and wildlife populations, and allowing movement through the urban matrix. Cottonwood trees and willow shrub dominate this habitat, though other trees and shrubs commonly occur along rivers, creeks, and streams.

Riparian habitat is important for breeding birds such as screech owls, great horned owl, red-headed woodpecker, northern flicker, orioles, as well as many migrating species, which use riparian corridors to travel through (Andrews and Righter 1992). Mammals inhabiting riparian areas include white-tailed deer, raccoons, eastern cottontail, fox squirrel, beaver, muskrat, mice, and voles (Fitzgerald et al. 1994). A federally threatened species, Preble's meadow jumping mouse (*Zapus hudsonius preblei*) inhabits the riparian habitats in Segments 4, 5, and 6 within the project area. In general, small mammal diversity is low in areas adjacent to developed areas. Additionally, fish, reptiles, and amphibians occur most frequently in riparian habitats and include northern leopard frogs and garter snakes.

Urban or Built-up Land. Segments 1, 2, 3, and 4 are the most densely developed segments, though each of the six segments within the project area has been developed for residential and commercial use. Many residential areas were constructed within the past 10 years. While development destroys natural wildlife habitat and displaces wildlife, some species are highly adaptable or prefer human altered environments. Wildlife generally can be found in and near street trees and shrubs, residential lawns, irrigated turf, and landscaped areas. The segments in the southern half of the study area (Denver through Broomfield), as well as the cities of Superior-Louisville, and Boulder are primarily urban.

Species observed in urban habitats include raccoon, red fox, coyote, American robin, northern flicker, mourning dove, common grackle, and house finch and non-native birds such as rock dove, European starling, and house sparrow. Canada geese utilize golf courses, parks, and riparian areas within urban zones (Andrews and Righter 1992).

Open Water. Open water areas, comprised of lakes, ponds, rivers, and streams, are distributed throughout the study area and shown in Plate 5. These areas provide important habitat for fish and amphibians, and foraging habitat for waterfowl, raptors, and other birds.

Dry and Irrigated Cropland. Dry croplands are found in Segment 3 and 4, in the rural areas within and surrounding the cities of Westminster and Broomfield. A portion of dry lands crop community is also located northeast of Boulder near SH 119 and SH 52 in Segment 6. Dry croplands (non-irrigated - mostly winter wheat), including pastures and fallow fields are used by some birds and terrestrial wildlife including ground-nesting birds, such as western meadowlark, small rodents including mice and gophers, as well as raptors for foraging.

Farmhouses, barns, and windbreaks provide the best habitat for birds in these areas. Mourning doves, western meadowlark, common grackle, horned lark, prairie chickens, ringed-neck pheasant, American kestrels, gulls, as well as non-native birds frequently occur in these areas (Andrews and Righter 1992).

Irrigated croplands consist of row crops, and are generally found in the northern half of the project area, in Segments 4, 5, and 6, within Boulder, Louisville, Lafayette, and Broomfield. Irrigated croplands benefit some species but also reduce or eliminate habitat for other species. Irrigated fields are critical for some species, such as bobolinks, which prefer this habitat for nesting in this part of their range (OSMP 1997). Boulder County OSMP has established agricultural management practices on open space lands to mow after ground-nesting birds are fledged.

TABLE 3-3: COMMON WILDLIFE SPECIES IN US 36 PROJECT AREA

Habitat	Mammals	Birds	Reptiles and Amphibians
All habitats (except water)	Red fox (<i>Vulpes vulpes</i>), Mule deer (<i>Odocoileus hemionus</i> ; urban in Boulder), Little brown bat (<i>Myotis lucifugus</i>), Big brown bat (<i>Eptesicus fuscus</i>)	Mourning dove (<i>Zenaida macroura</i>), American robin (<i>Turdus migratorius</i>), American crow (<i>Corvus racyrhncchos</i>), Black-billed magpie (<i>Pica pica</i>), American kestrel (<i>Falco sparverius</i>)	N/A
Urban/Developed	Raccoon (<i>Procyon lotor</i>) Fox squirrel (<i>Sciurus niger</i>) House mouse (<i>Mus musculus</i>) Norway rat (<i>Rattus norvegicus</i>)	Black-capped chickadee (<i>Parus atricapillus</i>), House finch (<i>Carpodacus mexicanus</i>), House sparrow (<i>Passer domesticus</i>), European starling (<i>Sturnus vulgaris</i>), Rock dove (<i>Columba livia</i>), Northern flicker (<i>Colaptes auratus</i>), Canada goose (<i>Branta canadensis</i>)	N/A
Grassland (includes native prairie, pastures, hay meadows, and open space)	Coyote (<i>Canis latrans</i>), Striped skunk (<i>Mephitis mephitis</i>), Long-tailed weasel (<i>Mustela frenata</i>), American badger (<i>Taxidea taxus</i>), Cottontail (<i>Sylvilagus</i> sp.), Jackrabbit (<i>Lepus</i> sp.), Thirteen-lined ground squirrel (<i>Spermophilus tridecemlineatus</i>), Northern pocket gopher (<i>Thomomys talpoides rostralis</i>), Plains pocket gopher (<i>Geomys bursarius</i>), Deer mouse (<i>Peromyscus maniculatus</i>), Prairie vole (<i>Microtus ochrogaster</i>)	Horned lark (<i>Eremophila alpestris</i>), Western meadowlark (<i>Sturnella neglecta</i>), Red-winged blackbird (<i>Agelaius phoeniceus</i>), Killdeer (<i>Charadrius vociferous</i>), Common grackle (<i>Quiscalus quiscula</i>), Barn swallow (<i>Hirundo rustica</i>), European starling (<i>Sturnus vulgaris</i>), Western kingbird (<i>Tyrannus verticalis</i>), Rock dove, Swainson's hawk (<i>Buteo swainsoni</i>), Rough-legged hawk (<i>Buteo lagopus</i> ; winter), Northern harrier (<i>Circus cyaneus</i>), Red-tailed hawk (<i>Buteo jamaicensis</i>)	Tiger salamander (<i>Ambystoma tigrinum</i>), Plains spadefoot (<i>Spea bombifrons</i>), Woodhouse's toad (<i>Bufo woodhousii</i>), Six-lined racerunner (<i>Cnemidophorus sexlineatus</i>), Bullsake (<i>Pituophis catenifer</i>), Western rattlesnake (<i>Crotalus viridis</i>).
Prairie dog colonies	Same as grassland species above, plus: Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	Grassland species above, plus: Burrowing owl (<i>Athene cunicularia</i>), Ferruginous hawk (winter), Bald eagle (<i>Haliaeetus leucocephalus</i> ; winter), Golden eagle (<i>Aquila chrysaetos</i> ; winter)	Same as grassland species except tiger salamander not present
Riparian and wetland	Raccoon, Long-tailed weasel, Coyote, White-tailed deer (<i>Odocoileus virginianus</i>), Eastern cottontail, Fox squirrel, Beaver (<i>Castor canadensis</i>), Muskrat (<i>Ondatra zibethicus</i>), Meadow vole (<i>Microtus pennsylvanicus</i>), Preble's meadow jumping mouse (<i>Zapus hudsonius preblei</i>), Deer mouse, Porcupine (<i>Erethizon dorsatum</i>)	Red-winged blackbird, American goldfinch (<i>Carduleis tristis</i>), Black-capped chickadee, Song sparrow (<i>Melospiza melodia</i>), Chipping sparrow (<i>Spizella passerine</i>), Downy woodpecker (<i>Picoides pubescens</i>), Bullock's oriole (<i>Icterus bullockii</i>), Belted kingfisher (<i>Ceryle alcyon</i>), Red-tailed hawk, Cooper's hawk (<i>Accipiter cooperi</i>), Great horned owl (<i>Bubo virginianus</i>), Eastern screech owl (<i>Otus asio</i>)	Northern leopard frog (<i>Rana pipiens</i>), Western chorus frog (<i>Pseudacris triseriata</i>), Bullsake, Northern water snake (<i>Nerodia sipedon</i>), Garter snakes (<i>Thamnophis</i> sp.), Tiger salamander, Woodhouse's toad, Bullfrog (<i>Rana catesbeiana</i>)



Habitat	Mammals	Birds	Reptiles and Amphibians
Lakes, ponds, rivers	Muskrat	American avocet (<i>Recurvirostra americana</i>), Spotted sandpiper (<i>Actitis macularia</i>), Killdeer, Great blue heron (<i>Ardea herodias</i>), Double-crested cormorant (<i>Phalacrocorax auritus</i>), Canada goose, Mallard, Cinnamon teal (<i>Anas cyoptera</i>), Blue-winged teal (<i>Anas discors</i>) Ring-necked duck (<i>Athya collaris</i> ; winter), Northern shoveler (<i>Anas clypeata</i> ; winter), Gadwall (<i>Anas strepera</i> ; winter), Common goldeneye (<i>Bucephalus clangula</i> ; winter)	Snapping turtle (<i>Chelydra serpentina</i>), Yellow mud turtle (<i>Kinosternon flavescens</i>), Garter snakes, Northern water snake
Foothills habitats (ponderosa pine, xeric shrub, foothills grassland, cliffs), west side of Boulder segment	Grey fox (<i>Urocyon cinereoargenteus</i>), Coyote, Bobcat (<i>Lynx rufus</i>), Mountain lion (<i>Felis concolor</i>), Black bear (<i>Ursus americana</i>), American elk (<i>Cervus elaphus</i>), Golden-mantled ground squirrel (<i>Spermophilus lateralis</i>), Colorado chipmunk (<i>Tamias quadrivittatus</i>), Abert's squirrel (<i>Sciurus aberti</i>), Chickaree (<i>Tamiasciurus hudsonicus</i>), Rock squirrel (<i>Spermophilus variegates</i>), Deer mouse, Townsend's big-eared bat (<i>Corynorhinus townsendii</i>), Fringed myotis (<i>Myotis thysanoides</i>), Long-legged myotis (<i>Myotis volans</i>)	Stellar's jay (<i>Cyanocitta stellari</i>) Mountain chickadee (<i>Parus gambeli</i>) Pygmy nuthatch (<i>Sitta pygmaea</i>) Pine siskin (<i>Carduelis pinus</i>) Evening grosbeak (<i>Coccythraustes vespertinus</i>), Black-headed grosbeak (<i>Pheucticus melanocephalus</i>), Brown creeper (<i>Certhia americana</i>), Canyon wren (<i>Catherpes mexicanus</i>), Common raven (<i>Corvus corax</i>), Dark-eyed junco (<i>Junco hyemalis</i>), Wild turkey (<i>Meleagris gallopavo</i>), Cooper's hawk	Plateau lizard (<i>Sceloporus undulatus</i>), Milk snake, Bullsnake, Western terrestrial garter snake, Western rattlesnake, Tiger salamander

SOURCE: General: NDIS 2004.

Mammals: Adams 2003; Fitzgerald, Meaney and Armstrong 1994.

Birds: Andrews and Righter 1992, Boulder County Nature Association 1999, Kingery 1998.

Amphibians and Reptiles: Hammerson 1999.

3.2.2 Wildlife Crossings

US 36, like all busy highways, is a barrier to movement by wildlife, especially mammals, reptiles and amphibians because of traffic, noise, the expanse of pavement and lack of cover. US 36 has bridges or large natural-bottomed culverts at Rock Creek, Coal Creek, and South Boulder Creek, that provide relatively good passage under the highway. Natural-bottomed culverts at ditches on City of Boulder open space (Davidson Ditch and others) also provide relatively good opportunities for passage by small and medium sized animals when the ditches are not carrying irrigation water, and are spaced at frequent intervals. Dry Creek has a double culvert with one side occupied by the creek and the other used as a bike path, which is less useful for wildlife movement. Other ditches cross the highway at scattered locations; these ditches probably provide for some wildlife movement when they are not carrying water, but have limited value because of their concrete-bottoms and length.

3.2.3 Wildlife Species

Large Mammals

Large carnivores, such as mountain lion (*Felis concolor*) and black bear (*Ursus americanus*), are mainly limited to Boulder Mountain Parks, however individuals occasionally travel through riparian corridors to lower elevation areas. American elk (*Cervus elaphus*), white-tailed deer (*Odocoileus virginianus*), and mule deer (*Odocoileus hemionus*) all occur within the project area. Riparian corridors such as the major creeks in the project area provide migration corridors for these and other wildlife. Resident mule deer populations inhabit open areas throughout Broomfield, Louisville, and Boulder. The riparian and agricultural habitats along the South Platte River are considered to be high priority habitat for white-tailed deer, and moderate priority habitat for mule deer (NDIS 2004). Plate 4 shows distribution for black bear, white-tailed deer, and mule deer in the project area.

A small herd of bull elk was observed in 2003-04 on Davidson Mesa between Marshall Road and US 36. These individuals were not seen in this area prior to the 2003-04 season and it is unknown if the herd will return in successive years. In addition, a herd of elk occurs north of the project area.

CDOW is responsible for maintaining big game herds at sustainable populations levels as established through a public review process. Deer herd management plans are completed every 5-10 years to determine how big game in specific geographic areas are managed. Three game management units (GMUs) occur within the US 36 project area, two of which are covered by the Boulder Deer Herd Management Plan. Because chronic wasting disease is steadily increasing in north-central Colorado deer and elk herds, the Boulder Deer Herd Management Plan shifted emphasis from traditional goals of managing male to female ratios to managing the disease. CDOW will selectively cull infected individuals to control spread of chronic wasting disease (CDOW 2002).

No areas of high road kill have been identified. Large ungulate roadkill is not prevalent in the project area likely due to avoidance of high-traffic areas such as US 36. City of Boulder does not consider mortality to wildlife from vehicle collision an issue within the city. CDOT provided some data on ungulate roadkills for 2002, however these data are incomplete and therefore do not provide an accurate assessment of high mortality areas for wildlife in the project area (CDOT 2004).

Medium and Small Mammals

Black-tailed prairie dogs. Black-tailed prairie dogs (*Cynomys ludovicianus*) are large colonial burrowing rodents that occupy grassland habitats in the study area. Black-tailed prairie dogs are a "keystone species" of the short- and mid-grass prairie ecosystem; many other wildlife species depend on prairie dogs for food and shelter (Miller et al. 1994) and their colonies support a higher diversity of plants and wildlife. Bald eagles, ferruginous hawks, red-tailed hawks, and golden eagles (Weber unk. Date) prey on prairie dogs, especially in winter months. Burrowing owls, mice, snakes, and toads use abandoned prairie dog burrows to nest or den. Black-tailed prairie dogs were a candidate species for federal threatened or endangered species status, but were removed from consideration for federal status in August 2004. The species is considered by CDOW and CNHP as a species of special concern and CDOT has a prairie dog relocation policy (see Section 4.3.7, Mitigation).

Detailed maps of prairie dog colonies along the two project corridors are provided at the end of this report, and are based on observations made during field studies in the summer of 2004.

Other Medium and Small Mammals. American badgers (*Taxidea taxus*) occur in all types of open habitats and forest margins, often in association with prairie dog towns, their primary source of prey in Colorado (Fitzgerald et al. 1994). Bobcats (*Felis rufus*), coyotes (*Canis latrans*), red foxes (*Vulpes vulpes*), an occasional gray fox (*Urocyon cinereoargenteus scottii*), long-tailed weasel (*Mustela frenata*), and striped skunk (*Mephitis mephitis*) occur in the study area. Riparian areas and adjacent uplands provide habitat for raccoon (*Procyon lotor*) and porcupine (*Erethizon dorsatum*).

Eastern cottontail (*Sylvilagus floridanus*), western cottontail (*Sylvilagus nuttallii*), black-tailed jackrabbit (*Lepus californicus melanotis*), and white tailed jackrabbit (*Lepus townsendii campbellii*) have overlapping distributions in the project area. Eastern cottontails are the most common and occur in most open space areas.

Beaver (*Castor canadensis*) inhabit riparian corridors and occur in the South Platte River, Clear Creek, Coal Creek and S. Boulder Creek, among other places. Muskrats (*Ondatra zibethicus*) inhabit marshes, ponds, lakes, and rivers (Fitzgerald et al. 1994) within the project area. Prairie vole (*Microtus ochrogaster*) can be found on the edges of riparian corridors and irrigation ditches, as well as grassland habitats. Meadow voles (*Microtus pennsylvanicus*) are associated with wetlands and riparian corridors (Fitzgerald et al. 1994).

Golden-mantled ground squirrel (*Spermophilus lateralis*), Colorado chipmunk (*Tamias quadrivittatus*), Abert's squirrel (*Sciurus aberti*), chickaree (*Tamiasciurus hudsonicus*), and rock squirrel (*Spermophilus variegates*) may occur in the foothills in Segment 6. Thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*) are often found inhabiting burrows within prairie dog colonies. Fox squirrels (*Sciurus niger*) inhabit riparian habitats as well as urban areas with trees throughout the study area (Fitzgerald et al. 1994).

Two subspecies of gopher occur in the project area: northern pocket gopher (*Thomomys talpoides rostralis*) and plains pocket gopher (*Geomys bursarius lutescens*). These subspecies inhabit a variety of areas including grasslands, agricultural and pastures, and roadsides (Fitzgerald et al. 1994).

Deer mice (*Peromyscus maniculatus*) occur in many different habitats and are likely to occur in all open space or undeveloped areas. Pocket mice (*Perognathus* sp. and *Chaetodipus hispidus*), kangaroo rats (*Dipodomys ordii*), and northern grasshopper mice (*Onychomys leucogaster*) inhabit various natural habitats along the Front Range (Fitzgerald et al. 1994). Non-native house mouse (*Mus musculus*) and Norway rat (*Rattus norvegicus*) occur throughout the project area, mainly in developed areas. Preble's meadow jumping mouse (*Zapus hudsonius preblui*) is documented in the project area and is discussed in more detail below under Threatened, Endangered and Special Status Species.

Bats

While more bat species may occur in the project area, those species more common or likely to occur are discussed. The two most common bats in the project area, especially Segment 6, are little brown myotis (*Myotis lucifugus*) and big brown bat (*Eptesicus fuscus*), which are more adaptable to human

activity than most other bats. These bats roost in buildings, caves, and rock crevices (Adams 2003; Fitzgerald et al. 1994). Townsend's big-eared bats (*Corynorhinus townsendii*) occur in Segment 6 and roost in caves in ponderosa pine woodland habitat in the foothills (Adams 2003) and are a Colorado State species of concern. Fringed myotis (*Myotis thysanoides*) are present in ponderosa pine woodland in Segment 6 between April and September (Fitzgerald et al. 1994). Western long-eared myotis (*Myotis evotis*) have been captured in the foothills west of Boulder but could roost in all segments of the project area (Adams 2003). Long-legged myotis (*Myotis volans*) primarily inhabits forested areas and roosts in trees, rock crevices, stream banks, and buildings (Adams 2003).

Silver-haired bat (*Lasiomyotis noctivagans*) are solitary and roost under tree-bark, in woodpecker holes, buildings, and rock crevices (Adams 2003). Silver-haired bats forage over woodland ponds and streams and are likely migratory. Hoary bat (*Lasiurus cinereus*) is also solitary and roosts in cottonwood tree foliage, as well as woodpecker holes, caves, and building exteriors (Adams 2003).

Birds

The open space areas, woodlands, riparian corridors, lakes, and ponds within the project area provide habitat for many species of migratory, nesting, and year-round resident birds. Over 300 species may occur throughout the year in the project area, therefore, only those species considered more common are discussed here. Special status bird species are discussed below under Threatened, Endangered and Special Status Species. Four groups of birds are discussed here: raptors, songbirds, wading birds, and waterfowl.

Raptors

The various habitats present within the project area provide habitat for many migratory and year-round raptor species. Prairie dog colonies and grassland patches throughout the corridor provide good foraging habitat for a variety of raptors seasonally or in migration. Twenty-two species of raptors are known or likely to occur in the study area. The most common species include American kestrel (*Falco sparverius*), great-horned owl (*Bubo virginianus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*Buteo swainsonii*), and turkey vulture (*Cathartes aura*). Surveys to locate raptor nests within ½ mile of proposed project facilities were conducted in April and June 2004. About 20 active red-tailed hawk nests and 7 active Swainson's hawk nests were found in the Westminster, Broomfield, Superior/Louisville, and Boulder segments. Osprey (*Pandion haliaetus*), American kestrel, great-horned owl nests were also observed. All nests were located in large trees, primarily in rural areas along irrigation ditches. Table 3-4 lists raptor species known or likely to occur in the project area, their associated habitats, occurrence, and nesting activity. Seven raptor species are discussed below under Threatened, Endangered, and Other Special Status Species.

TABLE 3-4: RAPTORS KNOWN OR LIKELY TO OCCUR IN THE US 36 PROJECT AREA

Common Name	Scientific Name	Habitat	Seasonal Occurrence	Nesting Activity
American Kestrel	<i>Falco sparverius</i>	Grasslands, agricultural areas, riparian forest edges, and urban areas.	Year-round resident.	Likely nests in all segments of project area from April through September in tree cavities, cliffs, and nest boxes.
American Peregrine Falcon	<i>Falco peregrinus</i>	May be seen in all habitats during migration. Forage in habitats adjacent to foothills in summer.	Migration and summer; uncommon in winter.	Nests on cliffs in Segment 6 from March through August. Seasonal closures implemented near nests.
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Near reservoirs and rivers. In winter near prairie dog towns and grasslands.	Mostly winter resident, several nesting pairs in summer.	Known nests in Segments 3 and 6. Nesting activity from February through July in cottonwood trees, far from human activity.
Barn Owl	<i>Tyto alba</i>	Riparian and grassland areas.	Spring and fall migration, summer resident, rare in winter.	Rare breeder; potentially nests in Segments 5 and 6 from April through September in tree cavities and cutbanks of riparian areas, buildings, and cliffs.
Broad-winged Hawk	<i>Buteo platypterus</i>	Riparian forests, city parks, and residential areas.	Migration and possibly summer (rare).	Does not nest in or near project area.
Burrowing Owl	<i>Athene cunicularia</i>	Grasslands in association with prairie dog colonies.	Summer resident.	Nests in Segments 5 and 6 from May through August in abandoned prairie dog burrows.
Cooper's Hawk	<i>Accipiter cooperii</i>	Pine/coniferous and lowland riparian forests, and urban areas.	Present in winter and migration; potentially in foothills in summer.	May nest in Segment 6 from April through September in dense coniferous tree stands and riparian forest.
Ferruginous Hawk	<i>Buteo regalis</i>	Grasslands and shrublands with scattered trees and hilly topography. Wintering individuals found near prairie dogs colonies.	Migration and winter, less common in summer.	May nest in Segments 5 and 6. Nests in trees or on ground from April through August.
Golden Eagle	<i>Aquila chrysaetos</i>	Grasslands, shrublands, pine woodlands.	Year-round resident; less common in summer.	May nest in Flatirons in Segment 6. Nests on cliffs or trees in rugged areas from March through August. Seasonal closures implemented near nests.
Great-horned Owl	<i>Bubo virginianus</i>	Lowland riparian forest and agricultural areas, other habitats as well.	Year-round resident.	Likely nests located in all Segments. Nests in trees February through September; using old corvid nests made from sticks.
Long-eared Owl	<i>Asio otus</i>	Lowland riparian forest edges and farm shelterbelts.	Migration and winter, potentially in summer at localized sites.	Rare breeder; potentially nests in Segments 5 and 6. Nests in trees March through July using old corvid nests.
Merlin	<i>Falco columbarius</i>	Grasslands, agricultural areas, riparian forests, and urban areas.	Migration and winter.	Not likely to nest in or near project area.

Common Name	Scientific Name	Habitat	Seasonal Occurrence	Nesting Activity
Northern Harrier	<i>Circus cyaneus</i>	Grasslands, agricultural areas, and wetlands with adequate cover.	Year-round resident.	May nest in Segments 3 and 6 from April through August on ground with vegetative cover.
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	Ponderosa pine and mixed fir forests in foothills.	Year-round resident (rare).	May nest in foothills of Segment 6. Nests in tree cavities from April through July.
Osprey	<i>Pandion haliaetus</i>	Near reservoirs and large lakes.	Migration and summer.	Nests located in Segment 6 at Boulder Reservoir and Valmont Reservoirs. Breeding activity from May through August in tops of conifer trees, dead snags, or nest platforms. Return to the same nest in consecutive years.
Prairie Falcon	<i>Falco mexicanus</i>	Nests on cliffs in open areas, forages over adjacent habitats. Wintering populations occur in grasslands and agricultural areas in conjunction with presence of horned larks.	Year-round resident.	May nest in foothills of Segment 6. Nests in cliffs from April through July.
Red-tailed Hawk	<i>Buteo jamacensis</i>	Lowland riparian habitats near open areas with patches of trees. In winter and migration, occurs in grasslands, shrublands, and agricultural areas near trees.	Year-round resident.	About 20 active nests found in 2003 field surveys. Active nests observed in Segments 2, 3, 4, 5, and 6. Nests deciduous trees from March through September.
Rough-legged Hawk	<i>Buteo lagopus</i>	Grasslands, shrublands, agricultural areas, and riparian forests.	Winter only.	Does not nest in or near project area.
Eastern Screech Owl	<i>Otus asio</i>	Lowland and foothills riparian forest and mature deciduous trees in urban areas.	Year-round resident.	Known nests in Segment 6, but potential nests in suitable habitat of other segments. Nests from April though July in tree cavities.
Sharp-shinned Hawk	<i>Accipiter striatus</i>	During migration and winter, occur in all types of forests and urban areas; in summer found in forests.	Primarily present during migration, but may occur in winter and summer.	May nest in foothills of Segment 6 from April through August in dense coniferous tree stands.
Swainson's Hawk	<i>Buteo swainsoni</i>	Grasslands, agricultural areas, shrublands, and riparian forests.	Migration and summer.	About 5 active nests observed during field surveys in 2004, in Segments 5 and 6. Nests in trees in or near open areas from April through August.
Turkey Vulture	<i>Cathartes aura</i>	Grasslands, agricultural areas, and shrublands.	Migration and summer.	Possibly nests in foothills of Segment 6. Nests on cliffs from May through August.

SOURCE: Andrews and Righter 1992, Kingery 1998, BCNA 1999, URS 2004a

Wintering ferruginous hawks primarily prey on prairie dogs. Numbers of individual ferruginous hawks observed along McCaslin Blvd and US 36 were equal to those of red-tailed hawks during the 1980s, however, current observations indicate that ferruginous hawks are declining and red-tailed hawks outnumber ferruginous hawks 8:1 (BCNA personal communication 2004).

Wintering rough-legged hawks and northern harriers are not found in close association with prairie dog colonies as these raptors prey predominantly on voles and other small mammals, and only opportunistically scavenge on prairie dog carrion. Wintering populations of these species have remained steady since the 1990s, as they are found in closer association with wetlands (which are protected) than prairie dog colonies throughout the US 36 corridor (Gietzen et al. 1996).

Songbirds

The majority of the segments in the project area consist have urban and prairie habitats with riparian corridors, open water, and wetlands. Segment 6, however, contains some habitat that is not present in other segments, such as ponderosa pine woodland, rock cliffs, and caves.

TABLE 3-5: BIRD SPECIES LIKELY TO OCCUR IN SUITABLE HABITATS THROUGHOUT THE US 36 PROJECT AREA

Common Name	Scientific Name	Habitat	Occurrence in US 36 Project Area
American Crow	<i>Corvus brachyrhynchos</i>	Riparian, agricultural, and urban areas, as well as ponderosa pine	Occurs in all segments year-round.
American Goldfinch	<i>Carduelis tristis</i>	Riparian woodland, agricultural, and urban areas.	Occurs in all segments year-round.
American Robin	<i>Turdus migratorius</i>	All habitats in project area, especially near fruiting vegetation.	Occurs in all segments year-round.
Bank Swallow	<i>Riparia riparia</i>	Colonial breeder in sandbanks in riparian areas. Occurs in agricultural areas during migration	Occurs in all segments in spring and fall migration and summer.
Barn Swallow	<i>Hirundo rustica</i>	Urban, riparian, agricultural, and open water areas.	Occurs in all segments in spring and fall migration and summer.
Belted Kingfisher	<i>Ceryle alcyon</i>	Riparian areas and open water	Likely occurs in all segments year-round.
Black-billed Magpie	<i>Pica pica</i>	Riparian woodland, agricultural, and urban areas.	Occurs in all segments year-round.
Black-capped Chickadee	<i>Parus atricapillus</i>	Riparian woodland, urban areas and foothill areas in winter and migration.	Occurs in all segments year-round.
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	Breeds in ponderosa pine and foothill riparian woodland. Migrates through riparian and urban forest.	May nest in Segment 6 and occur in other segments in migration and summer.
Bullock's Oriole	<i>Icterus bullockii</i>	Riparian and urban forests, forages in riparian shrubland (willow and tamarisk).	Occurs in all segments during migration and summer.
Chipping Sparrow	<i>Spizella passerina</i>	Breeds in ponderosa pine and riparian woodland. Migrates through open and urban areas.	Present in migration and summer. Likely nests in segments 5 and 6. Occurs in all segments during migration.
Cliff Swallow	<i>Hirundo pyrrhonota</i>	Nests on cliffs, and buildings, bridges, culverts, and dams. In migration, occurs near open water, wetlands, and agricultural fields.	Occurs in all segments in spring and fall migration and summer.
Downy Woodpecker	<i>Picoides pubescens</i>	Lowland and riparian woodland, urban areas, and ponderosa pine woodland.	Occurs in all segments year-round.
Hairy Woodpecker	<i>Picoides villosus</i>	Ponderosa pine, lowland and foothill riparian woodland, and urban forests.	Uncommonly occurs in all segments a year-round, nest primarily in foothills and higher elevations.
House Finch	<i>Carpodacus mexicanus</i>	Urban and agricultural areas, riparian woodland, and shrublands.	Occurs in all segments year-round.

Common Name	Scientific Name	Habitat	Occurrence in US 36 Project Area
House Wren	<i>Troglodytes acodo</i>	Riparian and ponderosa pine woodland; rare in urban areas during summer.	Potentially occurs in suitable habitats during migration and summer.
Lark Sparrow	<i>Chondestes grammacus</i>	Grasslands, shrublands, open riparian areas.	Present in all segments during summer and migration.
Lewis's Woodpecker	<i>Melanerpes lewis</i>	Lowland and riparian woodland, agricultural areas, and urban forest.	Rare and localized in suitable habitats in all segments year-round.
Mourning Dove	<i>Zenaida macroura</i>	All habitats in project area, except open water.	Occurs in all segments primarily during migration and summer; rare in winter.
Northern Flicker	<i>Colaptes auratus</i>	Riparian woodland and urban areas.	Occurs in all segments year-round.
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	Breeds in sandbanks, migrates over riparian and agricultural areas.	Occurs in segments 1 through 5 in spring and fall migration and summer.
Northern Shrike	<i>Lanius excubitor</i>	Agricultural and open riparian areas, and grasslands.	May occur all segments in winter only.
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	Cattail marshes, wet meadows, agricultural areas, and riparian woodland.	Occurs in all segments year-round.
Rock Wren	<i>Catherpes mexicanus</i>	Open, rocky slopes and cliffs. Migrates through grasslands, riparian, and urban areas.	Occurs in all segments in migration; may nest in Section 6.
Say's Phoebe	<i>Sayornis saya</i>	Grasslands and shrublands near buildings and bridges. Occurs in all habitats during migration.	Occurs in all segments in migration and summer.
Song Sparrow	<i>Melospiza melodia</i>	Shrubby riparian woodland and cattail marshes.	Occurs in suitable habitat in all segments year-round.
Western Kingbird	<i>Tyrannus verticalis</i>	Grasslands and agricultural areas near streams, isolated trees, houses, and farm shelterbelts.	Occurs in all segments in migration and summer.
Western Meadowlark	<i>Sturnella neglecta</i>	Grasslands, agricultural areas, and shrublands.	Occurs in all segments year-round.
Western Wood-pewee	<i>Contopus sordidulus</i>	Ponderosa pine and foothill riparian woodland. Migrates through riparian woodland and urban forests.	Likely occurs in foothills of Segment 6 in summer and all segments in migration.
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	Cattail marshes, agricultural and riparian areas.	May occur in segments 1 through 5 in migration and summer.

SOURCE: Andrew and Righter 1992; Kingery 1998.

The following species primarily occur in the foothills areas of Segment 6, but occasionally can be observed in other segments within the project area:

- Steller's jay (*Cyanocitta stelleri*)
- Mountain chickadee (*Parus gambeli*)
- Pygmy nuthatch (*Sitta pygmaea*)
- Red-breasted nuthatch (*Sitta canadensis*)
- White-breasted nuthatch (*Sitta carolinensis*)
- Pine siskin (*Carduelis pinus*)
- Evening grosbeak (*Coccothraustes vespertinus*)
- Brown creeper (*Certhia americana*)
- Canyon wren (*Catherpes mexicanus*)

- Common raven (*Corvus corax*)
- Dark-eyed junco (*Junco hyemalis*)
- Wild turkey (*Meleagris gallopavo*)

Waterfowl and Wading Birds

The numerous lakes and ponds, as well as rivers, streams, and ditches provide important habitat for wintering, migrating, and nesting waterfowl and shorebirds in the US 36 project area.

Local breeding species include Canada goose (*Branta canadensis*), great blue heron (*Ardea herodias*), and double-crested cormorant (*Phalacrocorax auritus*), wood duck (*Aix sponsa*), mallard (*Anas platyrhynchos*), blue-winged teal (*Anas discors*), and cinnamon teal (*Anas cyanoptera*), killdeer (*Charadrius vociferous*), American avocet (*Recurvirostra americana*), and spotted sandpiper (*Actitis macularia*).

Shorebirds that may or may not nest in the project area but are likely present in summer are Virginia rail (*Rallus limicola*), common snipe (*Gallinago gallinago*), American white pelican (*Pelecanus erythrorhynchos*), and black-crowned night heron (*Nycticorax nycticorax*) (Kingery 1998).

Common wintering waterfowl include Canada goose, mallard, ring-necked duck (*Aythya collaris*), northern shoveler (*Anas chrypeata*), gadwall (*Anas strepera*), and common goldeneye (*Bucephala clangula*).

Reptiles and Amphibians

The riparian, wetland, and plains ecosystems within the project area provide habitats for various reptiles and amphibians. Tiger salamander (*Ambystoma tigrinum*) occurs on many open space areas with suitable moist, wooded habitat. Northern leopard frogs (*Rana pipiens*) occur in wetlands and riparian habitats including Sawhill Ponds in Segment 6 and other suitable locations, such as Coal Creek in Segment 5 (City of Louisville Open Space 2001). They are discussed further in Special Status Species. Plains spadefoot (*Spea bombifrons*) occurs in the eastern segments of the project area with eastern Boulder County the limits of the species' habitat. Woodhouse's toad (*Bufo woodhousei*) has been observed in Segment 6 at Sawhill Ponds and likely occurs elsewhere. Western chorus frogs (*Pseudacris triseriata*) are considered to be widespread in marshy ponds throughout the project area. Non-native bullfrogs (*Rana catesbeiana*) occur in riparian habitats throughout the project area and contribute to the decline of other frog species due to resource competition and predation.

Northern prairie lizard (*Sceloporus undulatus garrmani*) inhabits sandy soil in shrublands with rocky or vegetative cover. Six-lined racerunner (*Cnemidophorus sexlineatus*) occurs in rocky outcrops and roadsides, banks and floodplains of streams in grassland habitats.

Sawhill ponds in Segment 6 provides habitat for snapping turtle (*Chelydra serpentina*), ornate box turtle (*Terrapene ornate*), and painted turtle (*Chrysemys picta*). These turtles are likely to occur at other ponds with suitable habitat in the project area.

Racers (*Coluber constrictor*) inhabit prairie grasslands and riparian woodlands; a breeding site is located in Segment 5. Bullsnares or gopher snakes (*Pituophis catenifer*) inhabits plains grassland, riparian areas, wetlands, pond and lake edges, stream margins, rural suburban areas, and agricultural land.

Western rattlesnakes (*Crotalus viridis*) may occur throughout the project area in all habitats except for highly urbanized and agricultural fields (Hammerson 1994). Milk snakes (*Lampropeltis triangulum*) and plains blackhead snakes (*Tantilla nigriceps*) inhabit shortgrass prairies and arid river valleys. Lined snakes (*Tropidoclonion lineatum*) occur in natural and urban habitats in damp areas.

Northern water snakes (*Nerodia sipedon*) primarily occur near water, including creeks, rivers, reservoirs, ponds, marshes, flooded meadows, and canals along major drainage systems. The species is considered common along Boulder Creek. Western terrestrial garter snake (*Thamnophis elegans*) and plains garter snake (*Thamnophis radix*) occur near any permanent or semi-permanent water source in the project area. Common garter snakes (*Thamnophis sirtalis*) also inhabit riparian and wetland environments and are discussed below under Threatened, Endangered and Special Status Species.

Invertebrates

Butterflies from research conducted on grassland areas in Boulder are associated with high quality grasslands (Collinge et al. 2003). Species of butterflies captured during recent surveys include cabbage white (*Pieris rapae*), checkered white (*Pontia protodice*), clouded sulfur (*Colias philodice*), orange sulfur (*Colia eurymene*), variegated Fritillary (*Euptoieta claudia*), western Aphrodite Fritillary (*Speyeria aphrodite ethne*), and wood nymph (*Ceryonis pegala*). Six additional species of butterflies are discussed in Section 3.6, Threatened, Endangered and Special Status Species.

3.3 SENSITIVE HABITATS AND WILDLIFE CORRIDORS

3.3.1 Sensitive Habitats

Sensitive habitats were identified from information obtained from the Colorado Natural Heritage Program (CNHP 2004), through discussions with open space and parks personnel, and county and municipality management plans. The areas discussed below include open space and natural areas important for wildlife, critical wildlife habitat identified by Boulder County Parks and Open Space, City of Boulder Open Space and Mountain Parks (OSMP), and Potential Conservation Areas (PCAs) identified by CHNP that are considered ecologically important for wildlife and/or provide good wildlife habitat, and wildlife corridors. Sensitive habitats are presented on Plate 2, and are discussed below by project segment.

Segment 1 - Denver

Denver City and County has several natural areas within the US 36 project area. Though these areas are largely fragmented and disturbed, these natural areas provide the best wildlife habitat in this segment. The City and County of Denver has not formally designated them as natural areas, but Heron Pond has been proposed for formal designation.

Inspiration Point Park is located west of Sheridan and 50th Avenue and has areas of ornamental gardens, restored grassland, and deciduous and pine tree groves. The north and western edges of the park are a natural area and provide a habitat linkage to Clear Creek. Additionally, a golf course is

located east of the park that provides habitat for red fox, Canada goose, and other urban-adapted wildlife.

Berkeley Lake and Rocky Mountain Lake Parks have lakes that provide habitat for aquatic species and waterfowl. Both parks have recreational facilities and have been altered by human development.

The South Platte River in Segment 1 has been highly disturbed and altered. The surrounding land use in this area is mainly industrial. Portions of this riparian habitat within the project area may provide wildlife habitat, but is not of high quality. The species that occur are adapted to human activity, such as foxes, some raptors and waterfowl. The South Platte River is an important wildlife corridor for species that otherwise would not have connected habitat within the heavily developed area of Denver.

Heron Pond is a proposed natural area located in the northeastern portion of the project area near the South Platte River. This area is disturbed but is proposed for improvement (Weinstein 2004).

Segment 2 - Adams County

Clear Creek is a riparian corridor, which provides habitat for migrating and nesting birds, beavers, and red fox. Native small mammal populations are likely low due to the presence of prey species such as non-native house mice, Norway rats, and domestic cats associated with the surrounding residential neighborhoods. Lowell Ponds State Wildlife Area is located more than one mile from project facilities. It consists of warmwater ponds and trails for wildlife viewing, hiking, fishing and picnicking. Riverside Cemetery, adjacent to the South Platte River, is a wildlife viewing area located more than 1 mile east of project facilities.

Segment 3 - Westminster

Two Ponds National Wildlife Refuge is located within the city of Arvada. It is a satellite of Rocky Mountain Arsenal National Wildlife Refuge and occupies 72 acres. It is managed for wetlands and native wildlife, and contains ponds, wetland, riparian woodland, and prairie grassland habitats (USFWS 2004a). Many birds are observed at the refuge during summer and spring/fall migration. Ten bird species nest at the refuge including Swainson's hawk and western meadowlark. Mammals known to inhabit the refuge include mule deer, raccoons, muskrats, beavers, and red fox. Ponds and riparian areas provide habitat for leopard frog, painted and snapping turtles.

Standley Lake North is a CNHP PCA located on the northwest edge of Standley Lake. It is identified as a site of general biodiversity interest due to nesting and roosting habitat for bald eagles. Wetlands and prairie grasslands also provide habitat for prairie dogs, beaver, mule deer, Swanson's hawk, and various other raptors and birds. Recently, great blue herons have nested at the lake (City of Westminster 2004). The City of Westminster owns and manages Standley Lake Regional Park, which was constructed between 1909 and 1919. Jefferson County Open Space owns land to the north of the lake (North Standley Open Space) (City of Westminster 2004).

Walnut Creek is another CNHP PCA of general biodiversity interest related to presence of Preble's meadow jumping mouse, a federally threatened species. MORE.

Big Dry Creek and Walnut Creek are important riparian corridors for wildlife. Standley Lake Open Space is connected with habitats to the northeast by Big Dry Creek. Numerous wetlands and scattered cottonwoods line Big Dry Creek.

Segment 4 - Broomfield

Boulder County Open Space owns the Carolyn Holmberg Preserve at Rock Creek Farm, which consists of 1,151 acres. The land was purchased by Boulder County in 1980 for agricultural preservation. The farm is currently active and is classified as irrigated cropland (NDIS 2004). However, native prairie also is present at the Preserve as well as riparian and wetland habitats.

The park is open to the public and has a picnic facility and 2.8 miles of multi-use trails: the 1.5-mile Mary Miller trail and the 1.3-mile Cradleboard Trail. Bank fishing is permitted at Stearns Lake, located at the Preserve. The preserve provides important habitat for prairie dogs, raptors, including burrowing owls, and other grassland birds.

Segment 5 - Superior/Louisville

The Carolyn Holmberg Preserve at Rock Creek Farm described in Segment 4 is partly located in Segment 5.

Coal Creek and Rock Creek are movement corridors for mule deer and white-tailed deer concentration areas (NDIS 2004). Coal Creek provides cottonwood riparian habitat and a pair of bald eagles nests along this creek west of US 36 (see Threatened, Endangered and Special Status Species for a detailed description). The Coal Creek Trail Open Space area is a 7-mile trail located along Coal Creek in eastern Boulder County, on the northeast side of US 36. Coal Creek provides important habitat for nesting, hunting, and foraging wildlife. Areas along the creek with adjacent habitat that has been preserved include cottonwood riparian forest, willow stands, wetlands, which is used by mule deer, white-tailed deer, coyotes, foxes, and a variety of birds. This corridor is protected as open space by Boulder County, the cities of Louisville and Lafayette.

Segment 6 - Boulder

Several types of sensitive habitats occur in this segment, including Colorado state-designated natural areas, CNHP PCAs, CNHP rare plant communities, as well as significant natural communities and critical wildlife habitat identified in the Boulder County Comprehensive Plan.

Natural Areas. These four areas have either been officially designated as natural areas by the Colorado Natural Areas Program, or are in the process of being designated. These areas have also been identified as sensitive by other agencies, including the Colorado Natural Heritage Program, as described below.

South Boulder Creek Natural Area— This state-designated natural area occupies 1,193 acres, and is managed by City of Boulder Open Space and Mountain Parks. It features a mosaic of high quality wetlands, wet meadows, and mesic grasslands, and good condition plains cottonwood riparian habitat (Colorado Natural Areas 2004). Portions of this area are also identified as significant natural communities (wet prairie) in the Boulder County Comprehensive Plan (Boulder County 2004). The South Boulder Creek Natural Area is located within the 3,086 acre CNHP Colorado Tallgrass Prairie PCA, which is considered an area of very high biodiversity significance because of a large occurrence of a globally imperiled species (Ute ladies'-tresses orchid) (CNHP 2004). The area also supports Preble's meadow jumping mouse, other rare plant species and mesic tallgrass prairie (*Andropogon gerardii-Sorghastrum nutans-Spartina pectinata*), which is globally imperiled (G2) and is considered to be critically imperiled or imperiled (S1S2) in Colorado by CNHP. Portions of this area are county-designated critical wildlife habitat that supports red-headed woodpecker, bobolink, and Johnny darter (Boulder County 2004). The Colorado Tallgrass prairie PCA also provides nesting habitat for grasshopper sparrows. The South Boulder Creek Natural Area and Colorado Tallgrass Prairie PCA occupy both sides of US 36.

Colorado Tallgrass Prairie Natural Area— This includes 8 parcels of land, all of which are located within the US 36 study area (City of Boulder OSMP and Colorado Natural Areas Program 1986). It occupies 269 acres and is managed by City of Boulder OSMP. It is located within the CNHP Colorado Tallgrass prairie PCA. Most of the parcels are mesic tallgrass prairie, and the large portion on the slopes of Davidson Mesa is xeric tallgrass prairie. Xeric tallgrass prairies (*Andropogon gerardii-Schizachyrium scoparium*) are ranked by CHNP as imperiled both globally (G2) and in the state of Colorado (S2). This is identified as a natural area in the Boulder County Comprehensive Plan, and the xeric tallgrass prairies are identified as a significant natural community. This area includes riparian forest, wet meadows and tall-grass prairies.

White Rocks— This area along Boulder Creek has been identified as important by several agencies. A state-designed natural area occupies 105 acres and is located on private land but managed under a conservation easement. The natural area includes sandstone cliffs that support a fern species known only from this location in Colorado, and two other rare plant species, forktip three-awn (*Aristida basiramea*) and American groundnut (*Apios americana*). These plant species are considered 'critically imperiled' in Colorado. This area is also mapped by CNHP as a PCA with moderate biodiversity significance, which occupies 247 acres. The Boulder County Comprehensive Plan identifies it as a Boulder County Natural Area for geologic, rare plants, rare animals and plant communities (Boulder County 2004). Important plant communities at White Rocks include plains escarpment prairie and plains cottonwood riparian forest. The riparian woodland habitat along Boulder Creek and the adjacent cliffs have also been designated as critical wildlife habitat by Boulder County in the Boulder County Comprehensive Plan for a large density of nesting raptors such as Swainson's hawk and barn owl, as well as habitat for nesting wood ducks in the riparian forest (Boulder County 2004). Habitats consist of prairie, sandstone cliffs, and plains cottonwood riparian forest.

Green Mountain/Boulder Foothills— This area of the foothills west of Boulder is in the process of being designated a state natural area, and is managed by City of Boulder OSMP. The area largely overlaps with the Boulder Foothills PCA, which is considered to be an area of high biodiversity significance

by CHNP. The Boulder Foothills PCA occupies 12,040 acres and includes the Flatirons and the first foothills peaks to the west. The vegetation communities in Green Mountain are primarily composed of montane forest with dense shady riparian growth in canyon bottoms. It provides habitat for 6 plant species considered to be critically imperiled or imperiled in Colorado, and includes the Flatirons, sandstone cliffs and rock outcrops that provide nesting habitat for golden eagles, prairie falcons, and peregrine falcons. It provides habitat for a number of rare butterflies, and rare animal species including Townsend's big-eared bat, as well as black bears, mountain lions, mule deer, and numerous birds (CNHP 2004).

CNHP PCAs

Fourmile Canyon Creek—The Fourmile Creek PCA is located east of Boulder and occupies 67 acres. It is considered by CNHP to have high biodiversity significance because it includes two fair occurrences of a globally imperiled species (Ute ladies'-tresses orchid). Boulder County has identified the area from the east side of SH119 to the confluence with Boulder Creek as an important stream habitat corridor. Because it is a riparian corridor, it is important habitat for wildlife and provides a link between the foothills and wetlands/pond habitat at Sawhill/Walden Ponds.

Hoover Hill—This 85-acre PCA located east of Boulder is considered to have high biodiversity significance because of a fair occurrence of a globally imperiled community, Great Plains mixed grass prairie (*Stipa comata* - East). This community is considered to be imperiled both globally and in the state of Colorado. The occurrence is also included as a significant natural community in the Boulder County Comprehensive Plan. This site provides good general wildlife habitat because it is an open, undeveloped area.

Marshall Mesa—Marshall Mesa is managed by the City of Boulder OSMP and is located southwest of Boulder near Marshall Lake. It is a CNHP PCA of high biodiversity significance, based on occurrence of three vulnerable butterfly species. It is also identified as a natural area in the Boulder County Comprehensive Plan, for geology and plant community (Boulder County 2004). It includes scattered ponderosa pine and juniper, as well as tall and mid-grass prairie that are designated critical wildlife habitat by the City of Boulder for nesting habitat for grasshopper sparrows. General wildlife inhabiting area include black bear, mountain lion, mule deer, elk. Three globally vulnerable species, Arogos skipper, Ottoe skipper, and mottled dusky wing have occurred at this site (CNHP 2004).

North Boulder Grassland—This CNHP PCA is located on the northwestern edge of the study area. It is mostly managed by City of Boulder Open Space and Mountain Parks, and occupies 5,042 acres; of which about 10% is in the US 36 study area. It is considered to be an area of very high biodiversity significance because it contains a good occurrence of a globally rare plant species, Bell's twinpod (*Physaria bellii*). It also includes an occurrence of Great Plains mixed grass prairie (*Heterostipa neomexicana*) herbaceous vegetation, which is considered vulnerable globally and in Colorado. The North Boulder Grasslands is considered good general wildlife habitat, with known occurrences of various rare butterflies.

South Boulder Canyon Ditch—This is a CNHP PCA located east of Boulder. It is rated as general biodiversity interest, and contains American groundnut (*Apios americana*), which is listed as critically imperiled in Colorado.



Shanahan Grassland— This 1,609-acre area south of Boulder is a CNHP PCA of 1609 acres. It is considered to be of high biodiversity significance because of an occurrence of a globally imperiled mesic tallgrass prairie community (*Andropogon gerardii*-*Sorghastrum nutans*-*Spartina pectinata*), and two globally vulnerable butterfly species, Ottoe skipper and Arogos skipper. It also provides habitat for prairie violet (*Viola pedatifida*), which is considered to be imperiled in Colorado. A portion of this area is included as a significant natural community in the Boulder County Open Space Plan.

Sunshine Canyon— This area is located west of Boulder. It is a CNHP PCA of high biodiversity significance, based on occurrence of a globally imperiled natural community, xeric tall grass prairie (*Andropogon gerardii* - *Schizachyrium scoparium*). The PCA occupies 97 acres. It is included as a significant natural community in the Boulder County Comprehensive Plan.

Walnut Creek— Walnut Creek PCA is located on the western edge of the US 36 boundary within the southeast corner of Rocky Flats National Wildlife Refuge is located within the Segment 6 study area. The Refuge consists of 6,266 acres surrounded by 50,000 acres Jefferson County open space. Its habitats include xeric tallgrass prairies, riparian corridors and wetlands, and mixed grass prairies, of which are important to many wildlife species. A management plan is currently being developed as part of a public process that includes an EIS (USFWS 2004b).

Other Boulder County Critical Wildlife Habitats

Boulder Creek Cottonwood Grove— This site is located at Boulder Creek located south of Pearl Street and west of N. 55th Street is considered a critical wildlife habitat due to its high diversity and density of species (Boulder 2002). Willow trees and shrubs, and cottonwoods dominate the riparian habitat.

Boulder Reservoir— This site on the west side of Boulder Reservoir includes wetlands and grassland habitats. The site is designated critical wildlife habitat by the City of Boulder Open Space due to nesting habitat for osprey, northern harrier, short-eared owl, and American bittern. The site is also considered potential nesting habitat for burrowing owls, though none have nested at the site recently (Boulder 2002).

Boulder Mountain Parks/Eldorado Mountain— This area located in the foothills west and southwest of Boulder is nesting habitat for golden eagle, prairie falcon, and peregrine falcons. The habitat is sandstone cliffs and rock outcrops, referred to as “the Flatirons”. The site is jointly owned by City of Boulder OSMF and Eldorado State Park (Boulder 2002).

Boulder Valley Ranch— This City of Boulder designated critical wildlife habitat is public Open Space and consists of native prairie that currently supports black-tailed prairie dogs. While burrowing owls have not been observed at the site since the 1980s, it still provides suitable habitat. The site is also considered potential nesting habitat for American bittern (Boulder 2002).

Carolyn Holmberg Preserve at Rock Creek Farm— This Preserve is grassland and irrigated cropland inhabited by black-tailed prairie dogs and burrowing owls. In addition, the site is used by a variety of raptors. Several riparian corridors cross the site, including Rock Creek.

Lefthand Creek Cottonwood Groves— This riparian corridor consists of cottonwood forest and willow shrub habitat. The area at the 49th Street and N. 73rd Street crossings at Lefthand Creek provides nesting habitat for red-headed woodpecker. Boulder County (2002) considers the corridor exceptional breeding bird density and diversity. Lefthand Creek is suitable habitat for Johnny darters, a CDOW species of concern, and plains topminnow, a fish under review for federal listing.

Sombrero Marsh— The City of Boulder OSMP, Boulder County Parks and Open Space, and Boulder Valley School District own this 20-acre site, located east of Boulder. Sombrero Marsh is a designated critical wildlife habitat because of the native prairie potholes and wetlands that support a variety of wildlife species including Wilson's phalarope, red-tailed hawks, and northern harriers. In addition muskrats, raccoons, skunks, eastern cottontail, ground squirrels, and voles also are frequently observed at the site.

South Boulder Creek— This cottonwood and willow riparian habitat and adjacent wet meadows provide habitat for two bird species red-headed woodpecker and bobolink that are considered special status, as well as, a fish species, Johnny darter.

Walden and Sawhill Ponds— These reclaimed gravel ponds and wetlands are located east of Boulder. Habitats are wetlands, shrubs, and scattered cottonwood trees that support American bittern and historically, least bittern. Boulder County Open Space owns Walden Ponds, while CDOW owns Sawhill Ponds but is managed by the City of Boulder OSMP.

3.3.2 Wildlife Viewing Areas/Recreation Areas

Areas considered good for fishing, birding, or wildlife viewing are open space areas that consist of relatively natural conditions. Because these areas are undeveloped areas surrounded by development, they are considered sensitive and a valuable wildlife resource. More than half of Boulder County Open Space properties are agricultural leasebacks, conservation easements, or natural habitat that are not open to public recreational use. These areas consist of National Wildlife Refuges, State Wildlife Areas, Wildlife Viewing Areas, and open space. These areas are shown in Plate 2.

National Wildlife Refuges

Two Ponds National Wildlife Refuge is located in Segment 3. This is 72-acre refuge consists of three ponds, wetlands, irrigation canals, and prairie grasslands (USFWS 2004a). Many birds are observed at the refuge during summer and spring/fall migration. Ten bird species nest at the refuge including Swainson's hawk and western meadowlark. Mammals known to inhabit the refuge include mule deer, raccoons, muskrats, beavers, and red fox. Ponds and riparian areas provide habitat for leopard frog, painted and snapping turtles.

A small portion of the southeast corner of Rocky Flats National Wildlife Refuge is located within the Segment 6 study area. The Refuge consists of 6,266 acres surrounded by 50,000 acres Jefferson County open space. Its habitats include xeric tallgrass prairies, the Walnut Creek riparian corridor, and wetlands, and mixed grass prairies. Walnut Creek contains known occurrences for Preble's

meadow jumping mouse, a federally and state listed species. A management plan is currently being developed as part of a public process that includes an EIS (USFWS 2004b).

State Wildlife Area

CDOw's state wildlife areas are easements or leases of properties used to protect wildlife and habitat, as well, as to provide opportunities for the public to hunt, fish, and watch wildlife in these areas. One CDOw State Wildlife Area, Lowell Ponds, is located in the project area at 56th and Lowell Blvd. in Segment 1. The site consists of warmwater ponds and trails for wildlife viewing, hiking, fishing, and picnicking.

Wildlife Viewing Areas

Wildlife viewing areas discussed here were chosen from a joint cooperative effort of various government and non-profit organizations in Colorado (Taylor Young 2000). In addition to Sawhill and Walden Ponds previously discussed, three wildlife viewing areas occur in the US 36 project area.

- The Mesa Trail along South Boulder Creek in Segment 6 consists of riparian, short to tall grass prairie, upland shrub, and ponderosa pine woodland habitats. Raptors, migratory songbirds, mule deer, coyotes, mountain lions, black bears, and various small mammals (Taylor Young 2000).
- South Platte River Greenway/Adams County Greenway is an urban wildlife corridor that is a total of 30-miles of paved pedestrian trail extending through the project area. While the Greenway is primarily surrounded by developed areas. Suburban parks and open space are also located adjacent to the Greenway. Numerous waterfowl, wading birds, and songbirds can be seen on the water or in the cottonwood/willow riparian habitat. Beavers, muskrats, red foxes, raccoons, skunks, and deer can be seen at night (Taylor Young 2000).
- Riverside Cemetery is located at Brighton Blvd. and York in Segment 1 and is located along the South Platte River. This riparian habitat provides opportunities to see American white pelicans, great-horned owl, northern harriers, Brewer's sparrows, as well as numerous waterfowl, and wading birds. Prairie dogs, red fox, white-tailed deer, and muskrats can also be observed (Taylor Young 2000).

Birding Areas

The Colorado Bird Society lists many good areas for birding in the project area. The presence of birds is indicators of good environmental condition and pristine habitats support greater diversity of birds. Preferred bird watching locations are therefore in areas of good quality wildlife habitat. These birding areas are often also available for fishing and recreational trail use.

TABLE 3-6: COLORADO BIRDING AREAS

Site Name	Segment	Comment
Boulder Reservoir	6	Located in northeast Boulder. Area attracts waterfowl and gulls. In some winters, Short-eared owls visit the northwestern corner. Also observed are northern harrier, bald eagle, gulls, waterfowl, grebes, and grassland sparrows.
Baseline Reservoir	6	A private reservoir located at Baseline Road and Cherryvale Road. Provides viewing opportunities from the east side for waterfowl, grebes, gulls, pelicans, loons, and wintering eagles.
Bobolink Trail	6	Located at Baseline and Cherryvale Roads. Species observed include: bobolink, spring migrants, common snipe, western meadowlark
Valmont Reservoir	6	While Valmont Reservoir is private, Legion Park to the south provides viewing access of the Reservoir. Good winter birding: waterfowl, ferruginous hawk, bald and golden eagles, red-tailed hawk.
Walden Ponds	6	This is a park on the eastern edge of Boulder, adjacent to Boulder Creek. The area has a series of ponds and riparian areas.
Sawhill Ponds	6	Sawhill Ponds borders Walden Ponds to the south and consists of a series of ponds.
Culver Ponds	5	Located 0.5-mile north of Valmont Avenue at 95 th Street. A private set of ponds (viewed from public road), they often attract a few swans.
Dodd Reservoir	6	A small private pond that intermittently attracts some interesting waterfowl. Located in Section 6 off Hwy 119 and N. 71 st Street.
Gregory Canyon	6	Located in Section 6, this trail is accessed from Baseline Road. May observe hooded warblers, Lazuli bunting, towhees, vireos, western tanager, swallows.
South Boulder Creek Trail	6	May observe American dipper, songbirds, eastern screech owl, and various waterfowl.
Standley Lake	3	This medium-sized lake with interesting waterfowl and gulls (a jaeger was spotted in 1999).
White Rocks Trail	6	Located near Valmont Drive and 95 th Street. Observe raptors, waterfowl, owls, egrets, herons, songbirds. Bald eagles are known to roost at this location.
Sombrero Marsh	6	Accessed from 63 rd and Arapahoe Streets. Good habitat for waterfowl, herons, yellow-headed blackbirds, and various shorebirds.
Chautauqua Park	6	Accessed from Baseline Road and 9 th Street may often see pygmy nuthatches among other birds.
Settler's Park	6	Located at West Pearl and Canyon Boulevard. May see canyon wren, lesser goldfinch, and violet-green swallows.

3.3.3 Wildlife Corridors

Wildlife corridors connect areas of fragmented wildlife habitat surrounded by developed or human inhabited areas. In small patches of habitat, corridors are essential for survival of populations as corridors provide a means for animals to disperse or survive when resources are scarce in their core home range. Without corridors to access adjacent areas of habitat, wildlife populations become isolated and susceptible to local extinctions through inbreeding, lack of resources, and disease among other reasons. Important habitats and corridors are discussed below by project segment. Wildlife Corridors in the US 36 project area are mapped in Plate 4.

Segment 1 - Denver

Habitats along the South Platte River in Denver are highly disturbed and altered, and are mostly bordered by industrial areas. Relatively small patches of riparian woodland and shrubland habitat



occur near the BNSF crossing, and most of the land along the river is disturbed and dominated by noxious weeds and other herbaceous plants. However, the South Platte River serves as an important corridor for species that would otherwise not have connected habitat within this highly developed area.

Segment 2 - Adams County

South Platte River. This corridor continues through the east part of Segment 2. Riparian cottonwood forest grows along the South Platte River, providing cover and habitat for birds and a corridor for wildlife species.

Clear Creek. This is a major riparian corridor connecting the foothills near Golden with the South Platte River. Relatively large areas of riparian woodland and shrub along the creek in some areas, while other portions include gravel pits and disturbed habitats. The creek is crossed by the BNSF railroad east of 64th Avenue and SH 287. This area consists of riparian cottonwood/willow riparian forest, adjacent ponds, and wetlands, habitat for birds and some raptors that more tolerant of human disturbance such as red-tailed hawks and American kestrels.

Segment 3 - Westminster

Big Dry Creek. This creek connects Standley Lake open space with habitats to the northeast. The habitat along this creek is lined with numerous wetlands and scattered cottonwoods. The portion of this creek located in the project area provides wildlife a corridor to move across the railroad and US 36. Several raptor nests are located along the creek, as well as swallow nests.

Clear Creek. A small portion of Clear Creek occurs in the southeast corner of Segment 3.

Walnut Creek. Walnut Creek flows into Big Dry Creek just west of US 36, but is crossed by the BNSF tracks at Wadsworth Blvd. Areas adjacent to the creek are open space and a golf course. While Preble's meadow jumping mouse have been captured on Walnut Creek, west of the project area, above the Great Western Reservoir, none have been captured within the project area on Walnut Creek.

Segment 5 - Superior/Louisville

Coal Creek and Rock Creek are movement corridors for mule deer and white-tailed deer concentration areas (NDIS 2004). Wildlife are able to access both sides of US 36 using existing wildlife crossings under the highway.

Coal Creek. Coal Creek is crossed by both US 36 and the BNSF railroad tracks in the project area. Boulder County considers the portion of Coal Creek west of US 36 to be a significant riparian corridor (Boulder County 1999), though the portion of the creek on the east side of US 36 also provides a good wildlife corridor. The habitat along the creek is composed of cottonwood riparian forest with willow shrubs and wetlands.

Rock Creek. The portion of Rock Creek east of US 36 provides a riparian corridor as well as a large expanse of open space for animals to inhabit or travel through. Wetlands and willow shrub habitats are located along the creek.

Segment 6 - Boulder

Boulder County has identified South Boulder Creek, Fourmile Canyon Creek from the east side of SH 119 to the confluence with S. Boulder Creek, and Lefthand Creek as important stream habitat corridors. Additionally, Boulder has a continuous expanse of open space land from Davidson Mesa to north through the foothills, as well as northeast through eastern Boulder County to Boulder Reservoir.

Lefthand Creek. A cottonwood grove along Lefthand Creek considered critical wildlife habitat by Boulder County (2002), but are not crossed by US 36 or the BNSF railroad. However Lefthand Creek is a good wildlife corridor as it consists of cottonwood riparian forest.

Fourmile Canyon Creek. The portion of this creek between CO 119 to the confluence with South Boulder Creek consists of cottonwood riparian forest and wetlands habitat that links to Walden/Sawhill Ponds.

South Boulder Creek. This riparian corridor supports Preble's meadow jumping mice, among other species and provides a corridor between the foothills into the plains.

3.4 NOXIOUS WEEDS

Noxious weeds are plant species not native to Colorado and have negative impacts on crops, native plant communities, livestock, and/or the management of natural or agricultural systems. Noxious weeds are officially designated as such by the state of Colorado and/or individual counties.

Management of noxious weeds is required under Federal Executive Order 13112 Invasive Species, State of Colorado Executive Order D 006 99-Development and Implementation of Noxious Weed Management Programs, and the Colorado Noxious Weed Act (Colorado Regulatory Statutes [CRS] 35-5.5-101-119 C.R.S. (2003). The Noxious Weed Act requires all persons to use integrated methods to manage noxious weeds, if such plants are likely to be materially damaging to neighboring lands.

New permanent rules pertaining to the administration and enforcement of the Colorado Noxious Weed Act were adopted in early 2004. Under the new rules, state listed noxious weeds are placed into one of three categories: List A, B, or C. List A species are designated for eradication, and it would be a violation of the rules to allow any plant of any population of any List A species to produce seed or develop reproductive propagules. List A species are considered to be rare noxious weed species that can be prevented from establishing permanent populations in Colorado. Only two small populations of one List A species, myrtle spurge, were found during field surveys. List B species would be managed by state noxious weed management plan with the goal of stopping the continued spread of these species. List C species are those for which the State in consultation with other interested parties, will develop management plans with the goal of supporting jurisdictions that choose to require management of those species.

In addition, under the Colorado Noxious Weed Act, each county and municipality is required to develop a weed management plan for lands under its jurisdiction and to establish a local advisory board to develop and regularly review the management plan and declare noxious weeds to be subject to integrated management. Each county and some cities in the project area maintains a list of noxious weeds that are a priority for the municipality.

Table 3-7 lists the noxious weeds observed in the project area during field surveys in May, June, and July 2004. Reports by counties and municipalities, the Department of Agriculture 2002 QuarterQuad Survey maps (Colorado Department of Agriculture 2002) and CDOT GPS/GIS Weed Survey Map (CDOT 2002) also provide data on noxious weeds in the project area.

The City of Boulder (OSMP) maintains an extensive list of additional weed species for lands that it manages. This list includes several species that are not identified by the state, but are of ecological importance to the management goals of the department (City of Boulder 2004). The US 36 and BNSF corridors are adjacent to OSMP lands in several areas, and the additional species managed by OSMP and observations of these species are listed in Table 3-8.

TABLE 3-7: NOXIOUS WEEDS OBSERVED IN THE PROJECT AREA

Common Name	Scientific Name	Noxious Weed Listing			Observed in Project Area (by Segment No.) ⁴	
		Colorado State List Category ¹	CDOT ²	Cities/ Counties ³	US 36	BNSF
Bouncingbet	<i>Saponaria officinalis</i>	B		By	5	6
Bull thistle	<i>Cirsium vulgare</i>	B	X	D	6	
Canada thistle	<i>Cirsium arvense</i>	B	X	All	All	All
Chicory	<i>Cichorium intybus</i>	C			4, 5, 6	5, 6
Common burdock	<i>Arctium minus</i>	C			3, 5, 6	6
Common mullein	<i>Verbascum thapsus</i>	C		J	4, 5, 6	1, 4, 6
Common St. Johnswort	<i>Hypericum perforatum</i>	C			5, 6	
Common tansy	<i>Tanacetum vulgare</i>	B		By	6	
Common teasel	<i>Dipsacus fullonum</i>	B		J, By	3, 4, 5, 6	2, 4, 6
Cutleaf teasel	<i>Dipsacus laciniatus</i>	B			3, 5	6
Dalmatian toadflax	<i>Linaria dalmatica,</i> <i>L. genistifolia</i>	B	X	D, A, J BC, By	3, 4, 5, 6	1, 4
Dame's rocket	<i>Hesperis matronalis</i>	B	X	By		6
Diffuse knapweed	<i>Centaurea diffusa</i>	B	X	All	3, 4, 5, 6	1, 2, 4, 5, 6
Downy brome (cheatgrass)	<i>Bromus tectorum</i>	C	X	By	All	All
Field bindweed	<i>Convolvulus arvensis</i>	C	X	A, Br,	All	All
Hoary cress (whitetop)	<i>Cardaria draba</i>	B	X	D, J, By	All	All
Houndstongue	<i>Cynoglossum officinale</i>	B	X	D, J, By	3, 5, 6	6
Jointed goatgrass	<i>Aegilops cylindrica</i>	C	X	By	6	3, 6
Kochia	<i>Kochia scoparia</i>		X		All	All
Leafy spurge	<i>Euphorbia esula</i>	B	X	All	2, 5	1, 2, 3, 5, 6
Moth mullein	<i>Verbascum blattaria</i>	B			4, 5	5
Musk thistle	<i>Carduus nutans</i>	B	X	All	All	All

Common Name	Scientific Name	Noxious Weed Listing			Observed in Project Area (by Segment No.) ⁴	
		Colorado State List Category ¹	CDOT ²	Cities/Counties ³	US 36	BNSF
Myrtle spurge	<i>Euphorbia myrsinites</i>	A		By	4, 6	
Oxeye daisy	<i>Chrysanthemum leucanthemum</i>	B	X	By	5	6
Perennial pepperweed	<i>Lepidium latifolium</i>	B	X	D, By	2, 3, 6	1, 2, 3
Perennial sowthistle	<i>Sonchus arvensis</i>	C			5	
Poison hemlock	<i>Conium maculatum</i>	C			2, 3, 4, 5, 6	1, 4, 6
Quackgrass	<i>Elytrigia repens</i>	B			4, 5	
Redstem filaree	<i>Erodium cicutarium</i>	B			3, 5, 6	1, 2, 4, 5, 6
Russian olive	<i>Elaeagnus angustifolia</i>	B	X	By	All	All
Salt cedar (tamarisk)	<i>Tamarix parviflora/ T. ramosissima</i>	B	X	A, Br, By	3, 5, 6	2, 4
Scotch thistle	<i>Onopordum acanthium/ O. tauricum</i>	B	X	All	All	All
Sulfur cinquefoil	<i>Potentilla recta</i>	B		By	6	
Yellow toadflax	<i>Linaria vulgaris</i>	B	X	D, A, J, BC, By	2, 3	

NOTES:

¹Colorado Department of Agriculture (2004)

²CDOT Statewide Maintenance List (2003)

³Colorado Department of Agriculture, County Weed Lists, City of Boulder Open Space and Mountain Parks Noxious Weed/Weeds of Concern Species Profile/Best Management Practices list. D = City and County of Denver, A = Adams County, J = Jefferson County, Br = Broomfield County, BC = Boulder County, By = City of Boulder

⁴Field observations made during EIS biological field studies, May-July, 2004

TABLE 3-8: CITY OF BOULDER OPEN SPACE AND MOUNTAIN PARKS ADDITIONAL WEED SPECIES¹

Common Name	Scientific Name	Observed on OSMP lands in Project Area
Bladder senna	<i>Colutea arborescens</i>	
Blue ornamental salvia	<i>Salvia azurea var. grandiflora</i>	
Buckthorn	<i>Rhamnus cathartica</i>	Segment 6 (BNSF)
Crown vetch	<i>Coronilla varia</i>	Segment 6 (US 36)
Cutleaf teasel	<i>Dipsacus laciniatus</i>	
Perennial sweetpea	<i>Lathyrus latifolius</i>	
Queen-of-the-meadow	<i>Filipendula ulmaria var. denudata</i>	
Smooth brome	<i>Bromus inermis</i>	Segment 6 (BNSF, US 36)
Tall oatgrass	<i>Arrhenatherum elatius</i>	
White campion	<i>Lychnis alba</i>	Segment 6 (BNSF)

NOTES:

¹ From City of Boulder Open Space and Mountain Parks Noxious Weed/Weeds of Concern Species Profile/Best Management Practices list

² Field observations made during EIS biological field studies, May -July 2004

3.5 FISHERIES AND AQUATIC HABITAT

Many rivers, ponds, lakes, and reservoirs provide habitat for native and introduced fish species and other aquatic species. Some ditches with perennial flow or perennial pools also provide fish habitat. Intermittent streams provide limited aquatic habitat. Plate 5 shows the distribution of recreational fishing waters and other water bodies in the study area. Table 3-9 lists the known recreational fishing areas within the study area (within 3 miles of project facilities and Table 3-10 lists the aquatic habitats within ¼ miles of project facilities. The only identified recreational fishing area within ¼ miles of project facilities is Boulder Creek, but limited fishing may occur in other areas.

TABLE 3-9: RECREATIONAL FISHING AREAS IN THE US 36 STUDY AREA

Segment	Name of Recreational Fishing Area
Denver	Berkeley Lake
	Rocky Mountain Lake
	South Platte River
Adams	Camenisch Park Pond
	Carl Park Pond
	Clear Creek Pond
	Engineers Lake
	Jim Baker Reservoir
Westminster	Faversham Park Pond
	Ketner Reservoir
	Lake Arbor
	Pomona Lake
	Standley Lake
	Water Point and Bellio Ponds (Hyland Ponds)
Westminster City Park Pond	
Broomfield	Tom Frost Reservoir
Superior-Louisville	None
Boulder	Left Hand Creek
	Maxwell Lake
	Boulder Creek
	Boulder Ponds
	Boulder Reservoir
	Coot Lake
	Cottonwood Lake
	KOA Lake
	Sawhill Pond #4

SOURCE: Goebel 2003, URS field observations

TABLE 3-10: AQUATIC HABITATS WITHIN ¼ MILE OF US 36/BNSF PROJECT FACILITIES

Segment	Perennial Rivers and Streams	Major Intermittent Streams	Lakes and Ponds
Denver	South Platte River (many fish species)	—	—
Adams	Clear Creek	—	<ul style="list-style-type: none"> • Gordon Lake • Pond at 62nd Ave. and BNSF tracks • Pond at 64th Ave. and BNSF tracks
Westminster	Big Dry Creek (population of state threatened fish species)	Walnut Creek	Lower Church Lake
Superior-Louisville		Rock Creek Coal Creek	Hogdson-Harris Reservoir
Boulder	<ul style="list-style-type: none"> • South Boulder Creek, (17 species of native and non-native fish) • Boulder Creek (mostly non-native fish, US 36 to Fourmile Creek is a fishing area which supports rainbow, brown, and brook trout) 	—	<ul style="list-style-type: none"> • Hillcrest Reservoir • Hayden Lake

The fish species commonly caught by recreational fishers in lakes in the study area are listed in Table 3-11. Other fish species in the study area are shown in Table 3-12.

TABLE 3-11: RECREATIONAL GAME FISH SPECIES IN THE US 36 STUDY AREA.

Common Name	Species Name	Status
Black bullhead	<i>Ameiurus melas</i>	native
Black crappie	<i>Pomoxis nigromaculatus</i>	introduced
Bluegill	<i>Lepomis macrochirus</i>	introduced
Brook trout	<i>Salvelinus fontinalis</i>	introduced
Brown trout	<i>Salmo trutta</i>	introduced
Channel catfish	<i>Ictalurus punctatus</i>	native
Common carp	<i>Cyprinus carpio</i>	introduced
Green sunfish	<i>Lepomis cyanellus</i>	native
Hybrid sunfish	<i>Lepomis cyanellus(m) X macrochirus(f)</i>	hybrid
Largemouth bass	<i>Micropterus salmoides</i>	introduced
Pumpkinseed	<i>Lepomis gibbosus</i>	introduced
Rainbow trout	<i>Oncorhynchus mykiss</i>	introduced
Smallmouth bass	<i>Micropterus dolomieu</i>	introduced
Tiger muskie	<i>Esox lucius X masquinongy</i>	hybrid
Walleye	<i>Stizostedion vitreum</i>	introduced
White sucker	<i>Catostomus commersoni</i>	native
Yellow perch	<i>Perca flavescens</i>	introduced

SOURCE: Van Buren 2004, Winkle 2004, NDIS 2004, Goebel 2003.

TABLE 3-12: OTHER FISH SPECIES IN THE US 36 STUDY AREA

Common Name	Species Name	Status
Brassy minnow	<i>Hybognathus hankinsoni</i>	Native – special status
Common shiner	<i>Luxilus cornutus</i>	Native – special status
Creek chub	<i>Semotilus atromaculatus</i>	Native
Western mosquitofish	<i>Gambusia affinis</i>	Introduced
Fathead minnow	<i>Pimephales promelas</i>	Native
Sand shiner	<i>Notropis stramineus</i>	Native
Longnose dace	<i>Rhinichthys cataractae</i>	Native
Longnose sucker	<i>Catostomus catostomus</i>	Native
White sucker	<i>Catostomus commersoni</i>	Native
Plains topminnow	<i>Fundulus sciadicus</i>	Native
Johnny darter	<i>Etheostoma nigrum</i>	Native – special status
Iowa darter	<i>Etheostoma exile</i>	Native – special status
Longnose sucker	<i>Catostomus catostomus</i>	Native

SOURCE: Van Buren 2004, Winkle 2004, NDIS 2004, Goebel 2003.

All of the fish species listed in Table 3-11 are native to the project area, with the exception of Western mosquitofish. Four of these fish species, brassy minnow, common shiner, Iowa darter, and Johnny darter are special status species that are further addressed below under Threatened, Endangered and Special Status Species. Mosquitofish and plains topminnow are rare in the area but could occur in any of the creeks within the project area (Van Buren 2004).

The South Platte River supports many of the fish listed in Tables 3-10 and 3-11. Coal Creek supports native non-game fishes such as fathead minnow (City of Louisville Open Space 2001). Coal Creek dries up often and therefore is not considered highly valuable fish habitat (Van Buren 2004), though it is a valuable riparian habitat.

Big Dry Creek in Segment 3, below Standley Lake, is an extremely valuable stream resource due to a population of common shiners, a state threatened species (Van Buren 2004). This shiner potentially occurs in the South Platte River and Stearns Lake within the project area as well (NDIS 2004). Additionally, carp occur in this water.

Boulder Creek supports no native fish and only a few non-native species, including brown trout, as it has been highly degraded by surrounding developments (Van Buren 2004).

Left Hand Creek is highly degraded in the project area due to high siltation, however the creek supports some native salmonids, including rainbow trout (Van Buren 2004).

South Boulder Creek supports approximately 17 species of fish, both native and introduced. Non-native or introduced fish dispersing into South Boulder Creek from area reservoirs are a concern for Boulder County. Two fish species of special concern, the orange-spotted sunfish and plains topminnow, inhabit South Boulder Creek (South Boulder Creek Mgmt Plan 2002). However, CDOW states that orange spotted sunfish do not inhabit creeks and do not occur in Boulder County (Van Buren 2004).

3.6 THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES

Threatened and endangered species are protected under the Endangered Species Act (ESA) or Colorado State law. Other sensitive species considered in this analysis are those that are proposed or candidates for federal or state listing, species considered by CDOW as special concern, species considered sensitive by county agencies, and species considered rare or vulnerable by CNHP.

3.6.1 Federally Listed Threatened, Endangered, and Candidate Species

The potential for occurrence of each federally or state listed species in the US 36 project area is evaluated in Table 3-13. Three federally listed species are known to occur in the project area: bald eagle, Preble's meadow jumping mouse, and Ute ladies'-tresses orchid. In addition, two state threatened species, burrowing owl and common shiner, also occur in the project area. More information about those species known or likely to be present is provided below. List of species were obtained from the USFWS and CDOW and are presented in Correspondence.

TABLE 3-13: FEDERAL AND STATE LISTED THREATENED AND ENDANGERED SPECIES AND THEIR POTENTIAL TO OCCUR IN THE US 36 PROJECT AREA

Common Name	Species	Federal Status	State of Colorado Status	Habitat	Potential for Occurrence in US 36 Project Area
Birds					
Bald eagle	<i>Haliaeetus leucocephalus</i>	FT	SE	Prefers open water near tall trees and prairie dog colonies, esp. in winter.	Present; summer nesting pairs in Segments 3 and 6, and wintering populations in Segments 3, 4, 5, and 6.
Burrowing owl	<i>Athene cunicularia</i>	--	ST	Grasslands, usually in association with prairie dog colonies.	Present; documented in Segments 5 and 6; could potentially occur elsewhere.
Interior least tern	<i>Sterna antillarum</i>	FE	SE	Migrants occur at reservoirs, lakes, and rivers with bare sandy shorelines. Local uncommon summer resident on southeastern plains of Colorado.	Unlikely, only during spring migration. Nests along the Platte River in central Nebraska.
Mexican spotted owl	<i>Strix occidentalis lucida</i>	FT	ST	Mixed conifer forests and pinyon-juniper woodland with narrow, shady, cool canyons in sandstone slickrock elevations of 4,400 to 6,800 feet.	Not present; no suitable habitat.
Piping plover	<i>Charadrius melodus</i>	FT	ST	Wetlands, lakeshores, and marshes. Rare migrant on eastern plains to foothills of Colorado between April and May.	Unlikely; occurrence very rare in eastern Colorado. Occurs downstream along Platte River in central Nebraska.
Whooping crane	<i>Grus americana</i>	FE	SE	Rare migrant in Colorado, east of project area. Stopover habitat during migration includes wetlands, irrigated meadows, broad drainage bottoms and reservoir edges. Generally in areas with minimal human disturbance	Unlikely; stopover is extremely unlikely within the project area, though individuals may fly over during migration. Occurs downstream along Platte River in central Nebraska.
Mammals					
Black-footed ferret	<i>Mustela nigripes</i>	FE	SE	Found in association with black-tailed prairie dog colonies in grassland habitats.	Unlikely. Considered extirpated from eastern Colorado.
Canada lynx	<i>Lynx canadensis</i>	FT	SE	Contiguous old-growth spruce, fir, and lodgepole pine forests with deep snow and available prey of snowshoe hare.	Not present; no suitable habitat.

Common Name	Species	Federal Status	State of Colorado Status	Habitat	Potential for Occurrence in US 36 Project Area
Preble's meadow jumping mouse	<i>Zapus hudsonius preblei</i>	FT	ST	Occurs along Front Range of northern Colorado and southern Wyoming in along permanent or intermittent streams in areas of good herbaceous cover and adequate cover of shrubs and trees.	Present in project area along S. Boulder Creek and adjacent ditches crossed by US 36 in Segment 6. Critical habitat designated in Jefferson County..
Amphibians					
Boreal toad	<i>Bufo boreas boreas</i>	FC	SE	Damp areas dominated by lodgepole pine, aspen, or Engelmann spruce-subalpine fir forests.	Not present; no suitable habitat.
Fish					
Brassy minnow	<i>Hybognathus hankinsoni</i>	--	ST	Fluctuating streams of the Front Range and eastern plains.	Potentially present in project area; considered rare, but may occur in any stream (CDOW 2004b).
Common shiner	<i>Luxilus cornutus</i>	--	ST	Requires cool, clear, moderate gradient streams with gravel bottoms shaded by brush or trees.	Present in Steams Lake, Big Dry Creek, and mainstem of South Platte River in Denver.
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	FT	ST	Prefers cold, clear, gravely headwater streams in the Arkansas and South Platte river drainages.	Not present; nearest populations is in Rocky Mountain National Park..
Pallid sturgeon	<i>Scaphirhynchus albus</i>	FE	--	Known population in Mississippi River from Missouri to the Gulf of Mexico.	Not present in study area. Occurs downstream in lower reaches of Platte River.
Invertebrates					
Pawnee montane skipper	<i>Hesperia leonardus montana</i>	FT	--	Found in the South Platte Canyon, southwest of Denver.	Not present; no suitable habitat and no known populations in project area.
Plants					
Ute ladies'-tresses orchid	<i>Spiranthes diluvialis</i>	FT	--	Sub-irrigated alluvial soils along streams; open meadows on floodplains.	Present, largest population in Colorado in Segment 6 along US36
Colorado butterfly plant	<i>Gaura neomexicana</i> spp. <i>Neomexicana</i>	FT	--	Sub-irrigated alluvial soils of drainage bottoms within mixed grass prairie.	Present along Walnut Creek near BNSF crossing in Westminster.

SOURCE: USFWS 2003; CNHP 2004; CDOW 2004a

NOTES:

Status: FE = listed as Federally Endangered

FT = listed as Federally threatened

SE = listed as endangered by the Colorado Division of Wildlife

ST = listed as threatened by the Colorado Division of Wildlife

Federally threatened or endangered species, with Colorado state status, which are potentially, likely or known to occur in the US 36 project are discussed in further detail below.

Bald Eagle

The bald eagle occupies Colorado's western valleys, mountain parks, and eastern plains in winter, and is considered a rare summer resident, though several nesting pairs are observed each year in the Denver metropolitan area. Bald eagles forage on rivers, large lakes and reservoirs, estuaries, and coastal habitats and require large trees or cliffs for roosting and perching. Bald eagles mainly subsist on fish and carrion, but also opportunistically prey on waterfowl and small mammals (Andrews and Righter 1992).

Bald eagles are frequently observed in winter along the US 36 corridor foraging or perched near black-tailed prairie dog colonies. Currently, three nest sites are known to be located in the project area. In Segment 6, one nest is in a cottonwood grove along Coal Creek, south of Marshall Lake on City of Boulder Open Space; this nest failed in 2003. A second bald eagle nest and roost site in Segment 6 is located at White Rocks, a City of Boulder OSMP area located northeast of the intersection of 75th and Valmont. The City of Boulder OSMP implements seasonal closures to recreation in these areas between November 1 and July 31 to provide protection to these nesting and roosting bald eagles. In Segment 3, a pair of bald eagles nests at the Standley Lake Regional Park in the City of Westminster. This nest is located on the northeast side of Stanley Lake.

Baseline Reservoir and South Boulder Creek are considered important winter habitat for bald eagles (S. Boulder Creek Mgmt Plan). According to NDIS 2004, winter foraging areas are present along the lower South Platte River (Segment 2), west of Standley lake (Segments 3 and 4), along Rock Creek (Segments 4 and 5), along Boulder Creek east of the City of Boulder, and near Boulder Reservoir (Segment 6).

Burrowing Owl

Burrowing owls are small, terrestrial raptors, which inhabit grassland habitats in close association with active and inactive black-tailed prairie dog colonies. They nest in abandoned black-tailed prairie dog or ground squirrel burrows as well as in native prairie, pasture, hayland, fallow fields, road and railway rights-of-ways. Burrowing owls are present in eastern Colorado between March 1 and October 1, and nest between April 1 and July 31.

Black-tailed prairie dog colonies are located throughout the US 36 project area, however, known burrowing owl nest sites are not abundant. Currently, only two known active burrowing owl nest sites occur in Boulder County. Since 1984, the Boulder County Nature Association (BCNA) has recorded between one and 3 pairs of burrowing owls nesting on Rock Creek Farm in Segment 5. A black-tailed prairie dog colony located on private property west of South Cherryvale Road in Segment 6 had burrowing owl activity in 1998.

Preble's Meadow Jumping Mouse

Preble's meadow jumping mice occur along the Front Range of northern Colorado and southern Wyoming. The species is typically associated with areas of medium to high moisture along permanent or intermittent streams in areas of good herbaceous cover and adequate cover of shrubs and trees. The southern portion of the project area is included within the Denver Metropolitan Block Clearance Area, meaning that there are no known Preble's meadow jumping mouse populations within this area, and that presence/absence surveys are not required. This includes all of Segments 1 and 2, and much of Segments 3 and 4. Preble's meadow jumping mice are known to occur in several portions of Section 6 - along South Boulder Creek north and south of US 36, Coal Creek south of US 36, on drainages in the foothills west of Boulder, and on several drainages on Rocky Flats National Wildlife Refuge. These areas are shown in Plate 6.

Most of the stream crossings along the US 36 and BNSF corridors outside of the block clearance areas have been previously evaluated for habitat suitability or have had previous trapping surveys. Additional field surveys will be conducted in 2004 for this project to determine whether potentially suitable habitat is present along the corridors. Depending on the results of the habitat evaluation and consultation with the Fish and Wildlife Service, trapping surveys may be conducted.

Brassy Minnow

Brassy minnows are considered state threatened due to low numbers and restricted habitat due to river and stream degradation. The species is currently documented to occur in the lower mainstem South Platte River and its major tributary streams of the foothills and plains (e.g., Cache la Poudre River, St. Vrain Creek) (NDIS 2004). Brassy minnow tend to school in relatively slow flow over various substrates, but are apparently able to spawn and maintain a population in fluctuating flows or irrigation canals, or else recolonize from off-channel habitats (Fausch 2000). According to CDOW, brassy minnows are extremely rare in the project area creeks (Van Buren 2004).

Common Shiner

Common shiners are native fish that require cool temperature streams with a moderate gradient and a gravel bottoms. Waters inhabited by common shiners must also be free of siltation and shaded by brush or trees to cool the water (NDIS 2004). Due to development and alteration, streams and rivers that are free of siltation are uncommon in Colorado and therefore the species is rare (NDIS 2004). The species is restricted to the South Platte River basin and currently occurs in Big Dry Creek within the project area, downstream Left Hand Creek, east of the project area (Van Buren 2004). Common shiners were also sampled in Stearns Lake in 1997 and from the South Platte River in Denver in the early 1980s (NDIS 2004).

Ute Ladies'-tresses Orchid

This species is a terrestrial orchid 8 to 20 inches tall that occurs in low elevation riparian and wet meadows of the Front Range and other Rocky Mountain states. It has white flowers in mid- to late-summer. The largest population in the State of Colorado occurs in the South Boulder Creek area, within City of Boulder OSMP lands on both sides of US 36 (Plate 7). The orchid occurs primarily in irrigated meadows, but also in more natural habitat along the South Boulder Creek riparian corridor and in small to large patches in wet meadows adjacent to South Boulder Creek (City of Boulder OSMP 1997). The City of Boulder OSMP actively maintains orchid habitat using disturbances such as dormant season grazing, haying, and prescribed burning, in order to reduce competition from other vegetation. The orchid does not flower every year.

Annual field surveys, final design or prior to construction, are necessary to assess presence or absence of Ute ladies'-tresses in areas of suitable habitat that may be affected by the project. URS conducted a site reconnaissance in the late summer of 2004 for the species, and at least 50 plants were observed in or adjacent to the US 36 project footprint.

Colorado Butterfly Plant

Colorado butterfly plant is a tall short-lived perennial herb in the evening primrose family. This species was reintroduced to a site along Walnut Creek in Westminster in Segment 3 about 15 years ago. During field visits in August 2004, the species was observed at this reintroduction site as well as downstream, near the BNSF railroad crossing over Walnut Creek. The site is open space managed by the City of Westminster Parks and Recreation Department (Neely 2004). There are also historic records of Colorado butterfly plant from Boulder County outside of the study area, but there are no current known occurrences (Riedel 2004; Mayo 2004). The other nearest known populations are in Fort Collins and Warren Air Force Base in Wyoming.

3.6.2 Other Special Status Animal Species

Table 3-14 lists other animal species with special status, including CDOW species of special concern, federal species of special concern, CNHP ranked species, and Boulder County ranked species. The species with county status that are listed in Table 3-14 were included due to their rarity and high likelihood of occurrence in the project area based on the Boulder County Nature Association's Avian Species of Special Concern list (BCNA 1999).

TABLE 3-14: OTHER SPECIAL STATUS SPECIES AND THEIR POTENTIAL TO OCCUR IN THE US 36 PROJECT AREA

Common Name	Scientific Name	Federal Status	State Status	CNHP Status	County Status	Habitat	Occurrence in US 36 Project Area
Mammals							
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>		SC			Grasslands throughout eastern Colorado.	Present; documented throughout project area, mostly in Segment 3, 4, 5, and 6.
Northern pocket gopher (macrotis ssp)	<i>Thomomys talpoides macrotis</i>		SC	G5T1 S1		Agricultural areas and pastures, semidesert shrublands, and grasslands.	Not present, known populations of the subspecies only in Douglas County, south of the project area.
Townsend's big-eared bat (pale ssp)	<i>Corynorhinus townsendii pallascens</i>		SC			Roost in caves and abandoned mines in shrubland and woodland habitat. Relatively sedentary, only migrates short distances from hibernacula.	Present, known to occur in Boulder foothills (Segment 6). Two roosts on open space are protected by seasonal closures between April and October.
Wolverine	<i>Gulo gulo</i>		SE	G4 S1		Subalpine forests and tundra.	Unlikely; 1870 report from Boulder foothills in Segment 6, but species very rare or extirpated from Colorado
Birds							
American peregrine falcon	<i>Falco peregrinus anatum</i>		SC	G4T3 S2B	OSMP BCNA3	Nests on cliffs, forages over many habitats.	Several nest sites are located in Segment 6 in City of Boulder OSMP property. These areas are temporarily closed annually from February 1 through July 31.
American bittern	<i>Botaurus lentiginosus</i>				OSMP BCNA1	Cattail marshes and adjacent wet meadows and around lakes and riparian areas, nests in marshes.	Present in Segment 6. Nests in suitable habitat at Boulder Valley Ranch, Boulder Reservoir, and Walden and Sawhill Ponds.
American redstart	<i>Setophaga ruticilla</i>			G5/S1B SZN	OSMP BCNA3	Moist deciduous woodlands with shrub undergrowth, mixed conifer/deciduous forests, and willow and alder thickets; generally in streamside habitats.	Potentially present during summer in Segment 6; record of occurrence along South Boulder Creek and possible nesting pairs.



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Common Name	Scientific Name	Federal Status	State Status	CNHP Status	County Status	Habitat	Occurrence in US 36 Project Area
Bank swallow	<i>Riparia riparia</i>				BCNA3	Nests in vertical banks of soft sand, gravel, clay, or mud, usually near water, but may use cliffs in gravel pits or roadcuts, colonial breeder.	Likely present; nests regularly at Sawhill Ponds in Segment 6
Barn owl	<i>Tyto alba</i>				BCNA3	Nests in natural crevices of trees, cliffs, and arroyo banks; and in human-built structures.	Likely present in Segments 5 and 6; recent nests known from White Rocks and Rock Creek.
Bobolink	<i>Dolichonyx oryzivorus</i>				BC BCNA4	Nests in moist tallgrass meadows and irrigated hayfields with young vegetation.	Present in Segment 6; occurs in South Boulder Creek area; designated county critical wildlife habitat along South Boulder Creek at Baseline Road.
Brown thrasher	<i>Toxostoma rufum</i>				BCNA1	Breeds in streamside riparian habitat, and in hedgerows or thickets in agricultural areas.	Potentially present in Segments 5 and 6; no known recent nesting.
Eared grebe	<i>Podiceps nigricollis</i>				BCNA1	Nests in colonies on marshes, ponds and lakes	Unlikely, no recent confirmed nesting sites in Boulder County, historic nesting in Segment 6
Ferruginous hawk	<i>Buteo regalis</i>		SC	G4/ S3B,S4N		Grasslands and shrublands; wintering birds prey on prairie dogs.	Likely present in open areas of Segments 3 to 6 in winter, especially prairie dog towns. No current known nests in study area, though may potentially nest in Segments 5 and 6; historic records of nests south of Boulder.
Golden eagle	<i>Aquila chrysaetos</i>				OSMP BCNA4	Grasslands, shrublands, pinyon juniper and ponderosa pine woodlands, and other habitats in migration and winter. Nests on cliffs and trees in rough areas. Forages in all adjacent habitats.	Present; known nesting areas in foothills areas of Segment 6. May forage in open areas of Segments 3 to 6.
Lark bunting	<i>Calamospiza melanocorys</i>				BCNA1	Breeds in grasslands and meadows, but scarce or absent from agricultural areas and near the foothills	Unlikely to breed in Segments 3 to 6, no known recent nests; may occur during migration.
Great egret	<i>Ardea alba</i>				BCNA3	Breeds in cottonwood groves, two recorded sites in Colorado. Forages at reservoirs, ponds and rivers.	Possible non-breeding occurrence at reservoirs in all segments; one of two known sites in Colorado is located along Boulder Creek just east of the study area, in a great blue heron rookery.
Least bittern	<i>Ixobrychus exilis</i>				BCNA3	Freshwater marshes	Possible in Segment 6; has nested at Sawhill Ponds
Lewis' woodpecker	<i>Melanerpes lewis</i>				OSMP BCNA1	Lowland and foothill riparian forest, agricultural fields, and urban wooded areas not inhabited by red-headed woodpeckers.	Potentially present in Segment 6; record of occurrence along South Boulder Creek and nesting records in region.
Loggerhead shrike	<i>Lanius ludovicianus</i>				BCNA1	Nest in isolated trees or shrubs in rural areas and grasslands.	Likely present in Segments 3-6; nesting records in area, record of occurrence along South Boulder Creek.
Long-billed curlew	<i>Numenius americanus</i>		SC		BCNA6	Shortgrass prairies with nearby ponds or lakes. Migrating birds are observed on shorelines of lakes and ponds as well as in grassland meadows and open spaces.	Unlikely, may occur at reservoirs during migration (Segments 3 and 6); no longer nests in study area.
Long-eared Owl	<i>Asio otus</i>				OSMP BCNA1	Lowland riparian forests with dense tall shrubs and trees, as well as urban areas in tree stands. Usually nests in abandoned nests of crows, magpies, hawks and squirrels	Potentially present year-round in Segment 6; record of occurrence along South Boulder Creek and known nesting at White Rocks



Common Name	Scientific Name	Federal Status	State Status	CNHP Status	County Status	Habitat	Occurrence in US 36 Project Area
Mountain plover	<i>Charadrius montanus</i>		SC		BCNA6	Nest in shortgrass prairies in areas grazed by cattle or black-tailed prairie dogs.	Unlikely; no suitable habitat in project area, considered by Boulder County Nature Association to be extirpated from Boulder County.
Northern bobwhite	<i>Colinus virginianus</i>				OSMP BCNA1	Lowland riparian forests and agricultural areas with adequate woody cover.	Potentially present year-round in Segment 6; records of occurrence along South Boulder Creek, though uncommon in area.
Northern harrier	<i>Circus cyaneus</i>				BCNA1	Grasslands, agricultural areas, and marshes. Breeds around marshes.	Present, breeds at Boulder Reservoir in Segment 6 and possibly other areas. Forages in open areas of Segments 3 to 6. Nesting area at west end of Boulder Reservoir is designated as Boulder County critical wildlife habitat.
Northern mockingbird	<i>Mimus polyglottos</i>				BCNA3	Agricultural areas with scattered trees, prairie, shrublands, and lowland riparian areas.	Potentially present year-round in Segments 3 to 6; though more likely during migration and summer; record of occurrence along South Boulder Creek.
Osprey	<i>Pandion haliaetus</i>				BCNA3	Nests and forages near large bodies of water.	Present in Segment 6 in summer and migration; known nesting areas at Boulder Reservoir and Valmont Reservoirs in Segment 6.
Ovenbird	<i>Seiurus aurocapillus</i>			G5/ S2B	BCNA3	Breeds in ponderosa pine woodlands or mixed conifer forests.	Potentially present in forested foothills of Segment 6 during summer
Prairie falcon	<i>Falco mexicanus</i>				BCNA4	Open habitats, including grasslands, shrublands, and alpine tundra. Migrants occur in grassland, shrubland, and agricultural areas. Nest on cliffs.	Present in summer and migration; suitable nesting habitat in Boulder foothills in Segment 6. Suitable foraging habitat in project area.
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>				OSMP BCNA1	Lowland riparian forest, occasionally agricultural or urban areas with tall trees. The majority of red-headed woodpeckers do not over-winter in Colorado.	Likely present in Segment 6; designated nesting habitat in Boulder County Critical Wildlife Area along Lethand Creek on northern boundary of study area. One recent active nest. Have not been recently observed at Critical Wildlife Habitat along South Boulder Creek
Sage thrasher	<i>Oreoscoptes montanus</i>				BCNA3	Breeds in foothill shrublands	Potentially present in foothills shrublands in Segment 6.
Short-eared owl	<i>Asio flammeus</i>			G5/ S2B	BCNA3	Grasslands, prairies and wetlands. Nest on the ground within dense, tall vegetation.	Potentially present in Segment 6; rare winter visitor principally seen in critical wildlife habitat on west side of Boulder Reservoir. No recent nesting records.
Willow flycatcher	<i>Empidonax traillii</i>				BC BCNA2	Nests in willows along streams, usually distant from trees. Migrate through lowland riparian forests.	May be present in riparian areas of Segment 6; Record of occurrence along South Boulder Creek.
Amphibians and Reptiles							
Northern leopard frog	<i>Rana pipiens</i>		SC			Pond, lake, and reservoir edges; wet meadows, marshes, streams, and irrigation ditches.	Likely present in all segments; documented on several properties in Boulder County, and are expected to occur in suitable habitats within the project area.
Common garter snake	<i>Thamnophis sirtalis</i>		SC			Aquatic, wetland, and riparian habitats in marshes, ponds, and stream edges. In northeastern Colorado, this snake occurs along the South Platte River and its tributaries below 6,000 feet in elevation	Likely present in all segments; suitable habitat includes Sombreiro Marsh, Boulder Creek, South Boulder Creek, Rock Creek, and the South Platte River among other sites.

Common Name	Scientific Name	Federal Status	State Status	CNHP Status	County Status	Habitat	Occurrence in US 36 Project Area
Fish							
Iowa darter	<i>Etheostoma exile</i>		SC			Inhabit lakes in aquatic vegetation and in streams with vegetation along undercut stream banks with vegetation extending into the water.	May be present in suitable habitats in project area, documented in South Platte River.
Johnny darter	<i>Etheostoma nigrum</i>				BC	Isolated portions of the S. Platte R. Basin and in portions of several tributaries as the streams flow from mountain areas out onto the plains. Species are bottom dwellers and occur in riffles, runs, and pools with sand and rubble substrates.	Likely present in Segment 6; critical wildlife habitat designated in South Boulder and Lefthand creeks by Boulder County.
Northern redbelly dace	<i>Phoxinus eos</i>		SC	G5 S1		Submerged vegetation in slow-moving streams.	Unlikely; historically present in Boulder Creek in Segment 6.
Plains topminnow	<i>Fundulus sciadicus</i>				BC	Clear, slow-moving streams with aquatic vegetation, backwater pools of small creeks and larger streams.	Present in Segment 6; Boulder County critical wildlife habitat in Lefthand Creek and documented in waters north of Boulder.
Orange-spotted sunfish	<i>Lepomis humilis</i>				OSMP	Lakes, reservoirs, and low gradient, murky rivers and streams.	Potentially present in Segment 6; known occurrence in South Boulder Creek.
Invertebrates							
Arogos skipper (butterfly)	<i>Atrytone arogos</i>		-	G3G4 S2		Undisturbed grasslands and prairies.	Present in foothills southwest of Boulder in Segment 6.
Hop's feeding azure (butterfly)	<i>Celastrina humulus</i>		-	G2G3/ S2		Mountain foothill canyons and ravines from about 5800-6500 feet, usually associated with patches of hops.	Present southwest of Boulder in Segment 6.
Moss's elfin (butterfly)	<i>Callophrys mossii schryveri</i>		-	G3G4T3/ S2S3		Rocky outcrops, woody canyons, cliffs	Present in foothills west and southwest of Boulder in Segment 6.
Mottled dusky wing (butterfly)	<i>Erynnis martialis</i>		-	G3G4/ S2S3		Open woodland, prairies, and open brushy fields.	Present in foothills west of Boulder in Segment 6
Ottoo skipper (butterfly)	<i>Hesperia ottoe</i>		-	G3G4/ S2		Native tallgrass prairie.	Present; documented in tall grass prairie in Segment 6.
Painted damsel	<i>Hesperigrion heterodoxum</i>			G5 S1		No specific habitat information available. Near water.	Likely present, found in 1962 in foothills west of Boulder in Segment 6
Cylindrical papershell (mussel)	<i>Anodontooides ferussacianus</i>			G5 S2		Small creeks and headwaters of larger streams, in mud and sand	May be present in some streams or major ditches in Segment 6. Historic records from east of Boulder.
Plants							
Sweet flag	<i>Acorus calamus</i>			G4? SH	OSMP	Wetlands	Unlikely; known only from one historic location within the City of Boulder in Segment 6
Dwarf wild indigo	<i>Amorpha nana</i>			G5 S2S3	OSMP	Prairies and grasslands.	Present; known from several locations south and southeast of Boulder on OSMP land in Segment 6
American groundnut	<i>Apios Americana</i>			G5 S1	OSMP	Mesic woodlands, riparian areas and stream banks. Occurs in Colorado along a river bank, along three irrigation ditches, and on a seep on a shaded cliff.	Present; occurrences within a 0.5-mile of both US 36 and BNSF corridors in Segment 6. Five occurrences east of Boulder. Historic location in Denver County.
Forktip three-awn	<i>Aristida basiramea</i>			G5 S1	OSMP	Roadsides, pastures and waste ground on the Great Plains. In Colorado, it is limited to a few sites on sandstone outcrops.	Present; occurs at White Rocks area in Segment 6

Common Name	Scientific Name	Federal Status	State Status	CNHP Status	County Status	Habitat	Occurrence in US 36 Project Area
Narrow-leaved milkweed	<i>Asclepias stenophylla</i>			G4G5 S2	OSMP	Prairie habitat on outwash mesas	Present; known from two locations in Segment 6 west of CO 93; may occur at other locations.
Black spleenwort	<i>Asplenium adiantum-nigrum</i>			G5 S1	OSMP	Sandstone cliffs, in shaded cracks, crevices and ledges, on relatively dry south and east-facing cliffs	Present in Segment 6. Known from one location at White Rocks, only location in Colorado
Platte River milkvetch	<i>Astragalus plattensis</i>			G5 S1		Rocky or gravelly prairies, ravines, open wooded or brushy areas, roadsides.	Unlikely; recorded in 1916 in northwest Denver (Segment 1). Occurs in eastern tier of counties of Colorado.
Paper birch	<i>Betula papyrifera</i>			G5 S1	OSMP	In Colorado, restricted to a single location in the foothills near Boulder, in a cool, north-facing foothill ravine.	Present, known from one location in Segment 6 in foothills southwest of Boulder.
Rattlesnake fern	<i>Botrypus virginianus ssp europaeus</i>			G5 S1	OSMP	Cool, moist ravines in the foothills	Present; known from one location in foothills southwest of Boulder in Segment 6
Rocky Mountain sedge	<i>Carex saximontana</i>			G5 S1	OSMP	Dry to wet woods. In Colorado, occurs in pine forests and thickets of the outer foothills of the Front Range	Present; known from several locations in foothills southwest of Boulder in Segment 6.
Torrey sedge	<i>Carex torreyi</i>			G4 S1	OSMP	Moist open meadows and woods. In Colorado, known only from gulches in the outer foothills near Boulder.	Present, occurs at one location in foothills south of Boulder in Segment 6
Yellow hawthorn	<i>Crataegus chrysoarpa</i>			G5 S1	OSMP	Stream banks, open wooded hillsides, prairie ravines.	Present; occurs in outer foothills south of Boulder in Segment 6
Philadelphia fleabane	<i>Erigeron philadelphicus</i>			G5 S1		Moist meadows and floodplains.	Present; observed on segment 6 on OSMP land in July, 2004, on both sides of US 36.
Showy prairie gentian	<i>Eustoma grandiflorum</i>				OSMP	Along streams; in wet meadows, pastures and fields, usually near old stream meanders or at the margins of lakes or ponds. Often in alkaline soils.	Present; occurs along boulder Creek floodplain near White Rocks in Segment 6
Colorado gumweed	<i>Grindelia inornata</i>			G2 S2		Waste places, roadsides, pastures and prairies, on plains near the mountain front from Denver southward.	Possible; known from a 1921 record near Denver; may occur in Segments 1, 2, 3
Gay-feather	<i>Liatris ligulistylis</i>			G5 S1S2	OSMP	Wet meadows.	Present; known from one location south of Boulder in Segment 6.
Broad-leaved twayblade	<i>Listera convallarioides</i>			G5 S2	OSMP	Cool ravines in mountains in Colorado	Present; known from one location in foothills south of Boulder in Segment 6.
White adder's mouth	<i>Malaxis brachypoda</i>			G4 S1	OSMP	Shaded streamsides, mossy wet areas, 7,200 to 8,000 feet in Colorado	Present; occurs in foothills southeast of Boulder in Segment 6
Bell's twinpod	<i>Physaria bellii</i>			G2 S2	OSMP	Dry, loose, gray to black shale slopes in Niobrara and Pierre Formation shales and limestones, 5,200 to 5,800 feet.	Present, known from a number of locations north of Boulder in Segment 6
Pictureleaf wintergreen	<i>Pyrola picta</i>				OSMP	Cool, moist slopes and ravines, in lodgepole pine, Douglas-fir, and ponderosa pine forests, 6,000 – 9,800 feet.	Present; occurs in foothills in Segment 6

Common Name	Scientific Name	Federal Status	State Status	CNHP Status	County Status	Habitat	Occurrence in US 36 Project Area
Toothcup	<i>Rotala ramosior</i>			G5 S1	OSMP	Muddy or sandy shores or damp depressions.	Present; known to occur in South Boulder Creek area in Segment 6.
Rocky mountain bulrush	<i>Schoenoplectus saximontanus</i>			G5 S1		Drying mudflats on the plains and piedmont valleys, also shorelines and ditches	Possible; not known to occur in study area but recorded in Adams county; suitable habitat present in all segments
Weatherby's spikemoss	<i>Selaginella weatherbiana</i>				OSMP	North-facing cliffs of the Front Range	Present; occurs in mountains west of Boulder in Segment 6
Prairie violet	<i>Viola pedatifida</i>			G5 S2	OSMP	Prairies, open woodlands, and forest openings; rocky sites on the outwash mesas, 5,800 to 8,800 feet	Present; known to occur in prairie grasslands south and north of Boulder in Segment 6; historic record in 1893 from Segment 1

SOURCE: General: Boulder County 2002; City of Boulder Open Space and Mountain Parks 1997, 2004a,b,c; NDIS 2004. Mammals: Adams 2003; Fitzgerald, Meaney and Armstrong 1994. Birds: Andrews and Righter 1992, Boulder County Nature Association 1999, Kingery 1998. Amphibians and Reptiles: Hammerson 1999. Fish: Van Buren 2004, Winkle 2004, Woodling 1985. Invertebrates: Iowa Department of Natural Resources 2001; Opler 1995. Plants: Anderson and Spackman 2003; City of Boulder Open Space and Mountain Parks 1997; Great Plains Flora Association 1986), Mayo 2004; Neely 2004; Spackman et al 1997; Weber and Wittman 2001.

NOTES:

Status: From CNHP 2003, Colorado Division of Wildlife 2003, U.S. Fish and Wildlife Service 2003.

State SC = Special concern

4.0 IMPACTS

4.1 INTRODUCTION

This section describes impacts to biological resources that would result from construction and operation of the five project packages (alternatives), and methods that would be or could be used to reduce impacts. Packages 2 and 3 are discussed together as these two packages only include impacts from construction and expansion of US 36; Packages 4 and 5 are discussed together because as well as expansion of US 36, they include impacts from a new commuter rail along the BNSF corridors. The impacts from the commuter rail would be the same for both packages 4 and 5, and the impacts in the US 36 corridor would be similar under all packages. Therefore, the discussion of impacts from the US 36 corridor expansion under Packages 4 and 5 only includes impacts different than Packages 2 and 3.

4.2 PACKAGE NO. 1: NO ACTION

No new impacts to biological resources would occur under the No Action. However, the highway would continue to contribute to habitat fragmentation and isolation of wildlife populations due to inadequate habitat connectivity across the highway. Without an adequate number of wildlife crossings suitable for multi-species use, habitat is fragmented and individual animals are killed when attempting to cross the highway to reach adjacent habitats. While large mammal roadkill is currently rare on US 36, many roadkilled birds, prairie dogs, and other small and medium sized mammals are evident.

4.3 PACKAGE NO. 2: EXPRESS TOLL + BRT, AND PACKAGE NO. 3: GP LANES + BUS INTERMODAL

4.3.1 Vegetation

Several types of native vegetation types would be located within the construction footprint. Construction impacts would primarily occur from clearing of vegetation and earth-moving. Most impacts would be permanent, with the former natural habitat covered by pavement or a project-related facility. Acres of habitat loss by package are shown in Table 4-1. There would be no direct impacts to xeric tallgrass prairie, xeric upland shrub, foothills and mountain grassland, or ponderosa pine, under any of the Packages. Impacts to irrigated and dryland cropland and to urban or built-up land are not quantified because these are not natural habitats. Impacts to riparian herb habitat are not provided separately, since much of this habitat is interspersed with riparian woodland or shrub, or else has been included in wetland impacts in a separate report.

TABLE 4-1: DIRECT IMPACT TO VEGETATION (ACRES)

Vegetation Type	Package 2 US 36	Package 3 US 36	Package 4			Package 5		
			US 36	BNSF	Total	US 36	BNSF	Total
Mesic tallgrass prairie	6.6	6.4	6.7	—	6.7	6.6	—	6.6
Midgrass prairie	41.3	49.9	54.3	—	54.3	48.8	—	48.8
Riparian woodland	6.5	6.6	6.1	7.6	13.7	6.2	7.6	13.8
Riparian shrub	5.4	6.0	5.3	3.3	8.6	5.1	3.3	8.4
Total	59.8	68.9	72.4	10.9	83.3	66.7	10.9	77.6

The area of impact to mesic tallgrass prairie and midgrass prairie is similar for all alternatives. Mesic tallgrass prairie occurs only on portions of City of Boulder Yunker open space, where it is mostly within the Colorado Tallgrass Prairie Natural Area. Midgrass prairie occurs only in the Davidson Mesa area, and is mostly of poor quality within the project footprint due to presence of non-native and invasive plants. Table 4-2 shows the largest areas of permanent direct impact to riparian woodland and shrub along important riparian wildlife corridors within the US 36 study area.

TABLE 4-2: ACRES OF DIRECT IMPACT TO RIPARIAN HABITATS ALONG US 36

Riparian Habitat Area	Package 2	Package 3	Package 4	Package 5
	US 36	US 36	US 36	US 36
Farmers Highline Canal/Niver Canal	0.83	1.39	0.85	0.85
Walnut Creek	0.44	0.95	0.43	0.24
Big Dry Creek	0.22	0.39	0.2	0.24
Rock Creek	2.09	2.1	2.18	2.18
Coal Creek	0.29	0.27	0.27	0.34
Marshallville Ditch	1.3	1.27	1.24	1.31
Shearer Ditch	0.89	0.59	0.87	0.89
S. Boulder Creek/S. Boulder Canyon Ditch	0.31	0.31	0.31	0.31
Upper Bear Creek Ditch	0.98	0.98	0.98	0.98
Other Miscellaneous Riparian Impact along US 36 ROW.	4.05	4.20	4.01	3.71
Total	11.40	12.45	11.34	11.05

The largest areas of impact to riparian habitat would occur at Rock Creek, under all Packages. The riparian woodland and shrubland located in the Boulder Segment is considered high quality due to the presence of threatened and endangered plant and animals species. Walnut Creek, Big Dry Creek, Rock Creek, and Coal Creek are considered important wildlife corridors as well as high quality wildlife habitat.

4.3.2 Wildlife

Impacts to wildlife include habitat loss, habitat fragmentation, disturbance (avoidance and displacement), and mortality. Habitat loss results from removal of existing habitat and replacement with pavement or structures. Most impacts due to habitat loss would be permanent, but habitat loss may be temporary in areas that are revegetated after construction. The loss of habitat would generally be in linear areas adjacent to the existing highway.

Wildlife habitat in the project area was categorized as high, moderate, and low quality to further assess the impact to wildlife from project implementation. High quality wildlife habitat consists of riparian, wetland, foothills, sensitive areas, and prairie dog colonies; moderate quality habitat consists of native prairie/grassland and large undeveloped or agricultural areas; low quality habitats are developed/urban areas, small to medium sized golf courses without connectivity to a high or medium quality habitat, and isolated patches of undeveloped land. Losses of high and moderate-quality are provided in Table 4-3.

TABLE 4-3: DIRECT IMPACTS TO HIGH AND MODERATE QUALITY WILDLIFE HABITAT (ACRES)

Wildlife Habitat Quality	Package 2 US 36	Package 3 US 36	Package 4			Package 5		
			US 36	BNSF	Total	US 36	BNSF	Total
High	186.2	183.5	185.1	57.8	242.9	183.9	57.8	241.7
Moderate	348.4	329.8	392.0	62.2	454.2	324.7	62.2	386.9
Total	534.6	513.3	577.1	119.9	697.1	508.6	119.9	628.5

Habitat fragmentation occurs when developed or unnatural features divide a previously contiguous area of habitat. Roads, residential and commercial developments, and agricultural areas can contribute to habitat fragmentation. Fragmentation is detrimental to wildlife as it isolates individuals into smaller subpopulations that can become vulnerable to disease, inbreeding, and eventually extinction. Connectivity between habitats, such as those divided by roads, allows animals to disperse to new territories to interact with other animals of their species and promote genetic integrity. Additionally, without connectivity between habitats separated by a highway, animals become more vulnerable to mortality from vehicle collisions. Mortality may affect population sizes in a localized area.

Construction activity is likely to temporarily displace many animals due to noise, human presence, and heavy equipment. Many animals avoid roads, and the widened road and increased traffic may result in long-term increases in displaced individuals. Avoidance and displacement results in indirect loss of habitat because habitats along roads and adjacent to construction areas are not used effectively. Indirect habitat loss has not been quantified because animal responses are dependent on the individual or species, and may change with time.

Direct wildlife mortality would occur during construction from losses of small terrestrial and burrowing animals during ground-clearing and earth-moving, and losses due to traffic (roadkill) during both construction and operation.

Large Mammals. Mule deer and white-tailed deer would have moderate impacts due to habitat loss and disturbance. Movement corridors along major streams would be temporarily affected during construction, but would be maintained or improved after construction. Elk and mountain lions occur rarely in the study area and are not expected to incur impacts as a result of this project.

Black-tailed Prairie Dogs. Impacts include destruction of burrows, habitat loss, and death or injury to individual black-tailed prairie dogs from construction activities and equipment. Long-term direct impacts to prairie dogs resulting from Package No. 2 would be slightly more than Package No. 3, as shown in Table 4-4.

TABLE 4-4: IMPACTS TO ACTIVE BLACK-TAILED PRAIRIE DOG COLONIES (ACRES)

Segment	Package 2 US 36	Package 3 US 36	Package 4			Package 5		
			US 36	BNSF	Total	US 36	BNSF	Total
Denver	--	--	--	--	--	--	--	--
Adams	--	--	--	--	--	--	--	--
Westminster	11.8	13.7	12.0	7.0	19.0	11.8	7.0	18.8
Broomfield	38.7	31.4	38.2	--	38.2	29.2	--	29.2
Superior-Louisville	28.2	29.1	27.5	0.1	27.6	27.0	0.1	27.6
Boulder	6.0	5.1	5.9	2.6	8.5	6.0	2.6	8.6
Total	84.7	79.3	83.6	9.7	93.3	74.0	9.7	84.2

Indirect impacts from continued development in the study area would further fragment prairie dog colonies by reducing available habitat and dividing colonies into smaller subpopulations that are vulnerable to disease, inbreeding, and predation. Additionally, indirect impacts to other species associated with prairie dogs or their burrows would occur from removal of a prairie dog colony. CDOT has a policy to relocate prairie dogs within impacted ROWs, and a large number of individual prairie dogs would need to be relocated.

Raptors. Raptors could be directly impacted by removal of nests in the ROW, disturbance to nesting pairs or young, and disturbance or displacement of individuals from foraging and/or nesting areas in construction zones. Removal of trees would affect availability of nests sites, and increased traffic and noise on the US 36 may result in avoidance of high traffic areas by some species or individuals. Furthermore, direct loss of habitat would decrease the availability of important prey species, such as prairie dogs, which may indirectly reduce the number of nesting pairs.

CDOW recommends buffer zones around active raptor nests to avoid impacts to nesting birds or young. These buffer zone distances vary by species and consist of ¼-mile for red-tailed hawks, 1/3-mile for Swainson's hawk, and ½-mile for osprey. During the 2004 season, 3 red-tailed hawk nests were located within the buffer zone distance from the US 36 project impact area. No Swainson's hawk or osprey nests were located within the buffer zone distance from US 36 impact area. Additional nests are located along the corridor; although no activity was observed during 2004 surveys, these nests may be used in the future. Nest locations are likely to be different at the time of

construction but these nest impacts are considered to be representative of the impacts that could occur.

Other Birds. Impacts to birds from construction and operation of US 36 would include direct loss of habitat, displacement during construction, mortality from vehicle collisions and fragmentation of habitat due to highway widening. Birds would incur increased mortality from collisions with vehicles, especially at riparian crossings, with a wider highway and higher traffic volumes. Nearly all bird species present in the project area are protected by the Migratory Bird Treaty Act (MBTA), a federal act that prohibits destruction or disturbance of active nests that results in loss of eggs or young without a permit from the USFWS. All wild birds, including raptors, are protected under the MBTA, except for non-native species that include house sparrow, rock dove, and European starling. Vegetation clearing, earth-moving, and other construction activities have the potential to destroy nests of bird species protected under the MBTA.

Other Wildlife. Impacts to small and medium-sized mammals, reptiles, and amphibians would include habitat loss, mortality from vehicle collisions or crushing by construction equipment, and avoidance/displacement. During operation, Packages 2 and 3 could cause increased mortality and habitat fragmentation. Wider roads accommodate more traffic and faster speeds, which requires longer distances for small animals to travel to reach the other side. Additionally, wider roads make animals more vulnerable to crushing by a vehicle when attempting to cross the roadway. Indirectly, wider roads reduce available access to preferred habitats, isolating populations as animals become isolated from other habitat.

Wildlife Crossings. Packages 2 and 3 do not currently include specific provisions for improvement of wildlife crossings. Existing crossings would be wider due to the increased road width, resulting in wider bridges and longer culverts. This may result in decrease use by wildlife, because of reduced vegetation cover under bridges and an increased tunnel-effect at culverts. Wildlife crossings are important for animals to access adjacent areas of similar habitat separated by a highway or railroad line. Without adequate under- or over-highway crossings, animals will either avoid crossing, isolating them from adjacent areas of habitat and other individuals of the same species or may be killed by vehicles while attempting to cross the road. Ideal crossing locations for animals are at ditch and stream crossings, however, many of these existing structures are inadequate for use or are spaced too far apart to provide sufficient crossing opportunities. Additionally, many animals not adapted to riparian environments or do not travel along stream or ditches, such as black-tailed prairie dogs, coyotes, and cottontails. When animals are cut off from adjacent areas, habitat would become fragmented, potentially resulting in extirpation of local populations from an area.

4.3.3 Sensitive Habitats and Wildlife Corridors

Direct impacts to sensitive wildlife habitats are provided in Table 4-5. Sensitive areas and Wildlife Corridors that would be impacted are shown in Plate 4.

TABLE 4-5: IMPACTS TO SENSITIVE HABITATS (ACRES)

Segment	Sensitive Area	Package 2 US 36	Package 3 US 36	Package 4			Package 5		
				US 36	BNSF	Total	US 36	BNSF	Total
Broomfield/Superior-Louisville	Carolyn Holmberg Preserve/Rock Creek Farm Open Space	21.6	19.8	19.1	19.8	39.0	20.3	19.8	40.2
Boulder	South Boulder Creek Natural Area	40.3	37.0	--	--	--	--	--	--
	Colorado Tallgrass Prairie Natural Area	15.4	14.8	15.4	--	15.4	15.3	--	15.3
	Colorado Tallgrass Prairie PCA	95.9	89.0	95.6	--	95.6	90.2	--	90.2
	S. Boulder Canyon Ditch	--	--	--	0.2	0.2	--	0.2	0.2
Total*		117.5	108.8	114.7	23.2	134.8	110.5	23.2	130.6

NOTES:

*Totals are less than the sum of numbers due to overlap of Colorado Tallgrass Prairie Natural Area and PCA.

The project will have no impacts to Boulder County Critical Wildlife Habitats, National Wildlife Refuges, state wildlife areas, Boulder County critical wildlife areas, or wildlife viewing areas under any of the Action Packages. Packages 2 and 3 would have the following impacts to wildlife corridors:

- Big Dry Creek (Westminster Segment). The existing culverts would be widened by 130 feet under Packages 2 and 4, 218 feet under Package 3, and 109 feet under Package 5. Total culvert length would be around 235 feet for Package 2 and 325 feet for package 3, for the culvert with the bike path, and about 20 feet longer for the stream culvert. In addition to the short-term impacts associated with construction and loss of habitat, the Big Dry Creek corridor would have long-term impacts from reduced wildlife use of the crossing and increased fragmentation between upstream and downstream portions of Big Dry Creek.
- Rock Creek (Superior-Louisville/Broomfield segments). A new three-cell box culvert would be constructed, replacing a shorter 2-cell box culvert. The new structure would allow continued wildlife crossing, and the increased length would be balanced by an increased opening. There would be a reduction in available habitat at the crossing, but there should be no long-term change in use of the corridor.
- Coal Creek (Superior-Louisville Segment). A larger bridge would be constructed. Wildlife passage would be reduced during construction but should return to existing conditions after construction. The larger bridge would reduce riparian habitat at the crossing.
- Davidson Ditch (Boulder Segment). The existing culvert would be widened by 80 to 90 feet, nearly doubling its length. This may reduce wildlife use of this crossing and may adversely affect connectivity between habitats in City of Boulder open space on the two sides of the highway. Habitat connectivity is particularly important because of the presence of Preble's meadow jumping mouse.

- Goodhue Ditch (Boulder Segment). Changes to this ditch crossing have not been identified, but it is likely that it would have the same changes as Davidson Ditch. Impacts would be very similar.
- South Boulder Creek (Boulder Segment). The existing bridge would be widened by 40 feet, this action should not adversely affect long-term use of the corridor.

4.3.4 Noxious Weeds

Project-related construction activities may introduce new noxious weeds into the project area or increase the abundance of existing noxious weeds. These activities include mobilization of construction vehicles, excavation and transport of borrow materials and topsoil, land clearing, and reclamation. Removal of existing vegetation and disturbance of soils encourages germination of weed seeds and spread of roots and seeds. Disturbed areas may be seeded by airborne seeds from plants in adjacent habitats. After construction, noxious weeds can persist or become established on road edges and in reclaimed areas. Noxious weeds that are present in the construction right-of-way can spread onto adjacent lands. The primary concerns with noxious weeds are effects on public (open space) land, sensitive areas, agriculture, and wetland and riparian habitat. Noxious weeds can degrade habitat quality on open space, sensitive areas, and riparian habitat, and can cause increased management problems and costs in all areas.

The primary concerns are List A species, and List B species that are common and likely to spread within and from the construction area. One List A species, myrtle spurge, was observed during 2004 field surveys but is not located within the construction footprint. The most common List B species along US 36 are Canada thistle, common teasel, diffuse knapweed, hoary cress, perennial pepperweed, Russian olive, and Scotch thistle. Canada thistle, common teasel, perennial pepperweed and Russian olive are particularly likely to invade wetland and riparian areas, and all of these species can invade upland areas. Cutleaf teasel and houndstongue are more limited in distribution but are also likely to spread in wetlands and riparian areas, respectively.

4.3.5 Fisheries and Aquatic Habitats

During construction, fish and other aquatic organisms may be adversely affected by construction activities such as clearing of vegetation and earth-moving on streambanks, construction in streams for installation of culverts or bridge piers, movement and reconstruction of stream channels, and accidental spills of fuel or other materials. Aquatic organisms and habitats may also be affected indirectly through erosion of upland soils. These activities may cause increases in suspended solids, sedimentation of stream habitats, changes in water temperature through reductions in riparian cover, losses of habitat, and changes in water flow or quality. These impacts would generally be short-term except where permanent facilities occupy stream habitat, and would be minimized through use of construction best management practices to control erosion, sedimentation, and spills.

Direct long-term impacts would occur where new bridges or culverts are installed or extended (Table 4-6). Concrete box culverts replace natural streambed material with concrete, which is of limited use for aquatic organisms. The relative darkness within the culvert reduces food production

in the stream and on the banks. Changes in streamflow velocity and loss of natural streambed material may greatly decrease passage by fish and other organisms. Impacts from bridges are less severe because natural streambeds are maintained, and the more open structure of a bridge allows more light, but food productivity is generally reduced unless the height and width of the bridge allows good light penetration to the stream and adjacent riparian habitat. Direct long-term impacts would also occur where streams are relocated, because of the time needed to re-establish riparian vegetation ecosystem functions in the new stream channel.

Long-term impacts may also occur from highway runoff, which contributes sediment, petroleum products, and other pollutants to stream environments and degrades stream quality. Highway runoff would be controlled and treated in detention ponds.

Direct long-term losses of stream habitats are summarized below: There would be no direct effects on lakes or ponds, although Lower Church Lake would be within 100 feet of the construction footprint. No recreational fishing lakes or streams would be impacted by the implementation of Package Nos. 2 or 3.

TABLE 4-6: IMPACTS TO AQUATIC HABITATS ALONG THE US 36 PROJECT AREA

Segment	Aquatic Habitat	Construction Activity	Long-term Loss or Modification of Aquatic Habitat*			
			Package 2	Package 3	Package 4	Package 5
Westminster	Big Dry Creek	Extension of existing culvert	Additional 130 feet of stream channel in culvert	Additional 218 feet of stream channel in culvert	Additional 130 feet of stream channel in culvert	Additional 109 feet of stream channel in culvert
	Walnut Creek	Relocation of stream channel on south side of highway under Package 3 only.	380 feet of stream channel would be impacted	542 feet of stream channel would be relocated	380 feet of stream channel would be impacted	NA
Superior-Louisville	Rock Creek	New box culvert	Additional 250 feet of stream channel in culvert	Additional 513.5 feet of stream channel in culvert	Additional 186 feet of stream channel in culvert	178 feet of stream channel in culvert
		Relocation of stream channel on south side of highway	2,307 feet of stream channel relocated	Same	Same	Same
	Coal Creek	New bridge	Additional 98 to 127 feet of stream channel under bridge	Additional 101 to 107 feet of stream channel under bridge	Additional 88 to 106 feet of stream channel under bridge	Additional 54 feet of stream channel under bridge
Boulder	South Boulder Creek	Widen existing bridge	Additional 40 ft. of stream channel under bridge	Same	Same	Same

NOTES:

*Excludes existing stream channel within culverts or under bridge. Numbers based on 7/30/04 Engineering Design Review

4.3.6 Threatened and Endangered Species

Impacts to threatened and endangered species in the project area were assessed quantitatively where applicable (Table 4-7), however, impacts to some species would be indirect or are not quantifiable; these impacts are discussed by species below. Non-quantifiable impacts to threatened or endangered species would be similar under all packages. Impacts to Preble's meadow jumping mouse and Ute-ladies' Tresses are shown in Plate 6.

TABLE 4-7: DIRECT HABITAT LOSS TO THREATENED AND ENDANGERED SPECIES (ACRES)

Species	Package 2 US 36	Package 3 US 36	Package 4			Package 5		
			US 36	BNSF	Total	US 36	BNSF	Total
Preble's meadow jumping mouse	61.46	58.45	61.50	5.74	67.24	61.14	5.74	67.24
Utes'-ladies tresses orchid	63.15	60.09	63.10	--	63.10	63.05	--	63.05
Burrowing owl	86.2	79.3	95.6	20.7	116.3	83.7	20.7	104.3

Bald Eagle. The project would not affect bald eagle nests, which are located more than 1 mile from the construction area. It may adversely affect bald eagle foraging in prairie dog colonies in open space along the US 36 corridor. Bald eagles are frequently observed foraging over or perched near black-tailed prairie dog colonies along the US 36 corridor (in all segments), primarily in the winter season. Under Package Nos. 2 or 3, the loss of black-tailed prairie dog habitat would indirectly affecting wintering bald eagles' prey availability. Short-term, temporary impacts to bald eagles would include disturbance to foraging individuals in the immediate vicinity of US 36 while construction activities are occurring. The visual and auditory impacts from construction equipment and human activity would temporarily displace individual eagles for the duration of construction activity. Long-term impacts consist of permanent loss of foraging habitat within the project boundary from road widening. Implementation of Package Nos. 2 or 3 may affect, but is unlikely to adversely affect bald eagles.

Preble's Meadow Jumping Mouse (Preble's). Preble's occupy stream and ditch crossings under and adjacent to US 36 in portions of Segment 6 within the project area. These locations include South Boulder Creek north and south of US 36, and all suitable riparian and adjacent upland habitat east to Davidson Ditch. The *Preble's Meadow Jumping Mouse Habitat Assessment and Disqualification Report* (URS 2004b) provides information on suitability of each riparian crossing in the project area to support Preble's. Direct impacts to Preble's include loss of habitat and mortality to individuals from earth-moving or crushing during construction in the US 36 ROW. Construction during winter may kill hibernating individuals. Direct impacts are summarized in Table 4-7. Package No 2 would impact more acres of occupied Preble's habitat than Package 3. However, implementation of Package Nos. 2 or 3 may affect, and are likely to adversely affect Preble's in the project area.

Burrowing Owl. Impacts to nesting burrowing owls include permanent loss of potential nesting habitat (prairie dog habitat loss), and disturbance to individuals during nesting and migration from construction activities. While no nests are currently known along US 36, burrowing owls utilize portions of Boulder OSMP property south of US 36 in the vicinity of Cherryvale Road and suitable nesting habitat occurs in other parts of Sections 4, 5, and 6. If owls or their young are present in burrows near the road, they could be killed or injured if the burrows are destroyed during the nesting period (April 1 to July 31) or during the period when burrowing owls are present (March 1 to October 31). Noise and disturbance during construction could also adversely affect burrowing owls nesting within about 225 feet and could cause nest abandonment (Craig 2001). Impacts would be avoided by seasonal restrictions on construction.

Common Shiner and Brassy Minnow. Impacts to brassy minnows, if present in project area creeks, and common shiners inhabiting Big Dry Creek within the project area, include displacement during construction of bridge and culvert crossings. In addition, impacts to fish and fish habitat could potentially occur from sediment deposition from cleared construction areas adjacent to the channel, and from accidental releases of fuel, oil, or other materials that would adversely affect water quality. Impacts would be most detrimental during the fish spawning period in late spring and early summer. These impacts would be temporary and would be addressed by a use of BMPs, a sediment control plan, and spill prevention plan. Fish passage under the highway at Dry Creek may be reduced due to the increased culvert length.

Ute-ladies' Tresses Orchid. This orchid is known to occur along both sides of US 36 from Davidson Ditch to the western edge of the City of Boulder's Van Fleet open space. Small to large patches of Ute ladies'-tresses occur in scattered locations throughout this area, and populations vary widely from year to year. Field studies for preparation of this EIS included a reconnaissance of the habitat, and more detailed surveys to map individuals will be conducted in advance of construction. Based on the reconnaissance, at least 20-30 orchids were present in the construction footprint in August of 2004. Package 2 would have slightly more impacts to potentially occupied habitat than Package 3 as shown in Table 4-7. Individual plants of Ute ladies'-tresses that occur within the construction footprint would be destroyed by crushing, uprooting, or burial during ground-clearing and earth-moving activities. Impacts are most likely to occur where the construction footprint would extend outside of the CDOT right-of-way, for road widening, on-ramps, and stormwater detention ponds. The number of plants that would be affected is unknown, but is likely to represent a very small portion of the South Boulder Creek population, which numbers up to 20,000 plants. Indirect effects could occur to additional Ute ladies'-tresses plants from alteration of hydrology and drainage patterns in areas adjacent to the highway. The US 36 project is likely to adversely affect this species.

Colorado Butterfly Plant. This species is known to occur about 0.7 miles upstream of US 36 on Walnut Creek, but not within the US 36 construction footprint. It could potentially become established along downstream portions of Walnut Creek or Dry Creek prior to construction. If present in the construction footprint, construction activities would destroy plants and destroy soil seed banks by exposure or deep burial. The US 36 project is not likely to adversely affect this species, since it is not currently known to occur.

Platte River Species. The US 36 project is unlikely to affect listed species that occur downstream on the Platte River in Nebraska (Interior least tern, piping plover, whooping crane, pallid sturgeon), because the project would not involve long-term reductions or changes in timing of down-stream flows.

Other Federally Listed Species. The US 36 project would not affect other listed species, including Mexican spotted owl, black-footed ferret, Canada lynx, boreal toad, greenback cutthroat trout, and Pawnee montane skipper, because no suitable habitat occurs within the project area or any areas that could be affected indirectly.

Other Sensitive Species. Impacts to other listed sensitive species that may incur moderate to high impacts are described in Table 4-8.

TABLE 4-8: IMPACTS TO OTHER SENSITIVE PLANT AND ANIMALS SPECIES IN THE US 36 PROJECT AREA

Common Name	Segment Present in Project Area	Type of Impact	Relative Impact
Barn owl	Superior-Louisville and Boulder	Loss of foraging habitat, displacement from suitable habitats during construction activities. May incur disturbance or destruction of nests during construction.	Moderate – nests between February and November in cutbanks along riparian corridors and abandoned buildings. Known nesting along Rock Creek.
Bobolink	Boulder - Present in Boulder County Open Space areas on both sides of US 36 near South Boulder Creek area.	Disturbance to or destruction of nests from land-clearing, loss of nesting and foraging habitat. Indirect impacts include potential mortality from flying across highway to reach adjacent habitats.	Moderate – potential disturbance to nests or nesting individuals.
Northern leopard frog	All segments	Mortality from crushing by construction equipment or land-clearing as well as loss of habitat where any wetlands or riparian habitats are disturbed or removed. (X acres [wetlands and riparian]).	High - from mortality and loss of high quality wildlife habitat.
Common garter snake	All segments	Mortality from crushing by construction equipment or land-clearing as well as loss of habitat where any wetlands or riparian habitats are disturbed or removed. (X acres [wetlands and riparian]).	High - from mortality and loss of high quality wildlife habitat.
Dwarf wild indigo, American groundnut, Narrow-leaved milkweed, Gay-feather, Toothcup, Prairie violet, Philadelphia fleabane	Boulder	Loss of individuals and soil seedbanks from land clearing or earth-moving during construction.	Moderate. Project may destroy individual plants and would cause a permanent loss of habitat, but would affect only a small area and is unlikely to adversely affect viability of existing population on adjacent open space.

Other sensitive species including ferruginous hawk, golden eagle, northern harrier, and osprey would incur minimal impacts under Packages Nos. 2 and 3; impacts to these raptors may include loss of foraging habitat and avoidance of these habitats during construction. Loggerhead shrike, northern mockingbird, and northern bobwhite are considered uncommon in the project area and therefore impacts are considered low to those birds. Fish species including Iowa darter, Johnny darter, and

orange-spotted sunfish would be displaced from areas of construction in or near water. Additionally, effects from siltation and changes in water quality may impact fish but these impacts would be mitigated and are considered low. Implementation of Packages Nos. 2 and 3 would have minimal impacts to sensitive butterflies; Hop's feeding azure and Ottoe skipper would have adjacent areas of suitable habitat following construction.

4.4 PACKAGE NO. 4 GENERAL PURPOSE LANES/MAXIMUM MULTIMODAL AND PACKAGE NO.5: RAIL + HOV LANES + GENERAL PURPOSE LANES

For US 36, impacts from implantation of Package Nos. 4 or 5 would be similar to the impacts described for Packages 2 and 3. Acres of impact for impacts associated with US 36 are provided in Tables 4-1 to 4-7. This section describes the impacts to biological resources from construction and operation of a commuter rail under Package No. 4 and 5. Impacts from rail corridor improvements would be the same under Package No. 4 or 5.

4.4.1 Vegetation

Construction of the rail improvements would affect a similar acreage of riparian woodland and riparian shrub habitat as the US 36 improvements (Table 4-2). Impacts would occur primarily at the locations listed in Table 4-9.

TABLE 4-9: MAJOR AREAS OF DIRECT IMPACT TO RIPARIAN HABITAT ON BNSF CORRIDOR UNDER PACKAGES 4 OR 5

Location	Riparian Woodland (acres)	Riparian Shrub (acres)	Total (acres)	Comment
South Platte River	0.11	—	0.11	Low quality habitat but important movement corridor in urban environment.
Fisher Ditch	—	0.93	0.93	Low quality wildlife habitat, but high impact
Clear Creek	0.53	0.12	0.65	High quality habitat, important corridor
Little Dry Creek	1.12	0.04	1.16	Important wildlife corridor
Wetland west of Wadsworth and 92 nd	1.05	.05	1.10	High quality riparian and wetland habitat, and prairie dogs.
Rock Creek	0.09	—	0.09	Important wildlife corridor
Coal Creek	0.64	—	0.64	Important wildlife corridor
Cottonwood No. 2 Ditch and Dry Creek Davidson Ditch	0.05	0.21	0.26	Potentially supports Preble's meadow jumping mouse, moderate quality wetland and riparian habitat.
S. Boulder Creek	0.17	0.19	0.36	High quality habitat, important corridor
Boulder Creek	0.45	0.06	0.51	High quality habitat, important corridor

Location	Riparian Woodland (acres)	Riparian Shrub (acres)	Total (acres)	Comment
Wonderland Creek	0.58	—	0.58	Wildlife corridor
Other/miscellaneous	2.41	0.80	3.21	
Total	7.6	3.3	10.9	

4.4.2 Wildlife

Impacts would be similar to that described for the US 36 corridor and would include habitat loss, habitat fragmentation, disturbance, and mortality. Acres of direct impacts to high and moderate quality wildlife habitat are presented in Table 4-3, and are approximately 1/4 of the area that would be affected by US 36 improvements. Acres of prairie dog colonies that would be lost are presented in Table 4-4. During the 2004 season, 7 active Swainson's hawk and 4 active red-tailed hawk nests were observed along the BNSF line that would be impacted under Packages 4 or 5. The type of impact would be the same as described for Package Nos. 2 and 3.

Habitat fragmentation is of limited importance under existing conditions because the railroad has low levels of train traffic and does not present substantial physical barriers to animal movement except where there are large berms or cuts such as at Dry Creek. Under Packages Nos. 4 and 5, the railroad would become a substantial barrier to wildlife movement because it would be fenced throughout its length, and the increased traffic would reduce wildlife movement across the tracks. RTD is proposing to install fencing along the entire commuter rail corridor. Exclusion fencing would create a major obstacle to animal movement through high and moderate-quality areas, especially open space, without mitigation or without wildlife-friendly fences. Exclusion fences would fragment habitat, isolating populations of species from other individuals and limiting access to territories or habitats necessary for long-term survival. Additionally, as the tracks become wider, many smaller sized animals, such as toads and badgers, may be unwilling or avoid crossing the ROW (van der Grift 2001). Smaller animals can become trapped by fences and are then more likely to be preyed on. Deer can become entangled in barbed wire fences and die. Passages under the tracks at stream and ditch crossings are likely to increase in importance for wildlife movement after construction. Wildlife underpasses at specific corridor locations, as well as wildlife friendly fencing (described in Section 4.4.7, Mitigation) can reduce collisions and habitat fragmentation.

Direct effects of trains include mortality to birds and mammals from collisions with trains. Mule deer, coyotes, killdeer, and great-horned owl would be susceptible. Bald eagles and coyotes are susceptible to getting killed by trains as they scavenge on other road-killed animals on the tracks (Wells et al. unk. Date).

4.4.3 Sensitive Habitats and Wildlife Corridors

Direct impacts to sensitive habitats are provided in Table 4.5. The BNSF corridors would affect portions of the Carolyn Holmberg Preserve and a small part of the CNHP South Boulder Ditch PCA. Removal of vegetation at this crossing would create a wider gap between habitats on each side of the railroad and would contribute to habitat fragmentation along this important riparian corridor.

Construction of the rail corridor improvements would have temporary impacts from disturbance and displacement at all corridor crossings and adjacent sensitive habitats during construction. The following long-term impacts would also occur:

- **South Platte River.** The river would be crossed by a high bridge (part of a flyover), and would not have any long-term impacts to wildlife movement.
- **Clear Creek.** The existing railroad bridge would be replaced by a wider bridge. The current configuration of the bridge, its abutments, the water surface of Clear Creek, and a drop structure immediately below the bridge combine to form a substantial barrier to animal movement under existing conditions. The current design plans (7/30/04 Engineering Design River) do not provide for improvement of this crossing for wildlife.
- **Big Dry Creek.** The existing crossing would not be changed. The BNSF rail line presents a substantial barrier to wildlife movement under existing conditions because the only crossing is a bicycle path, and the railroad tracks are elevated on a steep-side fill, which is difficult to ascend and descend. Packages 4 and 5 do not currently include measures that would improve wildlife movement at Dry Creek.
- **Walnut Creek.** The existing crossing would not be changed. The current configuration of the BNSF railroad and Old Wadsworth Blvd. presents a barrier to wildlife movement, because the creek is piped under the intersection. Packages 4 and 5 do not currently include design measures that would improve this crossing.
- **East Tributary of Rock Creek.** This crossing is currently of minimal value to wildlife because it consists of a small, long culvert at the bottom of a steep embankment. This crossing could be substantially improved to maintain habitat connectivity during commuter rail operation.
- **Rock Creek.** The existing culvert would be extended. This crossing would be of increased importance for wildlife during commuter rail operation, and the existing design would limit use by wildlife.
- **Coal Creek.** A new bridge would be placed parallel to the existing bridge. The new bridge would not change use of this wildlife corridor, which is high value.
- **South Boulder Creek.** A new bridge would be placed parallel to the existing bridge. The new bridge would not change use of this wildlife corridor, which is high value.
- **Boulder Creek.** A new bridge would be placed parallel to the existing bridge. The new bridge would not change use of this wildlife corridor.
- **Fourmile Canyon Creek.** The existing bridge would be replaced by a concrete box culvert. The new culvert may decrease wildlife passage compared to existing conditions because movement over the tracks would be prevented by fencing and the box culvert would have a concrete bottom which is likely to be wet throughout its length. The adjacent roads have bridges designed for wildlife movement.

4.4.4 Noxious Weeds

Impacts would be similar to those described for US 36 in Packages 2 and 3. No Category A noxious weeds are known to occur along the rail corridor. Category B species that are common and mostly likely to be problems are Canada thistle, Common teasel, diffuse knapweed, hoary cress, leafy spurge, Russian olive, and Scotch thistle. Dame's rocket is abundant near Boulder Creek but is not likely to spread in the construction area.

4.4.5 Fisheries and Aquatic Habitats

The types of impacts would be the same as those described above for Packages Nos. 2 and 3. Direct long-term losses of stream habitats are summarized in Table 4-10: There would be no direct effects on lakes or ponds, but construction would occur within 50 to 100 feet of several of them, including the ponds at 62nd Avenue and 64th Avenue, Lower Church Lake and Hillcrest Reservoir. Hundreds of feet of shoreline would be in close proximity to the construction zone in each of these areas. Impacts to water quality and habitat in lakes and ponds would be minimized through use of construction best management practices to control erosion, sedimentation, and spills.

TABLE 4-10: DIRECT AQUATIC IMPACTS TO AQUATIC HABITATS ALONG THE BNSF CORRIDOR

Segment	Aquatic Habitat	Construction Activity	Long-term Loss or Modification of Aquatic Habitat*
			Package Nos. 4 and 5
Denver	South Platte River	New bridge, piers in river	NA – bridge 55 feet above river and 34 feet wide not likely to adversely affect habitat.
Adams	Clear Creek	New bridge, 7 piers in creek	Additional 18 feet of stream channel under bridge.
Westminster	Big Dry Creek	No change	0
	Walnut Creek	No change	0
Superior-Louisville	Rock Creek	Extend culvert	Additional 15'-20' of stream channel in culvert.
	Coal Creek	New bridge parallel to existing, 3 piers in creek	Additional 19 feet of stream channel under bridge (20 feet above river).
Boulder	South Boulder Creek	New bridge parallel to existing bridge	Additional 19.3 feet of stream under bridge (6 feet above river).
	Boulder Creek	New bridge parallel to existing bridge, 1 pier in creek	Additional 19 feet of stream channel under bridge (6 feet above creel).

NOTES:

*Excludes existing stream channel within culverts or under bridge.

4.4.6 Threatened and Endangered Species

Preble's Meadow Jumping Mouse

The only location along the BNSF corridor that provides suitable habitat for Preble's is at the crossing of Cottonwood No. 2 Ditch and Dry Creek Davidson Ditch, which are adjacent just east of 75th. No trapping has been conducted at or near this location and therefore Preble's are assumed to be present. The area of potential habitat affected would be 5.7 acres under both Packages 4 and 5 (Table 4-7). The types of impacts that would occur are the same as described for Packages 2 and 3.

Burrowing Owl

No burrowing owl nests are known to exist near the BNSF corridor, but 20.7 acres of good quality habitat occurs in association with prairie dog colonies in Segments 4, 5, and 6. The types of impacts would be similar to those described for Packages 2 and 3. The higher frequency of train traffic and noise from the addition of the commuter rail may disturb populations of burrowing owls known to occur in the open space property.

Colorado Butterfly Plant

This species is known to occur both upstream and downstream of the BNSF crossing of Walnut Creek. The nearest known plant is about 300 feet away, but existing habitat within the project footprint appears unsuitable for this species. Colorado butterfly plant could potentially become established within the construction area prior to construction. If present in the construction footprint, construction activities would destroy plants and destroy soil seed banks by exposure or deep burial.

Other Sensitive Species

Impacts to sensitive animal species would generally be the same as those impacts described for the US 36 corridor, except for the following:

Ferruginous Hawk. Impacts to ferruginous hawk would be greater along the proposed commuter rail line than US 36 because areas along the railroad tracks are currently less disturbed by human presence and therefore more likely to be utilized by ferruginous hawks. Impacts to this species include disturbance and displacement to foraging individuals during construction and loss of foraging habitat.

American Groundnut. American groundnut is known to occur along a portion of the South Boulder Canyon Ditch upstream and within 0.5 mile of the BNSF crossing of this ditch. There is a low potential for occurrence at the BNSF crossing, and it was not observed during 2004 field reconnaissance. If present, the project may destroy individuals within the construction footprint,



but would affect only a small area and is unlikely to adversely affect viability of existing populations on nearby open space.

Bobolink and most of the sensitive plants known to occur on City of Boulder open space along US 36 are not expected to occur along the rail corridor.

5.0 MITIGATION

5.1 US 36 CORRIDOR

5.1.1 Vegetation

The following mitigation measures would reduce impacts to vegetation:

- During final design, the grading plan would minimize removal of riparian vegetation where possible.
- During construction, vehicle operation would be limited to the designated construction area, and the limits of the construction area would be fenced where they are adjacent to sensitive habitats including riparian areas and prairie dog towns.
- Silt fencing and other BMPs would be used to prevent degradation of habitats adjacent to the construction area by transport of eroded sediment.
- Graded areas within the ROW would be seeded with an appropriate mixture of native grasses and forbs.
- Restoration of temporarily disturbed riparian habitat would include planting of native trees and shrubs as well as seeding and re-grading. Native grasses, forbs and shrubs would also be seeded in riparian areas.
- To compensate for the effects of riparian habitat loss, equivalent areas of riparian habitat would be enhanced or restored. Habitat enhancement would consist of planting of native trees and shrubs, control of noxious weeds, seeding of native species, or establishment of conservation easements on riparian areas in the vicinity of the project.

5.1.2 Wildlife

The following mitigation measures would reduce impacts to wildlife:

Black-tailed Prairie Dog. CDOT has a statewide policy on black-tailed prairie dog mitigation that would be implemented on this project. This policy identifies a four-step process to be used when black-tailed prairie dogs may be affected by a project:

1. Avoidance of impacts
2. Minimization of impacts
3. Relocation

4. If relocation is impossible, impacted black-tailed prairie dogs would be humanely removed from burrows that would be directly affected by the project, and donated for feeding of captive black-footed ferret or raptors.

All of the Action Packages would affect 80 to 95 acres black-tailed prairie dog colonies along US 36, and opportunities to avoid or minimize impacts are limited. Therefore, prairie dogs would be relocated to a suitable relocation site, which has not yet been identified. CDOT and county officials would work with CDOW, open space land management agencies, and willing landowners to identify and clear a relocation site prior to the start of construction.

Raptors. The following mitigation measures would reduce impacts to nesting raptors:

- Trees in the construction footprint would be cleared prior to March 1 to prevent raptors (and other birds) from nesting on site and avoid take of or disturbance to active nests during the breeding season. If construction would begin after March 1, nest surveys would be conducted prior to construction to ensure that no active nests are present in or near the construction footprint.
- Raptor nest surveys would be conducted annually during an appropriate season (generally May 1 through June 1) to determine presence of active raptor nests. If an active nest is located, seasonal buffers would be established and coordinated with CDOW to prevent disturbance to nesting birds.
- Protective buffer zones would be established around active nests during construction to avoid disturbance while nesting.
- Individual trees removed in the ROW would be replaced at a 2:1 ratio or as specified by state and federal wildlife agencies to ensure raptor perch trees are not destroyed.

Other Migratory Birds. Destruction or disturbance of nests that results in loss of eggs or young is a violation of the act. In order to comply with the MBTA, land-clearing activities would be timed to avoid the breeding season (primarily May through July, but differs according to species) to avoid impacts to active bird nests, as described for raptors (1st bullet - above). In addition, any construction to bridge structures may potentially destroy or disturb swallows nesting on the underside of the bridge. Bridge construction timing should be scheduled to avoid impacts to these birds.

Wildlife Crossings and Corridors. General guidelines for wildlife crossings include:

- Where feasible, replace box culverts with bottomless box culverts or bridges with natural substrate to promote animal usage. Where new culverts will be installed, use bottomless box culverts or bridges. Install culverts in close proximity to tree/shrub cover where possible.
- Bridge structures should span the largest amount of riparian habitat as possible under a constructed bridge to allow for travel along the water's edge. Riparian areas with dense vegetation are favored by many species for travel corridors.

- Minimum dimensions for a large animal underpass is 8 feet tall by 24 feet wide, with an openness ration of 0.9 (height x width/length). As the width of the roadway increases, proportionately increase the height and width of the underpass structure. This openness will prevent a tunneling effect that will discourage animal use.
- If a stream or ditch conveys water, provide animals a shelf or a raised dry ledge on the side of the channel of unsubmerged substrate to use as a dry walkway under the structure under normal flows. Shelves should be at least one foot higher than the normal water level and at least 1.3 feet wide to be effective (Forman Sperling et al. 2002).
- Place vegetative debris such as old stumps, logs and small brush along one edge of the bottom of an underpass (approximately 1 foot wide) as cover for small mammals and amphibians when crossing.
- Crossing structures (i.e., culverts) should have natural bottom substrates, such as coarse sand to facilitate wildlife use. Avoid materials such as rip-rap and concrete at culvert entrances and floors.

For Small Animals:

Small animals will use small-diameter culverts (less than 3 feet in diameter) more than large culverts. Reptiles prefer circular pipes, while amphibians, rabbits, and domestic animals prefer rectangular (Forman Sperling et al. 2002). Therefore, a variety of types of small mammal crossings would be most effective.

- Install dry bottomless concrete culverts or pipes of mixed size classes 500 to 1,000 feet apart (and abundant vegetative cover near culvert entrances. Individual species respond to culverts differently, therefore, crossings should not be monotypic - but spaced frequently with varying sizes (Clevenger et al. 2001). These small crossings should be placed so that water does not flow through them.
- Small animal culvert size should be less than 5 feet in diameter or height.
- Place vegetative debris such as old stumps, logs and small brush along one edge of the bottom of an underpass (approximately 1 foot wide) as cover for small mammals and amphibians when crossing.

Table 5-1 shows the proposed crossing structures at along US 36, based on the 7/30/04 Engineering Design Review drawings, along with recommendations for improvements and recommendations for new crossing locations.

TABLE 5-1: US 36 WILDLIFE CROSSING RECOMMENDATIONS

Crossing Name	Proposed Structure*	Comment	Recommendation
Allen Ditch	No change proposed yet. Existing structure is a bottomless box culvert	Low corridor value due to surrounding development; used by urban wildlife during low flow.	Create shelf (dry area for animals to cross under through culvert during periods of normal flow).
Niver Canal and Farmers Highline Canal	No change proposed yet. Existing structure is a concrete box culvert.	Moderate corridor value. Good riparian habitat on both sides of highway.	Replace with a bottomless culvert for small to medium-sized animal crossing, include a dry shelf.
Big Dry Creek	Packages 2 and 4 - Widen existing box culverts by 70' on the west and 60' on the east. Package 3 - widen existing culvert by 108' on west and 110' on east. Package 5 - widen by 58' on west and 51' on east.	High corridor value (potentially); swallows nesting under culvert; open space property on both sides of highway. Existing structure limits wildlife use and fish passage.	Create shelf (dry area for animals to cross under through culvert during periods of high flow), preferably with a natural substrate.
Equity Ditch	No change proposed yet. Existing structure is a bottomless box about culvert: 2' high by 5' wide.	Low to moderate corridor value due to future City of Broomfield development on north side of US 36 (at 112th); South side of US 36 undeveloped. This ditch connects to Walnut Creek upstream.	Replace existing structure with a bottomless culvert for small/medium sized animal crossing.
New	N/A		Install box culvert for small to medium sized animal use 1200' west of Airport Creek.
Community Ditch	No change proposed yet. Existing structure is a concrete box culvert: 3' x 10 wide.	Low corridor value due to development.	Replace culvert with taller structure and include a shelf of dry substrate for animals to cross dry during normal water flows.
Unnamed Tributary of Rock Creek	No change proposed yet.	Low corridor value under current conditions; could help link habitat north of US 36 to Rocky Flats NWR.	Install bottomless culvert for small to medium sized animal use.
Rock Creek	Three-cell box culvert with 8' high x 20' long cells, about 360' long. For Package No. 3, culvert would be extended to 629' long. Packages 4 and 5 would be 308' and 295', respectively.	High corridor value; open space on both sides.	A bridge is preferred for a wildlife crossing at this location, however a triple box culvert with one culvert used specifically for wildlife use is adequate.
New	N/A		Install box culvert for small to medium sized animal use 1000' west of 88th Avenue crossing.
Coal Creek	Replace existing bridge: 260' long with 200' channel bottom, 198-227' wide, 15' high for Package 2. For Package 3, main road 139 to 145' wide, and EB and WB BRT lanes each 31' wide. 3 span. Package 4 is 188' to 264' wide, and Package 5 is 175' to 200' wide.	Very high value wildlife corridor.	Proposed bridge structure would be fine for wildlife usage. Keep pedestrian path separate from wildlife crossing.
Unnamed Ditch on Davidson Mesa	No change proposed yet. Existing structure is a box culvert: 2' wide.	Low crossing value under current conditions, but crossing should be improved for medium sized animal use.	Replace existing structure with bottomless culvert with dry shelf for medium sized animal crossing.
New	N/A	Prairie dogs on both sides of highway, therefore multi-use culverts would be beneficial.	Install box culverts for small to medium sized animal crossing spaced approximately every 500' to 1000' between the Unnamed Ditch on Davidson Mesa and Davidson Ditch.

Crossing Name	Proposed Structure*	Comment	Recommendation
Davidson Ditch	Widen existing culvert 23.5' on south side, 63' on north side. Total structure width 182' for Alt 2. For Alt 3, widen 20' on south, 47' on north, total width 163'. For Packages 4 and 5, widen by 36' on south side and 63' on north, total of 195'.	High wildlife corridor value. PMJM occupied. Surrounded by OSMP grassland.	Create a dry shelf for animal crossing or add an adjacent dry culvert for crossing. Enlarge opening to compensate for increased length.
Goodhue Ditch	No change proposed yet. Current structure is a bottomless box culvert, 12' wide x 3.5' high. Would need to be lengthened	High wildlife corridor value. PMJM occupied. Surrounded by OSMP grassland.	Create a dry shelf for animal crossing or add an adjacent dry culvert for crossing. Enlarge opening to compensate for increased length.
Marshallville Ditch	No change proposed yet. Current structure is a bottomless box culvert, 8' wide x 4' high. Would need to be lengthened.	High wildlife corridor value. PMJM occupied. Surrounded by OSMP grassland.	Create a dry shelf for animal crossing or add an adjacent dry culvert for crossing.
Shearer Ditch	No change proposed yet. Current structure is a metal pipe with a 3' diameter. Would need to be lengthened.	Moderate wildlife corridor potential – currently low use due to culvert design. Surrounded by OSMP grassland.	Replace with a bottomless box culvert with dry shelf for wildlife passage or add adjacent dry bottomless culvert for wildlife crossing.
S. Boulder Canyon Ditch	No change proposed yet. Current structure is a concrete siphon.	High wildlife corridor potential as it is a tributary of South Boulder Creek - currently low use due to culvert design.	Replace with double bottomless box culvert crossings (one for water and other for wildlife [dry], however this should be fairly wide to promote wildlife use due to the topography).
S. Boulder Creek	Widening existing bridge 27' on south side and 13.5' on north side. Total width would be 127'.	High corridor value. Pedestrian path between wall and west pier, river in middle, east open (muddy at site visit) for wildlife crossing.	Current structure is fine for wildlife usage. Keep and raise area of unsubmerged substrate available for wildlife crossing.
New	N/A	Open space on both sides of US 36.	Install box culverts (spaced approximately every 500') between S. Boulder Creek and Upper Dry Creek Ditch to facilitate small to medium-sized animal crossing.

NOTES:

*All dimensions of culverts are inside dimensions.

5.1.3 Sensitive Habitats

Impacts to sensitive areas should be avoided or minimized during final design.

5.1.4 Noxious Weeds

DOT would develop a project-specific noxious weed management plan that would be implemented during construction. This plan would include identification of noxious weeds in the area, weed management goals and objectives, and preventative and control methods.

Preventative measures include the following:

- Contractor's vehicles would be inspected before they are used for construction to ensure that they are free of soil and debris capable of transporting noxious weed seeds or roots.
- Noxious weeds observed in and near the construction area at the start of construction would be treated with herbicides or physically removed to prevent seeds blowing into disturbed areas during construction.
- Periodic surveys would take place during the construction period to identify and treat noxious weeds that have developed.
- Potential areas of topsoil salvage would be assessed for presence and abundance of noxious weeds prior to salvage. Topsoil from heavily infested areas would either be treated by spraying, taken off-site, or buried during construction.
- Disturbed areas would be reclaimed as soon as construction is finished and seeded using a permanent seed mixture. If areas are completed and permanent seeding cannot occur due to the time of year, mulch and mulch tackifier would be used for temporary erosion control until seeding can occur.
- Fertilizer would not be used in seeded areas, because it can enhance the growth of noxious weeds at the expense of desired vegetation.
- Certified weed-free mulch would be used for reclamation, and weed-free straw bales would be used for sediment barriers.

Weed control would use the principles of integrated pest management, to treat target weed species efficiently and effectively by using a combination of two or more management techniques (biological, chemical, mechanical, and/or cultural). Weed control methods would be selected based on the management goal for the species, the nature of the existing environment, and methods recommended by Colorado State University, county weed boards, and other weed experts. The presence of important wildlife habitat or threatened and endangered species would be considered when choosing control methods.

5.1.5 Fisheries and Aquatic Habitats

Under Colorado Senate Bill 40 (SB 40), any project affecting streams, their banks, or tributaries is required to consult with the CDOW. Following final design, an individual application for SB 40 Wildlife Certification would be required, including detailed plans and specifications. CDOW would review the plans to ensure that they are technically adequate to protect and preserve fish and wildlife resources, and CDOW would provide recommendations or alternative plans if the planned project would adversely affect a stream.

Best management practices (BMPs) would be used to control erosion and sedimentation during construction and to protect water quality in streams. BMPs may include berms, brush barriers, check dams, erosion control blankets, filter strips, sandbag barriers, sediment basins, sheet mulching, silt fences, straw-bale barriers, surface roughening, and/or diversion channels. A spill prevention and

emergency response plan would be prepared and used during construction for storage, handling and use of chemicals, fuels and similar products.

5.1.6 Threatened, Endangered, and Other Special Status Species

CDOT and RTD will consult with the USFWS to ensure compliance under Section 7 of the Endangered Species Act. Mitigation measures related to threatened and endangered species will be developed in consultation with USFWS.

Bald Eagle

- Raptor nest surveys (to include bald eagle nests) would be conducted within 0.5 mile from construction activities prior to starting construction of specific highway segments. If an active or inactive nest is identified, a 0.5-mile buffer would be required around the nest, and seasonal restrictions on construction in the area would be implemented. Seasonal restrictions coincide with bald eagle breeding seasons (November 15 to July 31), and no human encroachment should occur within the 0.5-mile radius of the nest.
- Construction activity would be restricted within 0.25 mile of active nocturnal roost sites between November 15 and March 15.
- Perch and roost trees removed during construction would be replaced at a 2:1 ratio with an appropriate tree species such as cottonwood (*Populus* sp.).

Burrowing Owl

- Conduct surveys during the spring of the construction year to determine presence of burrowing owls and the locations of occupied nests.
- Avoid construction within 75 yards (225 feet) of an active nest site from April 1 to July 31 (Craig 2001). This seasonal restriction should be applied to the entire colony, because burrowing owls have a propensity to occur on the margin of a black-tailed prairie dog colony.
- Direct impacts to nesting burrowing owls would also be avoided by covering or destroying black-tailed prairie dog burrows within the construction area prior to nest establishment (prior to March 1), so that burrowing owls do not nest in the construction area. Black-tailed prairie dogs would be humanely removed prior to destruction of burrows. Continuous monitoring and destruction of burrows would be needed to prevent establishment of nests prior to the start of construction. If a nest becomes occupied after the start of active construction, a seasonal buffer zone would be required.

Preble's Meadow Jumping Mouse

- Avoidance and mitigation during construction, by use of silt fencing or similar visible barriers, restrictions in the area of disturbance, and construction limited to the non-active season (November through March).
- Any habitat destroyed for project construction would be replaced through creation of equivalent suitable habitat for Preble's in the vicinity. Mitigation areas should link fragmented habitat patches by restoring areas of non-habitat between zones of Preble's occupied habitat. This mitigation site could be combined with a wetlands mitigation site creation.

Utes'-ladies Tresses Orchid

- Surveys will be conducted to identify and map Ute ladies'-tresses plants within and adjacent to the construction footprint in the area from Davidson Ditch to the west edge of Van Fleet open space. Surveys will be conducted for three years since the number of flowering plants varies widely from year, and will be done prior to final design. Surveys will be done during the flowering season by qualified botanists.
- Impacts will be avoided or minimized where possible by relocation of facilities such as detention ponds, and ramps, by use of roadside ditches instead of ponds for water quality control, and/or by narrowing of construction footprints.
- Facilities within Ute ladies'-tresses habitat will be designed to not adversely affect the hydrology of adjacent Ute ladies'-tresses habitat. Monitoring wells may be needed to assess water pre-construction water levels and to monitor changes during and after construction.
- The primary mitigation for plants and habitat that cannot be avoided will be protection or enhancement of other existing populations in Colorado. The conservation requirements will be commensurate with the level of impact, which is not currently known, and will be determined in consultation with the U.S. Fish and Wildlife Service (FWS). The selection of appropriate conservation measures will be selected from a menu of alternatives that will be developed in consultation with the FWS, open space management agencies, and local experts specialists on this species.
- Ute ladies'-tresses that cannot be avoided will be transplanted to a mitigation site or to a botanical garden. Removal and transplant of Ute ladies'-tresses will be conducted by botanists after tubers have formed in the fall. Detention ponds may potentially be designed to provide suitable habitat for Ute ladies'-tresses and may serve as transplant sites. Selection of a mitigation site will be coordinated with mitigation for Preble's meadow jumping mouse and wetlands, and will consider habitat suitability, benefits to the species, and provisions for long-term management and protection.

Colorado Butterfly Plant

- Surveys will be conducted within and adjacent to the construction footprint of US 36 at Dry Creek and Walnut Creek. If Colorado butterfly plants are found, CDOT will consult with the FWS regarding appropriate conservation measures.

Other Sensitive Animal Species

- Mitigation for nesting ospreys is described for Raptors (above)
- Conduct all land-clearing activities prior to April 1 to avoid destruction of sensitive bird nests.
- Conduct pre-construction nest surveys for barn owls in dirt cutbanks in suitable riparian habitat (such as Walnut Creek) prior to construction if land-clearing begins after April 1.
- Avoid land-clearing activities in known bobolink nesting habitat in Segment 6 during their nesting season (May 15 through July 30).

Other Sensitive Plant Species

Prior to construction, presence/absence surveys will be conducted for all areas that would be affected by project activities within designated sensitive habitats including the South Boulder Creek Natural Area, Colorado Tallgrass Prairie Natural Area, and CNHP Colorado Tallgrass Prairie Potential Conservation Area. The survey(s) will be conducted during an appropriate season for best observation and identification of the sensitive species, by qualified botanists. If found, mitigation would be developed based on the relative numbers of plants that would be affected, the potential for avoidance or minimization of impacts, and the potential for transplanting of individuals and seedbeds to suitable habitat on adjoining open space. Mitigations would be developed in consultation with the open space land management agencies where the impacts would occur.

5.2 BNSF CORRIDOR

5.2.1 Vegetation

Mitigation measures would be the same as described for Package Nos. 2 and 3.

5.2.2 Wildlife

Black-tailed Prairie Dog. RTD does not have a policy regarding relocation of prairie dogs affected by construction. However, the same mitigation described for US 36 should be applied to prairie dog colonies affected by construction along the BNSF corridor.

Raptors and Other Migratory Birds. Mitigation measures would be the same as described for Package Nos. 2 and 3.

Wildlife Crossings and Corridors. The general guidelines for wildlife crossings described under Packages 2 and 3 would also apply to the US 36 and BNSF corridor under Packages 4 and 5.

Fencing installed along the BNSF corridor should use wildlife-friendly design at crossings of wildlife corridors, other stream and ditch crossings, and in all areas adjacent to open space land, such as the Rock Creek Farm Open Space and Boulder County Mountain Parks and Open Space properties. In addition, other areas considered high or moderate quality wildlife habitat should not be fenced or fencing should be wildlife friendly fencing, if possible. Wildlife-friendly fences include 3-wire fences; to allow large to small-sized wildlife to cross through, fences should include posts and a visible top such as wooden top rail, PVC pipe, or thick colored wire for the top rail. Rails or smooth wire strand can be used below the top rail. To allow wildlife movement, but contain livestock, the top post of a fence should be no more than 40 inches high; the bottom strand of wire should be 16 inches from the ground, and smooth twisted wire should be 8 inches apart between the top and bottom rails (CDOW 2004).

As discussed under impacts, stream and ditch crossings of the BNSF corridor are likely to become more important under Packages 4 and 5 than under existing conditions, because of increased train traffic and fencing. Table 5-2 shows the proposed crossing structures along the BNSF corridor, based on the 7/30/04 Engineering Design Review drawings, along with recommendations for improvements for wildlife passage.

TABLE 5-2: BNSF WILDLIFE CROSSING RECOMMENDATIONS

Crossing Name	Proposed Structure*	Comment	Recommendation
South Platte River	Bridge is part of 23 rd Street Junction Flyover, 55' above riverbed. 290' long x 34.3' wide. Steel plate girders.	High corridor value	Proposed bridge should allow for wildlife movement on banks (under bridge). Create improved riparian habitat.
Clear Creek	Bridge: 6.5' high x 244' long x 35.3' wide. Precast, prestressed concrete voided slabs. 7 piers in creek.	High wildlife corridor value; Existing bridge structure combined with 8' drop structure immediately below bridge is a substantial barrier to wildlife movement.	Current bridge design creates major barrier for animal movement; add a shelf under bridge and over drop structure to provide wildlife passage on each side of Clear Creek
Big Dry Creek	No change. Current structure is a concrete arch (8' x 16' long x 100' wide) with a 12' x 5' culvert underneath arch floor. Bike path is in a separate box culvert.	Moderate to high corridor value. Only crossing for wildlife is on bike path.	Install a shelf under culvert for animals crossing on unsubmerged substrate.
Walnut Creek	No change. Current structure is a corrugated metal pipe under Highway 121.	Existing railroad/Old Wadsworth Blvd crossing is a substantial barrier to wildlife movement. The City of Westminster has purchased land for open space along Walnut Creek.	Replace with a span bridge or 3-cell box culvert to provide wildlife crossing opportunity and recreational path. Walnut Creek could be an important regional corridor with improvement, connects habitats at Rocky Flats to Big Dry Creek.
East Tributary of Rock Creek	No change. Current structure is a concrete pipe culvert (200' long).	Potentially moderate corridor value; currently low value due to design. Connects to open space areas.	Replace with box culvert with shelf for small to medium sized animal use.

Crossing Name	Proposed Structure*	Comment	Recommendation
Rock Creek	Extend culvert. Current structure is a concrete Arch culvert (16' x 12') with 4 overflow pipes 50' east of crossing for flooding.	High wildlife corridor value; however, road constructed 120' upstream of tracks with no obvious sign of wildlife crossing under new road. Metal pipes may also serve for wildlife if replaced with concrete box culverts.	Replace with a larger structure for animals to cross under tracks or add shelf for wildlife crossing within existing culvert.
Coal Creek	New bridge parallel to existing bridge on east side: 20' high x 118' long x 19.3' wide. Precast, pre-stressed concrete voided slabs. Three piers in creek.	High corridor value.	No recommendation; current bridge design is fine for wildlife passage.
Davidson Lateral	6' high x 10' wide x 42' wide precast concrete culvert	Moderate crossing value; surrounded by open agricultural land; however, riparian woodland in immediate crossing vicinity and may be used if better design.	Proposed culvert should include a shelf for small-medium sized animals to cross through culvert in periods of high flow.
Marshallville Ditch	5' high x 10' long x 46' wide precast concrete culvert.	Moderate crossing value; surrounded by agricultural land; however, riparian woodland in immediate crossing vicinity.	Proposed culvert should include a shelf for small-medium sized animals to cross through culvert in periods of high flow.
South Boulder Canyon Ditch	5' high x 10' long x 61' precast concrete culvert.	Moderate crossing value; surrounded by agricultural land; however, riparian woodland in immediate crossing vicinity.	Proposed culvert should include a shelf for small-medium sized animals to cross through culvert in periods of high flow.
Cottonwood No. 2 Ditch and Dry Creek Davidson Ditch	Current crossing consists of two channels: south is culvert, north is 3 concrete box culverts.	Moderate corridor value, though currently does not allow for animals to cross as tracks are up steep embankment and culverts not suitable for passage.	Replace culverts with larger concrete box culverts or bridge with unsubmerged shelf to allow wildlife passage.
Enterprise Ditch	5' high x 10' long x 42' wide precast concrete culvert.	With improvement, likely a moderate corridor value	Culvert design should include a shelf for small to medium sized animals to cross during periods of high flow.
South Boulder Creek Inlet Canal	5' high x 81.7' long x 42' wide concrete culvert with 5 15'-long openings.	High wildlife value; current structure does not allow wildlife crossing under bridge.	Create shelf under bridge for unsubmerged wildlife use.
South Boulder Creek	New bridge structure, parallel to existing bridge, on north side. Approximately same dimensions, 7-8' high x 128' long x 19.3' wide	High wildlife value.	Improved structure should include area for wildlife crossing over unsubmerged substrate.
Dry Creek No. 2 Ditch	New bridge structure parallel to existing bridge, on north side. 5-7 feet high x 82' long x 19.3' wide. Precast prestressed concrete slabs. 4 piers in creek.	Moderate wildlife value; connects to golf course to South Boulder Creek.	Culvert design should include a shelf for animals to cross during periods of high flow.
Boulder Creek	New bridge structure parallel to existing bridge, on north side. Same dimensions, 4-6' high x 62' long x 10' wide. Combined width 38' precast prestressed concrete voided slabs, one pier in creek.	High wildlife corridor value. Current bridge is okay, though could be improved through raising height.	Current bridge is okay for wildlife use, though could be improved through raising height to allow larger animals (including deer) to use.
Goose Creek	No change. Current structure is a bridge with bicycle path.	Moderate wildlife corridor value.	None, current structure allows animal movement.
Wonderland Creek	Concrete box culvert with four openings: 5' high x 51' long x 34' wide.	Moderate wildlife crossing value. Somewhat isolated from downstream areas by 47th Street.	Culvert design should include a shelf for animals to cross during periods of high flow.

Crossing Name	Proposed Structure*	Comment	Recommendation
Fourmile Canyon Creek	Concrete box culvert: 5' high x 13' long x 42' wide.	High wildlife corridor value; surrounding highways have bridges designed to allow wildlife movement. This creek connects to Boulder Creek to the east.	Culvert design should include a shelf for animals to cross during periods of high flow.

NOTES:

*All dimensions of culverts are inside dimensions.

5.2.3 Sensitive Habitats and Wildlife Corridors

Mitigation would be the same as described under Packages 2 and 3 for the US 36 highway improvements.

5.2.4 Noxious Weeds

Mitigation would be the same as described under Packages 2 and 3 for the US 36 highway improvements. RTD does not have a specific weed policy, but is subject to the same state and county weeds rules, and the same mitigations should be applied.

5.2.5 Fisheries and Aquatic Habitats

Mitigation measures would be the same as described under Packages 2 and 3 for the US 36 highway improvements. The Colorado Senate Bill 40 provisions do not apply to RTD or the BNSF rail improvements. BMPs would be used to control erosion and sedimentation during construction of the rail.

5.2.6 Threatened, Endangered, and Sensitive Species

Bald Eagle, Burrowing Owl, Preble's Meadow Jumping Mouse, and Colorado Butterfly Plant

Mitigation would be the same as described for US 36 under Package 2 and 3, except that RTD and FTA would be the agencies responsible for endangered species consultation and mitigation for the BNSF rail corridor.

Other Sensitive Plant Species

Mitigation for American groundnut is the same as mitigation described for Other Sensitive Plants for US 36 under Packages 2 and 3.

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Correspondence



February 9, 2004

Ms. Claire Solohub
District Wildlife Manager
Colorado Division of Wildlife
6060 Broadway
Denver, CO 80216

Re: Wildlife Resource Information for US 36 Environmental Impact Statement

Dear Ms. Solohub:

To comply with the National Environmental Policy Act and the Endangered Species Act, URS Corporation is requesting information on biological resources to for preparation of an EIS for transportation improvements between Denver and Boulder. The Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Colorado Department of Transportation (CDOT) and Regional Transportation District (RTD) are initiating preparation of the EIS for improvements proposed along the US 36 highway corridor and the Burlington Northern Santa Fe railroad corridor. The EIS study area includes portions of the City and County of Denver, Jefferson County, Adams County, Boulder County, and the City and County of Broomfield. A map of the study area is attached.

URS is assembling information to provide a basis for impact assessment and EIS alternatives evaluation. We have already obtained available data from Natural Diversity Information Source (NDIS), such as maps of species' ranges; federal and state-listed threatened and endangered species; applicable county information such as natural resource management plans; the CDOW Conservation Plan for Grassland Species, and Colorado Natural Heritage Program data (CNHP).

URS would like your input on known wildlife habitat or concerns relating to this study area and project. Additionally, we are requesting your assistance in locating additional information such as:

- GIS data of black-tailed prairie dog colonies and raptor nest locations;
- Recreational activities occurring in sensitive wildlife habitats, such as bird watching, wildlife viewing, or fishing;
- Fisheries resources in lakes, rivers, or streams in the EIS project area that is not available on CDOW's website; and
- Other information not available on the internet such as databases or publications pertaining to the project area, as well as your personal knowledge or concerns of issues based on your familiarity with the project area.

Thank you for your assistance. You can reach me directly by phone at 303-740-2793 or via e-mail at Jeffrey_dawson@urscorp.com

Sincerely,


URS Corp.
Jeffrey Dawson

Cc: Tricia Bernhardt, URS
Kim Cornelisse, URS

URS Corporation
8181 E. Tufts Avenue
Denver, CO 80237
Tel: 303.694.2770 and 303.740.2600
Fax: 303.694.3946



February 6, 2004

Mr. Michael Wedemyer
District Wildlife Manager
Colorado Division of Wildlife
6060 Broadway
Denver, CO 80216

Re: Wildlife Resource Information for US 36 Environmental Impact Statement

Dear Mr. Wedemyer:

To comply with the National Environmental Policy Act and the Endangered Species Act, URS Corporation is requesting information on biological resources to for preparation of an EIS for transportation improvements between Denver and Boulder. The Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Colorado Department of Transportation (CDOT) and Regional Transportation District (RTD) are initiating preparation of the EIS for improvements proposed along the US 36 highway corridor and the Burlington Northern Santa Fe railroad corridor. The EIS study area includes portions of the City and County of Denver, Jefferson County, Adams County, Boulder County, and the City and County of Broomfield. A map of the study area is attached.

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Thank you for your assistance. You can reach me directly by phone at 303-740-2793 or via e-mail at Jeffrey_dawson@urscorp.com

Sincerely,

URS Corp
Jeffrey Dawson

Cc: Kim Cornelisse, URS
Tricia Bernhardt, URS

URS Corporation
8181 E. Tufts Avenue
Denver, CO 80237
Tel: 303.694.2770 and 303.740.2600
Fax: 303.694.3946



February 9, 2004

Mr. John Koehler
District Wildlife Manager
Colorado Division of Wildlife
6060 Broadway
Denver, CO 80216

Re: Wildlife Resource Information for US 36 Environmental Impact Statement

Dear Mr. Koehler:

To comply with the National Environmental Policy Act and the Endangered Species Act, URS Corporation is requesting information on biological resources to for preparation of an EIS for transportation improvements between Denver and Boulder. The Federal Highway Administration (FHWA), Federal Transit Administration (FTA), Colorado Department of Transportation (CDOT) and Regional Transportation District (RTD) are initiating preparation of the EIS for improvements proposed along the US 36 highway corridor and the Burlington Northern Santa Fe railroad corridor. The EIS study area includes portions of the City and County of Denver, Jefferson County, Adams County, Boulder County, and the City and County of Broomfield. A map of the study area is attached.

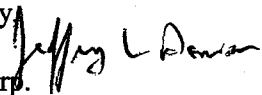
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- Recreational activities occurring in sensitive wildlife habitats, such as bird watching, wildlife viewing, or fishing;
- Fisheries resources in lakes, rivers, or streams in the EIS project area that is not available on CDOW's website; and
- Other information not available on the internet such as databases or publications pertaining to the project area, as well as your personal knowledge or concerns of issues based on your familiarity with the project area.

Thank you for your assistance. You can reach me directly by phone at 303-740-2793 or via e-mail at Jeffrey_dawson@urscorp.com

Sincerely,


URS Corp.
Jeffrey Dawson

Cc: Tricia Bernhardt, URS
Kim Cornelisse, URS

URS Corporation
8181 E. Tufts Avenue
Denver, CO 80237
Tel: 303.694.2770 and 303.740.2600
Fax: 303.694.3946

MEETING NOTES

Meeting date: June 17, 2004

Personnel present:

Jeff Peterson	CDOT
Alison Michael	FWS
Genevieve Hutchinson	RTD
Kim Cornelisse	URS
Jeff Dawson	URS

Location: CDOT offices, fourth floor, Empire Park

Purpose: Review Threatened and Endangered Species Issues, Surveys, and Mitigation

Results:

Preble's meadow jumping mouse. The group reviewed each stream and major ditch crossings to determine whether trapping surveys should be conducted. The review was based on past trapping results, location and habitat characteristics. The following conclusions were reached:

- (1) Jeff Peterson, Alison Michael, and Kim Cornelisse will visit Coal Creek (US36 and BNSF crossings), unnamed ditch on Davidson Mesa (US36), Rock Creek (BNSF) and New Dry Creek Ditch (BNSF) to determine whether trapping surveys are warranted. Kim will organize a group trip the week after next.
- (2) Preble's meadow jumping mouse are assumed to be present in the South Boulder Creek open space from Davidson Ditch to the Table Mesa Drive Interchange, and trapping surveys will not be required. Alison will check with Anne Ruggles and/or Karen Meaney regarding past trapping results from Davidson Ditch and Goodhue Ditch.
- (3) Trapping surveys will not be conducted at all other stream and ditch crossings, because of unsuitable habitat at the sites or in the surrounding areas. URS will document the results of its habitat evaluation with text and photographs.

Ute ladies-tresses orchid. URS will conduct presence/absence surveys of suitable habitat in the project footprint this summer. Negative results (no orchids) within suitable habitat in the South Boulder Creek area does not mean that they are not present, since individual orchids do not appear

every year. Ellen Mayo should be contacted regarding potential mitigations. Tom Grant at the Denver Botanic Gardens may be doing a project on experimental propagation of Ute ladies-tresses.

Mitigation for Preble's meadow jumping mouse and Ute ladies-tresses. Wetlands, Preble's meadow jumping mouse, and Ute ladies-tresses should be mitigated together. 1:1 acreage replacement for Preble's habitat is probably not going to be feasible, and mitigation needs to be creative. The project should consider acquiring an area that represents a gap in habitat protection and upgrading the habitat to restore linkages. Purchase of water rights may be useful because Preble's appear to be more associated with ditches with senior water rights because of the longer period of flow. A partnership with City of Boulder Open Space and Mountain Parks may be possible.

Burrowing owl. Presence/absence surveys are not needed for the EIS. The EIS mitigations should include a requirement that destruction of prairie dog towns occur when burrowing owls are not likely to be present (October to March), and that pre-construction surveys should be conducted (per CDOW protocol) if destruction occurs during the months the owl could be present. If the owls are present, no construction can occur within a specified distance.

Black-tailed prairie dog. Brad Beckham is working with the counties to find re-location sites for the various CDOT projects. If relocation sites are not available, prairie dogs should be donated to raptor rehabilitation or feeding black-footed ferrets.

Rare plants. Known locations should be avoided if possible. New sightings of rare species found during the reconnaissance surveys should be provided to City of Boulder open space and the Natural Heritage Program.

Molluscs. Kim will check with Randy Van Buren on available information for cylindrical papershell.

Wildlife corridors. Both bobcats and badgers have been observed along US36 in the South Boulder Creek open space. Facilities should be improved to facilitate movement of wildlife across/under the road. Since the road will be widened, existing openings under the road should be enlarged to compensate for their increased length. Non-water crossings should be provided.

February 24, 2004

Jeff Dawson
Senior ecologist
URS
8181 E. Tufts Avenue
Denver, Colorado 80237

Colorado Natural Heritage Program
Colorado State University
8002 Campus Delivery
Fort Collins, Colorado 80523-8002
(970) 491-1309
FAX: (970) 491-3349
www.cnhp.colostate.edu

Dear Jeff:

The Colorado Natural Heritage Program (CNHP) is in receipt of your request for information regarding the U.S. 36 EIS Study Corridor in the Denver metro area. In response, I have searched our Biological and Conservation Datasystem (BCD) for natural heritage elements (occurrences of significant natural communities and rare, threatened or endangered plants and animals) documented from the vicinity of the area specified in your request, specifically within the boundaries of a study area ArcView shape file provided by URS corporation to CNHP.

The enclosed report describes natural heritage resources known from this area and gives location (by Township, Range, and Section), precision information, and the date of last observation of the element at that location. This report includes elements known to occur within the specified project site, as well as elements known from similar landscapes near the site. Please note that "precision" reflects the resolution of original data. For example, an herbarium record from "4 miles east of Colorado Springs" provides much less spatial information than a topographic map showing the exact location of the occurrence. "Precision" codes of Seconds, Minutes, and General are defined in the footer of the enclosed report.

The report also outlines the status of known elements. We have included status according to Natural Heritage Program methodology and legal status under state and federal statutes. Natural Heritage ranks are standardized across the Heritage Program network, and are assigned for global and state levels of rarity. They range from "1" for critically imperiled or extremely rare elements, to "5" for those that are demonstrably secure.

You may notice that some occurrences do not have sections listed. Those species have been designated as "sensitive" due to their rarity and threats by human activity. Peregrine falcons, for example, are susceptible to human breeders removing falcon eggs from their nests. For these species, CNHP does not normally provide location information beyond township and range. Please contact us should you require more detailed information for sensitive occurrences.

There are several CNHP designated Potential Conservation Areas located within your project area (see enclosed shape files and site profiles). In order to successfully protect populations or occurrences, it is necessary to delineate conservation areas. These conservation areas focus on capturing the ecological processes that are necessary to support the continued existence of a particular element of natural heritage significance. Conservation areas may include a single occurrence of a rare element or a suite of rare elements or significant features.



The goal of the process is to identify a land area that can provide the habitat and ecological processes upon which a particular element or suite of elements depends for their continued existence. The best available knowledge of each species' life history is used in conjunction with information about topographic, geomorphic, and hydrologic features, vegetative cover, as well as current and potential land uses. The proposed boundary does not automatically exclude all activity. It is hypothesized that some activities will cause degradation to the element or the process on which they depend, while others will not. Consideration of specific activities or land use changes proposed within or adjacent to the preliminary conservation planning boundary should be carefully considered and evaluated for their consequences to the element on which the conservation unit is based.

The Colorado Division of Wildlife has legal authority over wildlife in the state. CDOW would therefore be responsible for the evaluation of and final decisions regarding any potential effects a proposed project may have on wildlife. If you would like more specific information regarding these or other vertebrate species in the vicinity of the area of interest, please contact the Colorado Division of Wildlife.

The information contained herein represents the results of a search of Colorado Natural Heritage Program's (CNHP) Biological and Conservation Data System (BCD), and can be used as notice to anticipate possible impacts or identify areas of interest. Care should be taken in interpreting these data. Sensitive elements are currently known from within the proposed project area, and additional, but undocumented, elements may also exist (see enclosed report). Please note that the absence of data for a particular area, species, or habitat does not necessarily mean that these natural heritage resources do not occur on or adjacent to the project site, rather that our files do not currently contain information to document their presence. CNHP information should not replace field studies necessary for more localized planning efforts, especially if impacts to wildlife habitat are possible.

Although every attempt is made to provide the most current and precise information possible, please be aware that some of our sources provide a higher level of accuracy than others, and some interpretation may be required. CNHP's data system is constantly updated and revised. Please contact CNHP for an update or assistance with interpretation of this natural heritage information.

The data contained in the report is the product and property of the Colorado Natural Heritage Program (CNHP), a sponsored program at Colorado State University (CSU). The data contained herein are provided on an as is, as available basis without warranties of any kind, expressed or implied, including (but not limited to) warranties of merchantability, fitness for a particular purpose, and non-infringement. CNHP, CSU and the state of Colorado further expressly disclaim any warranty that the data are error free or current as of the date supplied.

Sincerely,

Michael Menefee
Environmental Review Coordinator

Enc.





United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services

Colorado Field Office

755 Parfet Street, Suite 361

Lakewood, Colorado 80215

IN REPLY REFER TO:
ES/CO:T&E
Mail Stop 65412

APR 15 2004

Jeff Peterson

Colorado Department of Transportation

4201 E. Arkansas Avenue, Empire Park B-400

Denver, Colorado 80222

Dear Mr. Peterson,

On April 12, 2004, the U.S. Fish and Wildlife Service (Service) received your February 6, 2004, request for a list of Federal endangered and threatened species that may be affected by proposed improvements to US36 highway corridor and the Burlington Northern Santa Fe railroad corridor between Denver and Boulder in Denver, Jefferson, Adams, Boulder, and Broomfield Counties, Colorado. These comments have been prepared under the provisions of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 et. seq.).

Following is a list of Federal endangered, threatened, proposed and candidate species for Denver, Jefferson, Adams, Boulder, and Broomfield Counties, which may be used as a basis for determining additional listed species potentially present in the project area. While other species could occur at or visit the project area, endangered or threatened species most likely to be affected include:

- Birds:** Whooping crane (*Grus americana*), Endangered
Least tern, interior population (*Sterna antillarum*), Endangered
Piping plover (*Charadrius melodus*), Threatened
Bald eagle (*Haliaeetus leucocephalus*), Threatened
- Mammals:** Preble's meadow jumping mouse (*Zapus hudsonius preblei*), Threatened
- Fishes:** Pallid sturgeon (*Scaphirhynchus albus*), Endangered
- Plants :** Ute ladies-tresses orchid (*Spiranthes diluvialis*), Threatened
Colorado butterfly plant (*Gaura neomexicana* ssp. *coloradensis*), Threatened

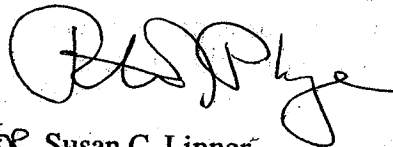
The Service also is interested in the protection of species which are candidates for official listing as threatened or endangered (Federal Register, Vol. 61, No. 40, February 28, 1996). While these species presently have no legal protection under the Act, it is within the spirit of this Act to consider project impacts to potentially sensitive candidate species. It is the intention of the Service to protect these species before human-related activities adversely impact their habitat to a degree that they would need to be listed and, therefore, protected under the Act. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed. If any candidate species will be unavoidably impacted, appropriate mitigation should be proposed and discussed with this office.

While the Service has no specific knowledge of the presence of these species within the project area, the following may occur in or visit the project area.

Mammals Black-tailed prairie dog (*Cynomys ludovicianus*)

If the Service can be of further assistance, please contact Alison Deans Michael of this office at (303) 275-2370.

Sincerely,



FOR Susan C. Linner
Colorado Field Supervisor

pc: CDOT (J. Peterson)
 Michael

Ref: Alison\H:\My Documents\CDOT 2004\Region 6\US36\US36SppList.wpd



Jeffrey Dawson

06/18/2004 03:56 PM

To: Alison_Michael@fws.gov, Jeff.Peterson@dot.state.co.us,
Sandi.Kohrs@dot.state.co.us, carol.duecker@rtd-denver.com,
Genevieve.Hutchison@rtd-denver.com, Tricia
Bernhardt/Denver/URSCorp@URSCorp, Kim
Cornelisse/Denver/URSCorp@URSCorp

cc:
Subject: Notes from June 17 Meeting Regarding T&E Issues

Alison and Jeff - please review and provide corrections if needed. Thanks.



T&E meeting 6-18-04.doc



US 36 CORRIDOR
Environmental Impact Statement

Photographs

Photographs of US 36 Corridor

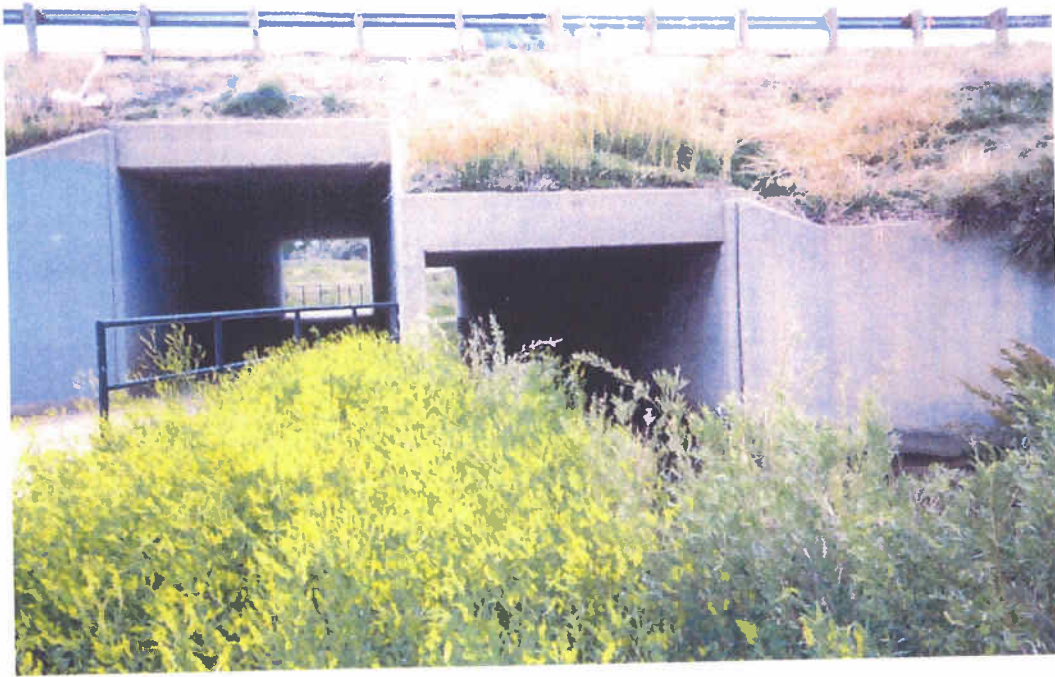


1. Allen Ditch, east crossing



2. Farmers Highline Canal riparian habitat, north side of highway

Photographs of US 36 Corridor



3. Big Dry Creek culverts. Creek on right, bicycle path on left



4. Rock Creek riparian area adjacent to north side of US 36

Photographs of US 36 Corridor



5. Rock Creek culvert, from west (Interlocken) side



6. Prairie dog towns (white upland areas with flowering field bindweed) and wetlands, looking southeast from 88th street

Photographs of US 36 Corridor



7. View northwest along US 36, towards Coal Creek



8. Coal Creek riparian habitat

Photographs of US 36 Corridor



9. Prairie dog town adjacent to Coal Creek



10. Mid-grass prairie near Boulder Valley scenic view

Photographs of US 36 Corridor



11. Davidson Ditch, low flow. Many wildlife tracks observed in mud.



12. Shearer Ditch, looking east from Cherryvale.

Photographs of US 36 Corridor



13. South Boulder Creek, looking downstream (north)



14. South Boulder Creek Bridge, looking downstream

Photographs of BNSF Corridor



1. South Platte River



2. Pecos Street Pond

Photographs of BNSF Corridor



3. Clear Creek, looking upstream to railroad bridge and dam



4. Little Dry Creek

Photographs of BNSF Corridor



5. Big Dry Creek riparian habitat. High railroad berm on right.



6. Lower Church Lake. US 36 berm on right.

Photographs of BNSF Corridor



7. Railroad tracks and habitat, looking west from Community Ditch



8. Rock Creek riparian habitat. Railroad on left.

Photographs of BNSF Corridor



9. BNSF railroad bridge over Coal Creek



10. South Boulder Creek riparian habitat

Photographs of BNSF Corridor



11. Railroad bridge over Boulder Creek



12. Scotch thistle and diffuse knapweed near rail corridor in Boulder



Photographs of BNSF Corridor



13. Wonderland Creek crossing



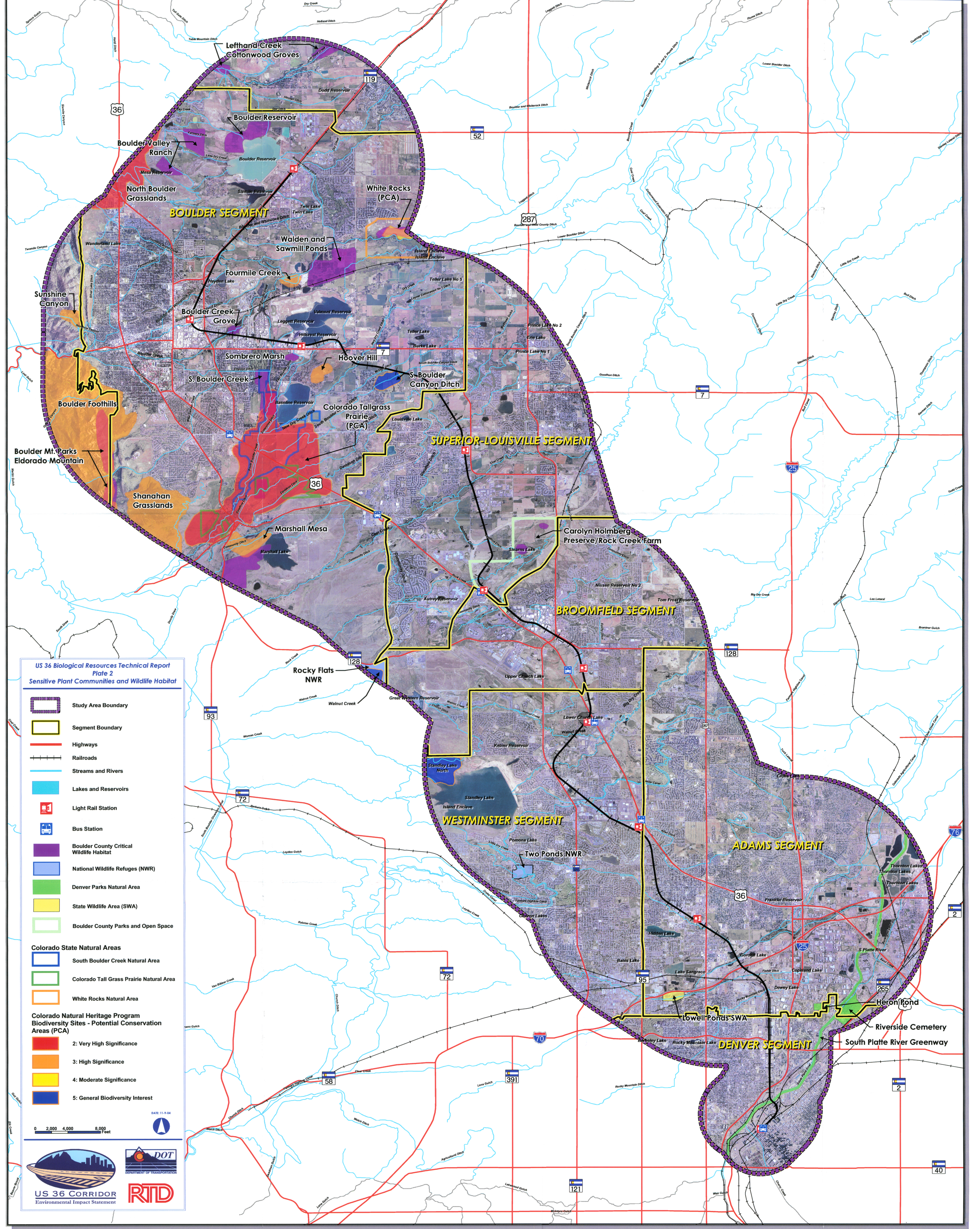
14. Prairie dog burrows along railroad, near Fourmile Canyon Creek



US 36 CORRIDOR
Environmental Impact Statement

Plates



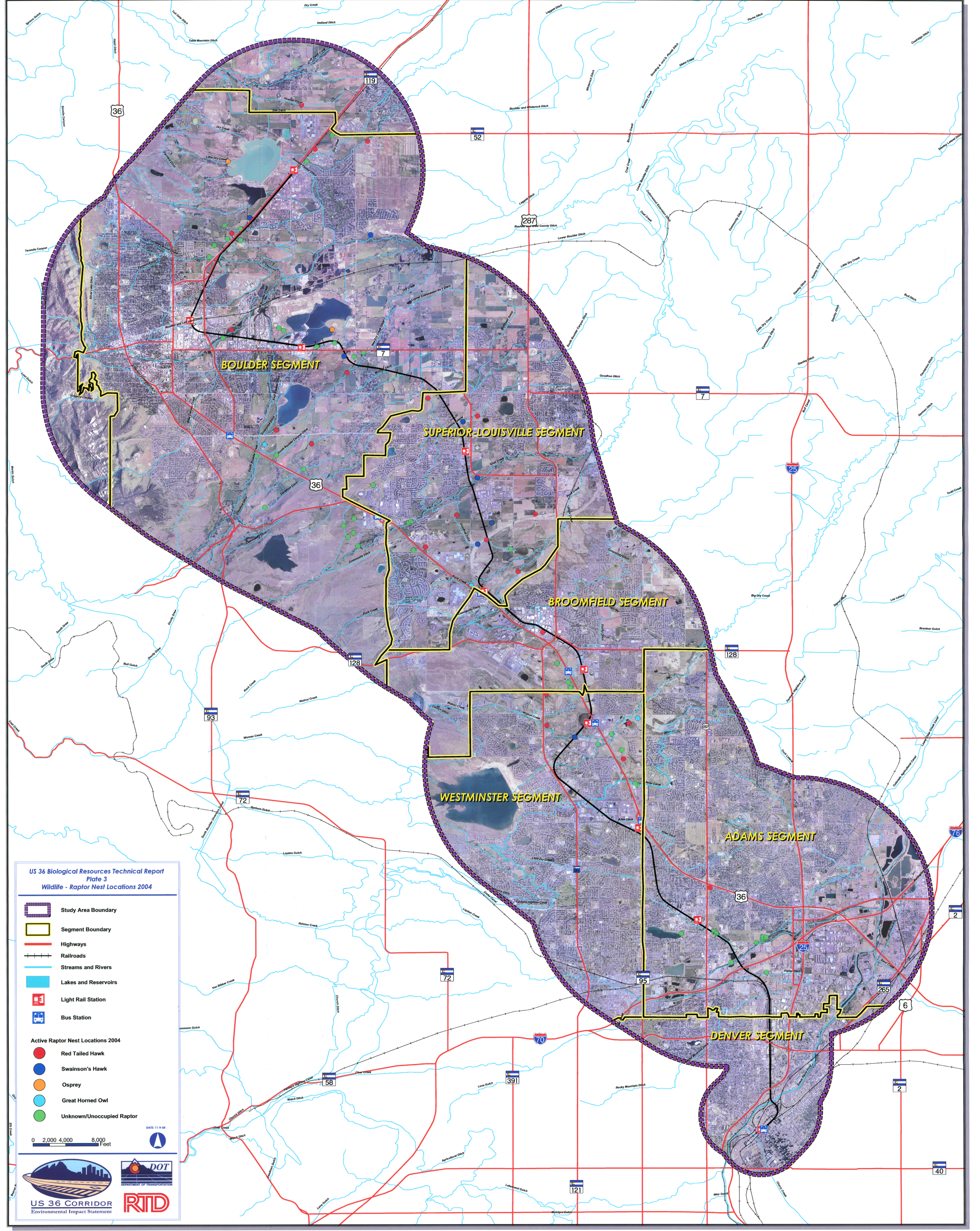


**US 36 Biological Resources Technical Report
Plate 2
Sensitive Plant Communities and Wildlife Habitat**

- Study Area Boundary
 - Segment Boundary
 - Highways
 - Railroads
 - Streams and Rivers
 - Lakes and Reservoirs
 - Light Rail Station
 - Bus Station
 - Boulder County Critical Wildlife Habitat
 - National Wildlife Refuges (NWR)
 - Denver Parks Natural Area
 - State Wildlife Area (SWA)
 - Boulder County Parks and Open Space
- Colorado State Natural Areas**
- South Boulder Creek Natural Area
 - Colorado Tall Grass Prairie Natural Area
 - White Rocks Natural Area
- Colorado Natural Heritage Program
Biodiversity Sites - Potential Conservation
Areas (PCA)**
- 2: Very High Significance
 - 3: High Significance
 - 4: Moderate Significance
 - 5: General Biodiversity Interest

DATE: 11-9-04

0 2,000 4,000 8,000 Feet

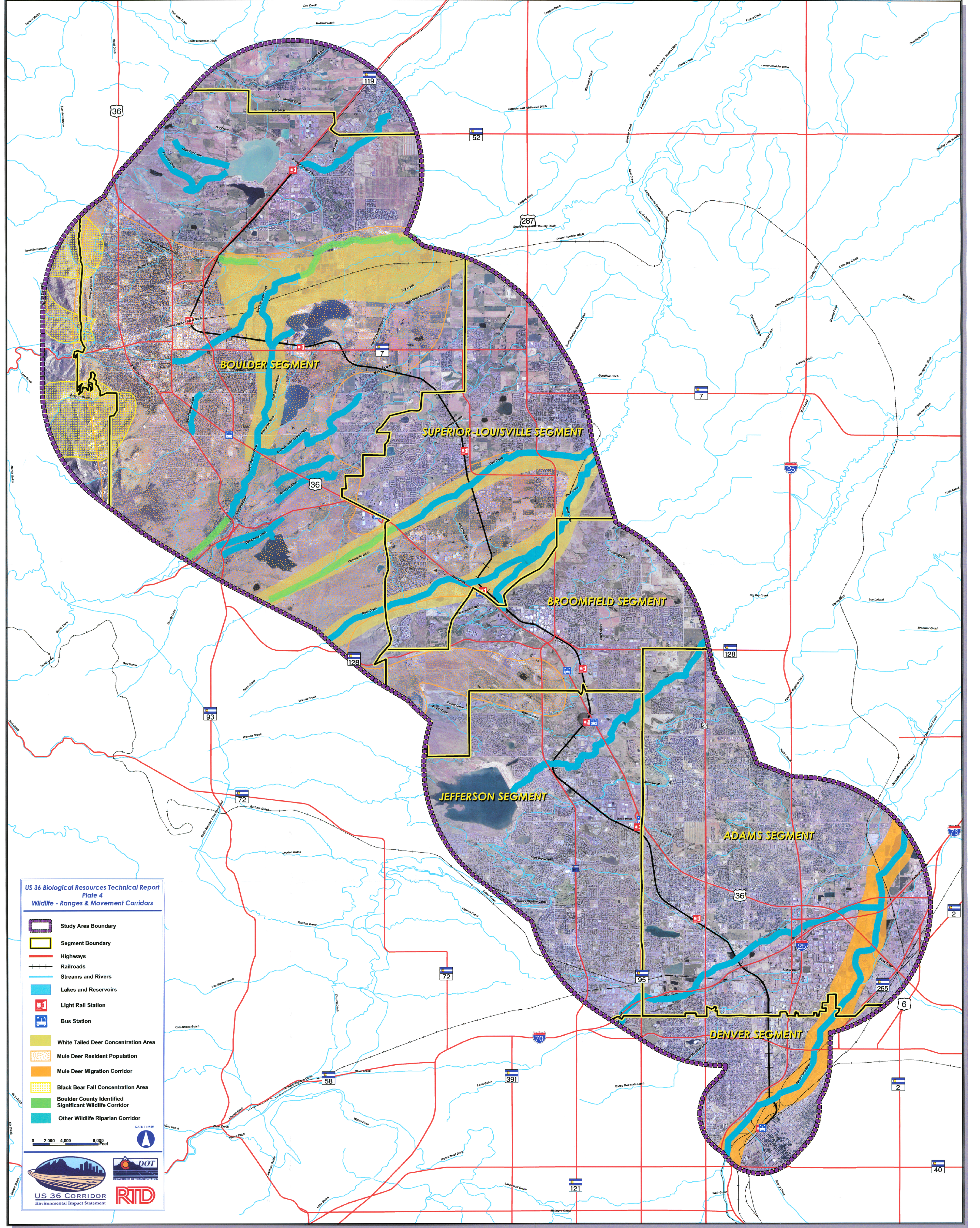


US 36 Biological Resources Technical Report
 Plate 3
 Wildlife - Raptor Nest Locations 2004

- Study Area Boundary
 - Segment Boundary
 - Highways
 - Railroads
 - Streams and Rivers
 - Lakes and Reservoirs
 - Light Rail Station
 - Bus Station
- Active Raptor Nest Locations 2004
- Red Tailed Hawk
 - Swainson's Hawk
 - Osprey
 - Great Horned Owl
 - Unknown/Uncollected Raptor

DATE: 11-9-04

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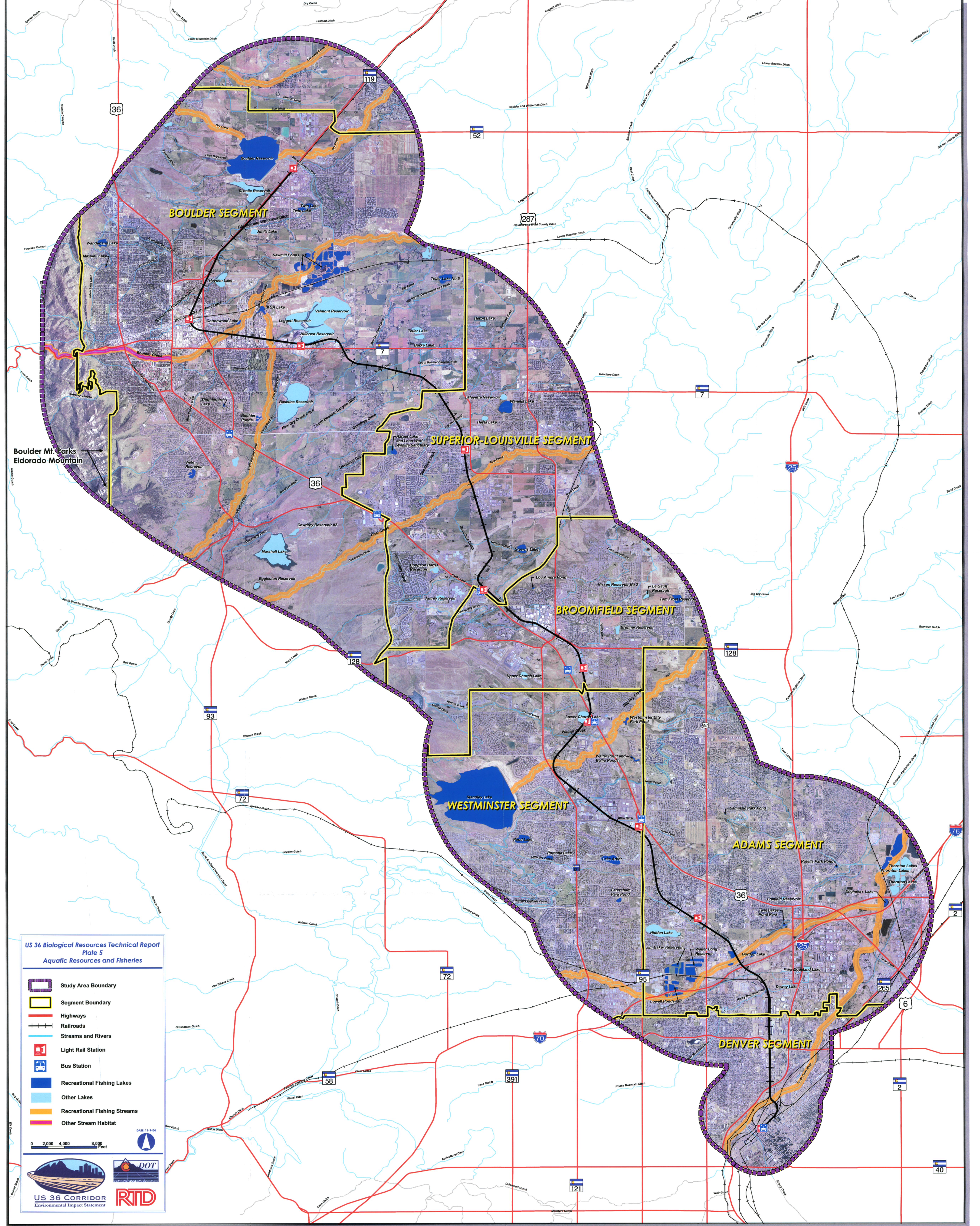


US 36 Biological Resources Technical Report
Plate 4
Wildlife - Ranges & Movement Corridors

- Study Area Boundary
- Segment Boundary
- Highways
- Railroads
- Streams and Rivers
- Lakes and Reservoirs
- Light Rail Station
- Bus Station
- White Tailed Deer Concentration Area
- Mule Deer Resident Population
- Mule Deer Migration Corridor
- Black Bear Fall Concentration Area
- Boulder County Identified Significant Wildlife Corridor
- Other Wildlife Riparian Corridor

DATE: 11-9-04
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BOULDER SEGMENT

SUPERIOR-LOUISVILLE SEGMENT

BROOMFIELD SEGMENT

WESTMINSTER SEGMENT

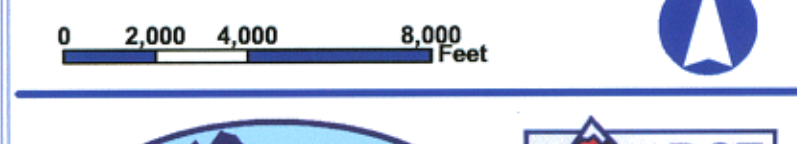
ADAMS SEGMENT

DENVER SEGMENT

Boulder Mt. Parks
Eldorado Mountain

**US 36 Biological Resources Technical Report
Plate 5
Aquatic Resources and Fisheries**

- Study Area Boundary
- Segment Boundary
- Highways
- Railroads
- Streams and Rivers
- Light Rail Station
- Bus Station
- Recreational Fishing Lakes
- Other Lakes
- Recreational Fishing Streams
- Other Stream Habitat

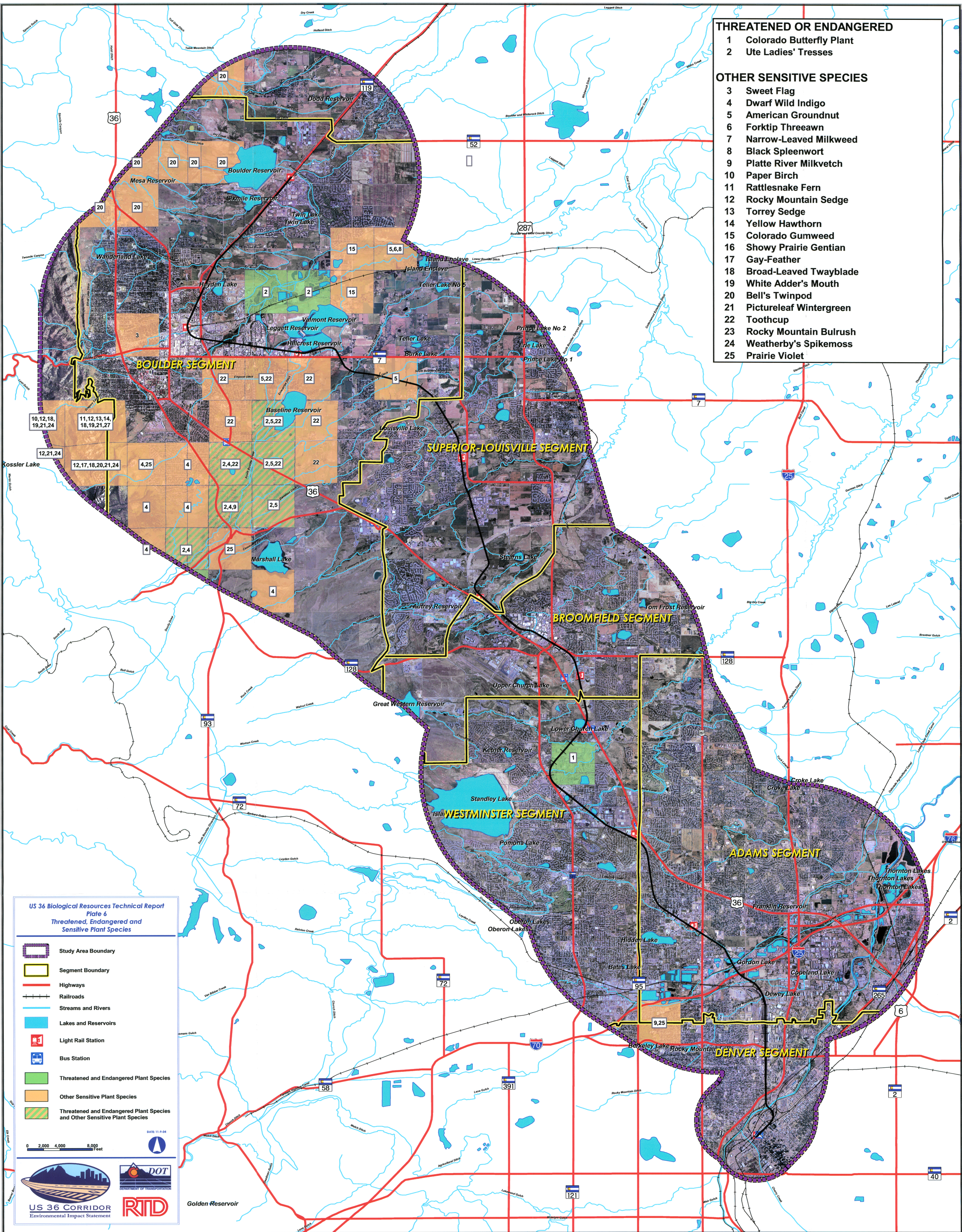


THREATENED OR ENDANGERED

- 1 Colorado Butterfly Plant
- 2 Ute Ladies' Tresses

OTHER SENSITIVE SPECIES

- 3 Sweet Flag
- 4 Dwarf Wild Indigo
- 5 American Groundnut
- 6 Forktip Threawn
- 7 Narrow-Leaved Milkweed
- 8 Black Spleenwort
- 9 Platte River Milkvetch
- 10 Paper Birch
- 11 Rattlesnake Fern
- 12 Rocky Mountain Sedge
- 13 Torrey Sedge
- 14 Yellow Hawthorn
- 15 Colorado Gumweed
- 16 Showy Prairie Gentian
- 17 Gay-Feather
- 18 Broad-Leaved Twayblade
- 19 White Adder's Mouth
- 20 Bell's Twinpod
- 21 Pictureleaf Wintergreen
- 22 Toothcup
- 23 Rocky Mountain Bulrush
- 24 Weatherby's Spikemoss
- 25 Prairie Violet

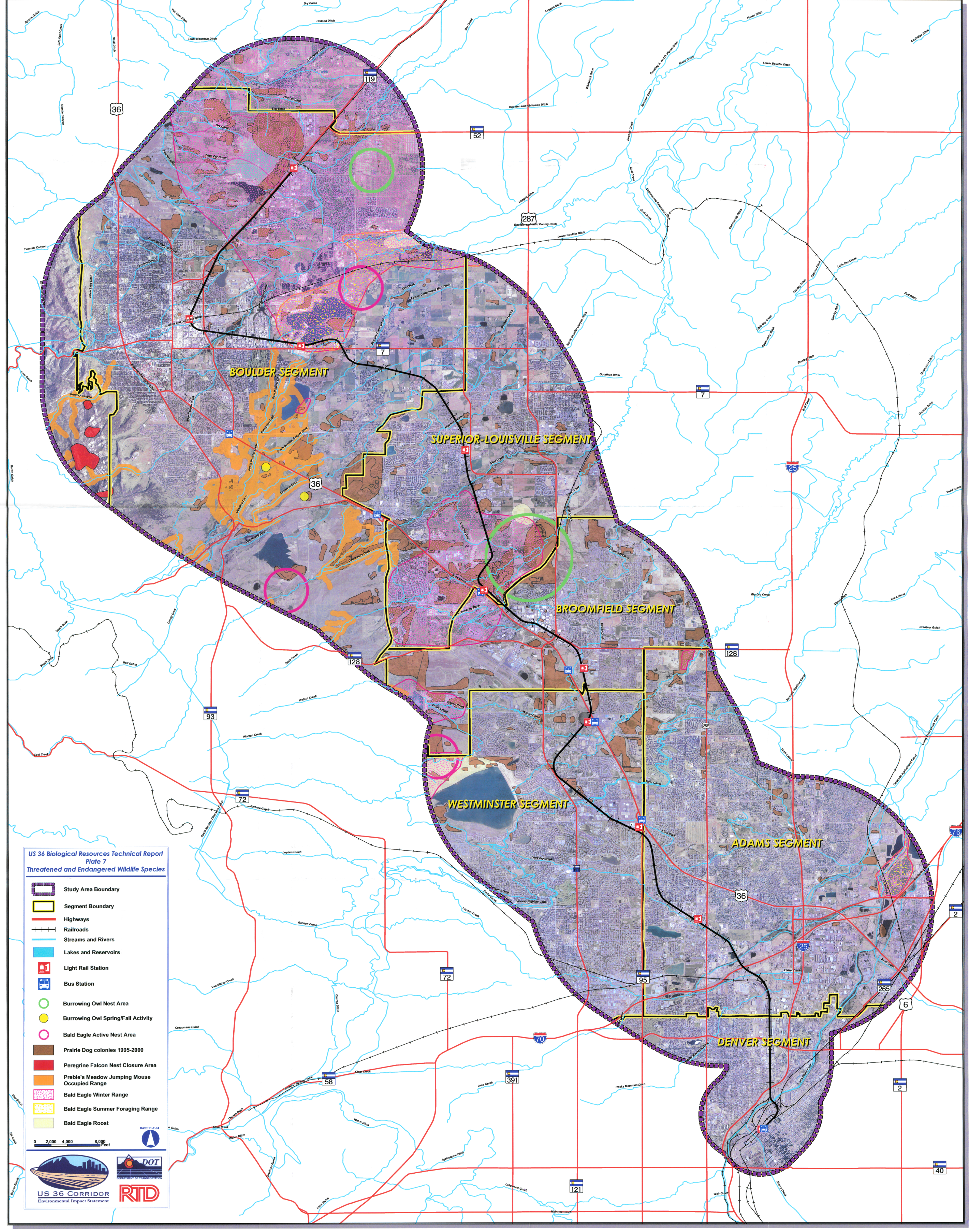


US 36 Biological Resources Technical Report
Plate 6
Threatened, Endangered and
Sensitive Plant Species

- Study Area Boundary
- Segment Boundary
- Highways
- Railroads
- Streams and Rivers
- Lakes and Reservoirs
- Light Rail Station
- Bus Station
- Threatened and Endangered Plant Species
- Other Sensitive Plant Species
- Threatened and Endangered Plant Species and Other Sensitive Plant Species

DATE: 11-9-04

0 2,000 4,000 8,000 Feet



BOULDER SEGMENT

SUPERIOR-LOUISVILLE SEGMENT

BROOMFIELD SEGMENT

WESTMINSTER SEGMENT

ADAMS SEGMENT

DENVER SEGMENT



US 36 CORRIDOR
Environmental Impact Statement

US 36 Corridor



US 36 CORRIDOR
Environmental Impact Statement

Maps of Riparian Habitats and Prairie Dog Towns

US 36 EIS

Riparian Habitat and Prairie Dog Colonies

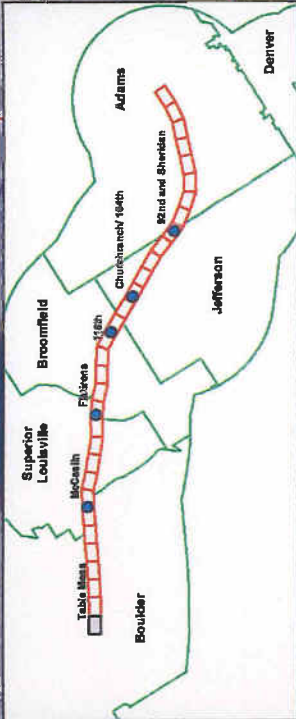
Sheet 1



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

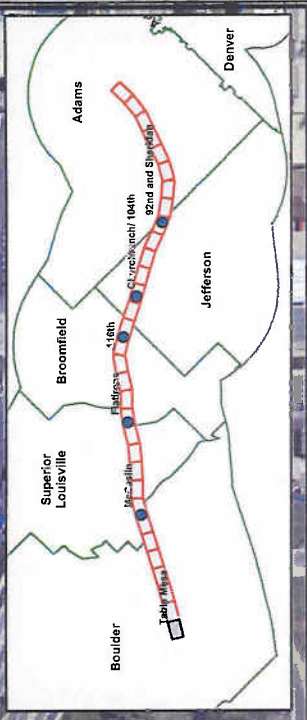
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US 36 EIS
Riparian Habitat and Prairie Dog Colonies
Sheet 1A



-  Black-Tailed Prairie Dog Colonies
-  Riparian Shrub
-  Riparian Woodland
-  Study Area
-  Boundary
-  Segment
-  Boundaries
-  Sheet
-  Boundaries



US 36 EIS

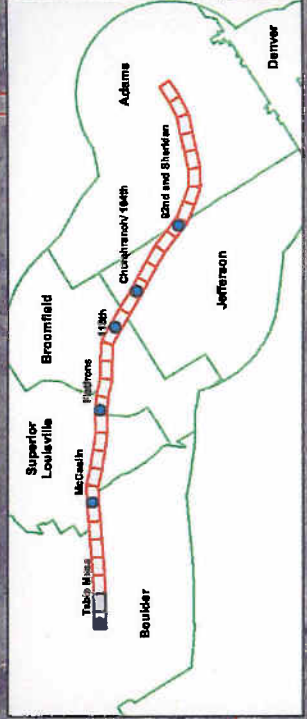
Riparian Habitat and Prairie Dog Colonies

Sheet 2



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed
- Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

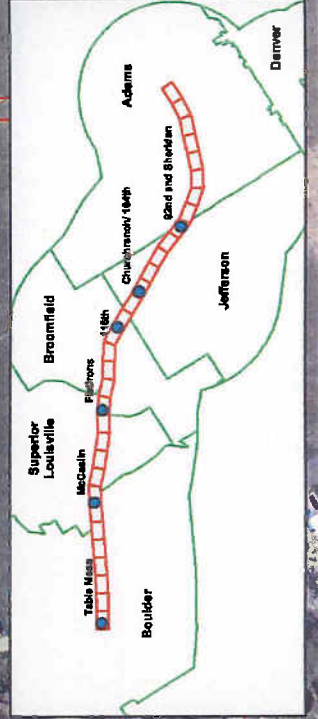
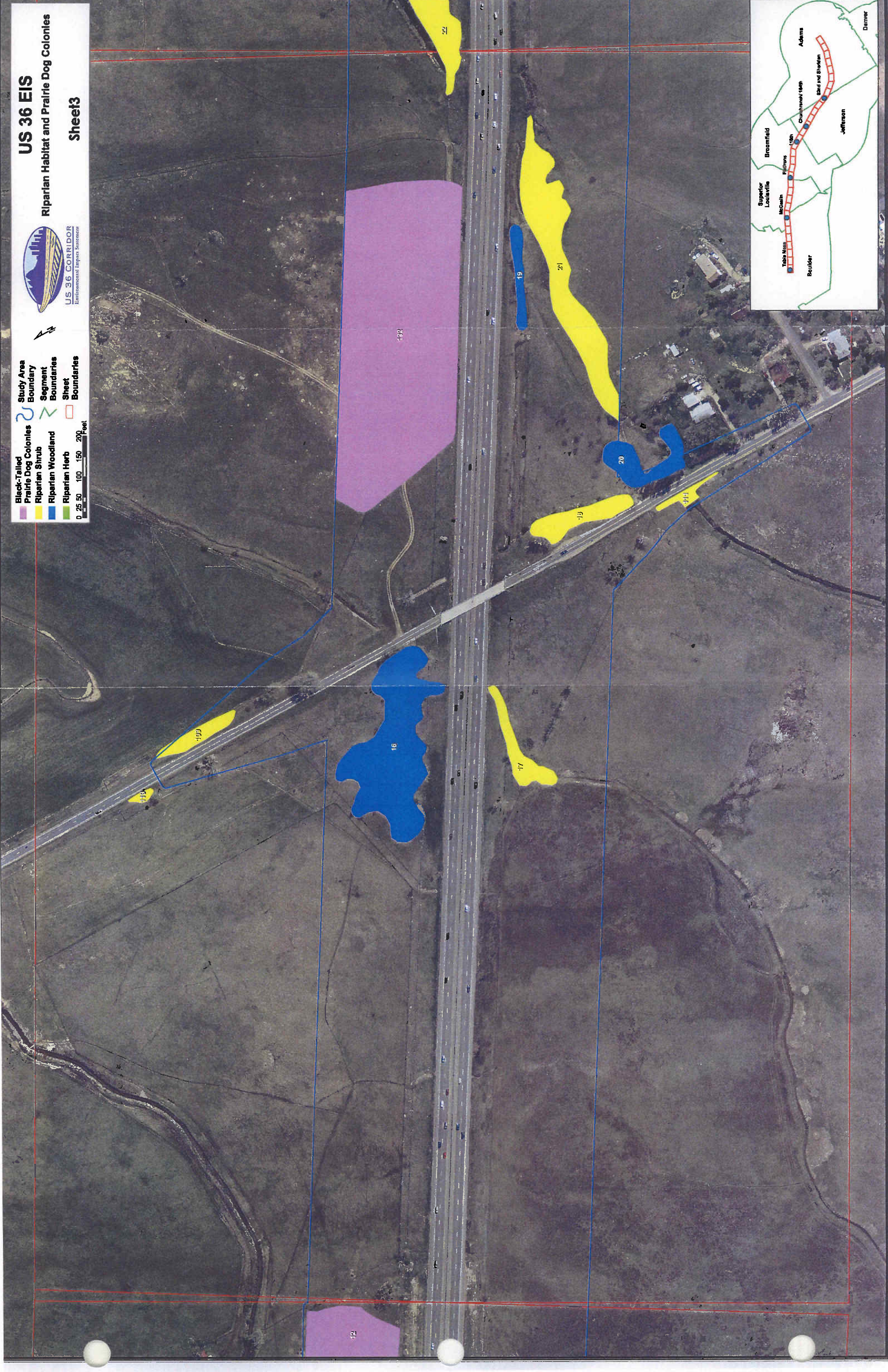
Sheet3



Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



US 36 EIS

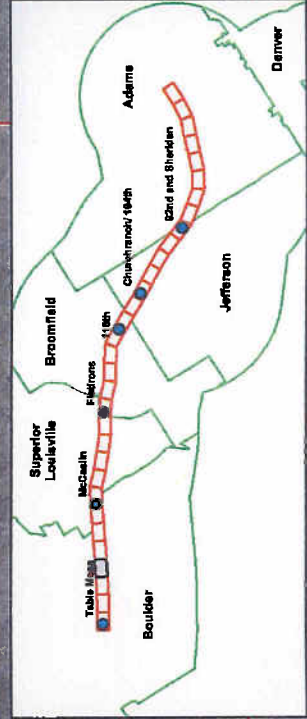
Riparian Habitat and Prairie Dog Colonies

Sheet 4



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



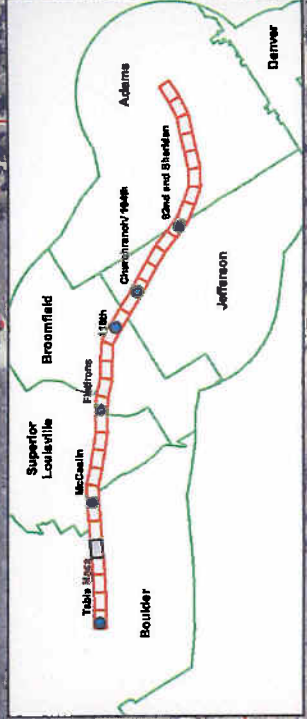
US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 5



- Black-Tailed
- Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 6

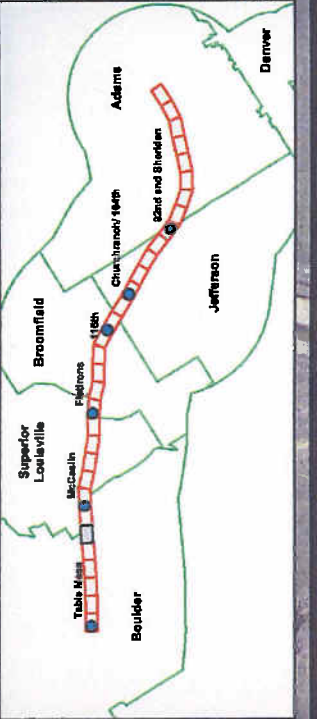


US 36 CORRIDOR
Environmental Impact Statement

Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

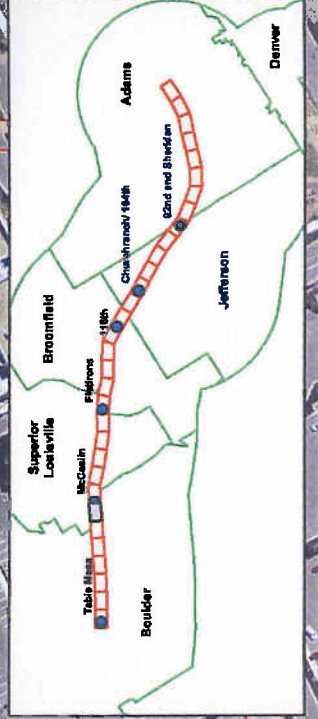
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US 36 CORRIDOR
Environmental Impact Statement

Black-tailed
 Prairie Dog Colonies
 Riparian Shrub
 Riparian Woodland
 Riparian Herb
 Study Area Boundary
 Segment Boundary
 Sheet Boundary
 0 25 50 100 150 200 Feet



US 36 EIS

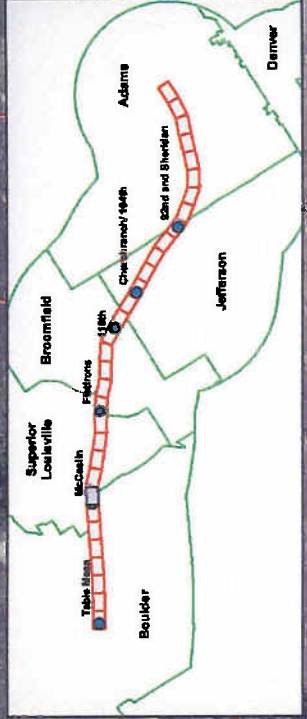
Riparian Habitat and Prairie Dog Colonies

Sheet 8



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

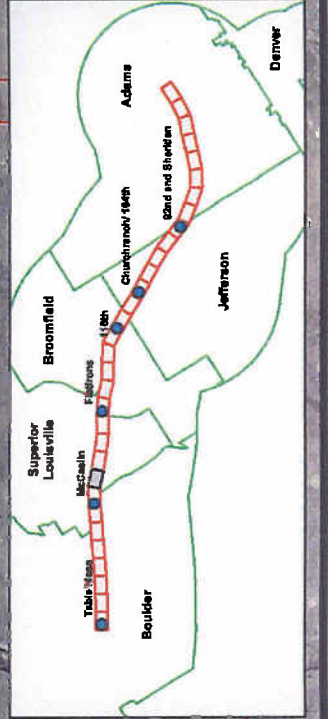
Riparian Habitat and Prairie Dog Colonies

Sheet 9



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed
- Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



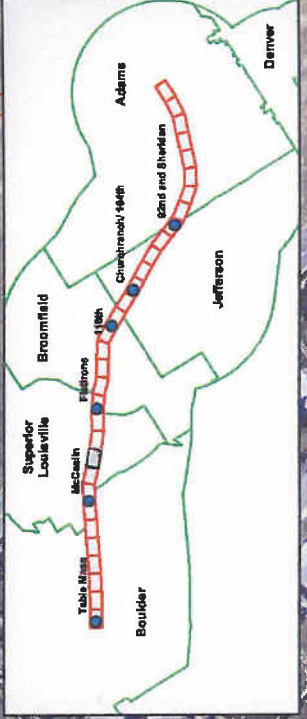
US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 10



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

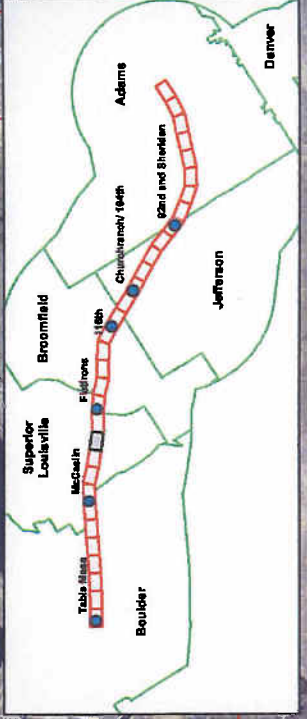
Riparian Habitat and Prairie Dog Colonies

Sheet 11



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



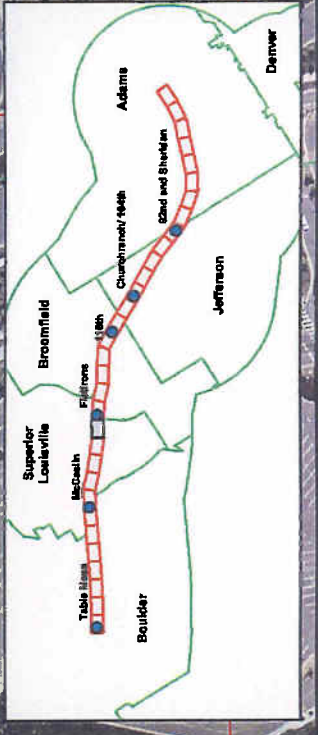
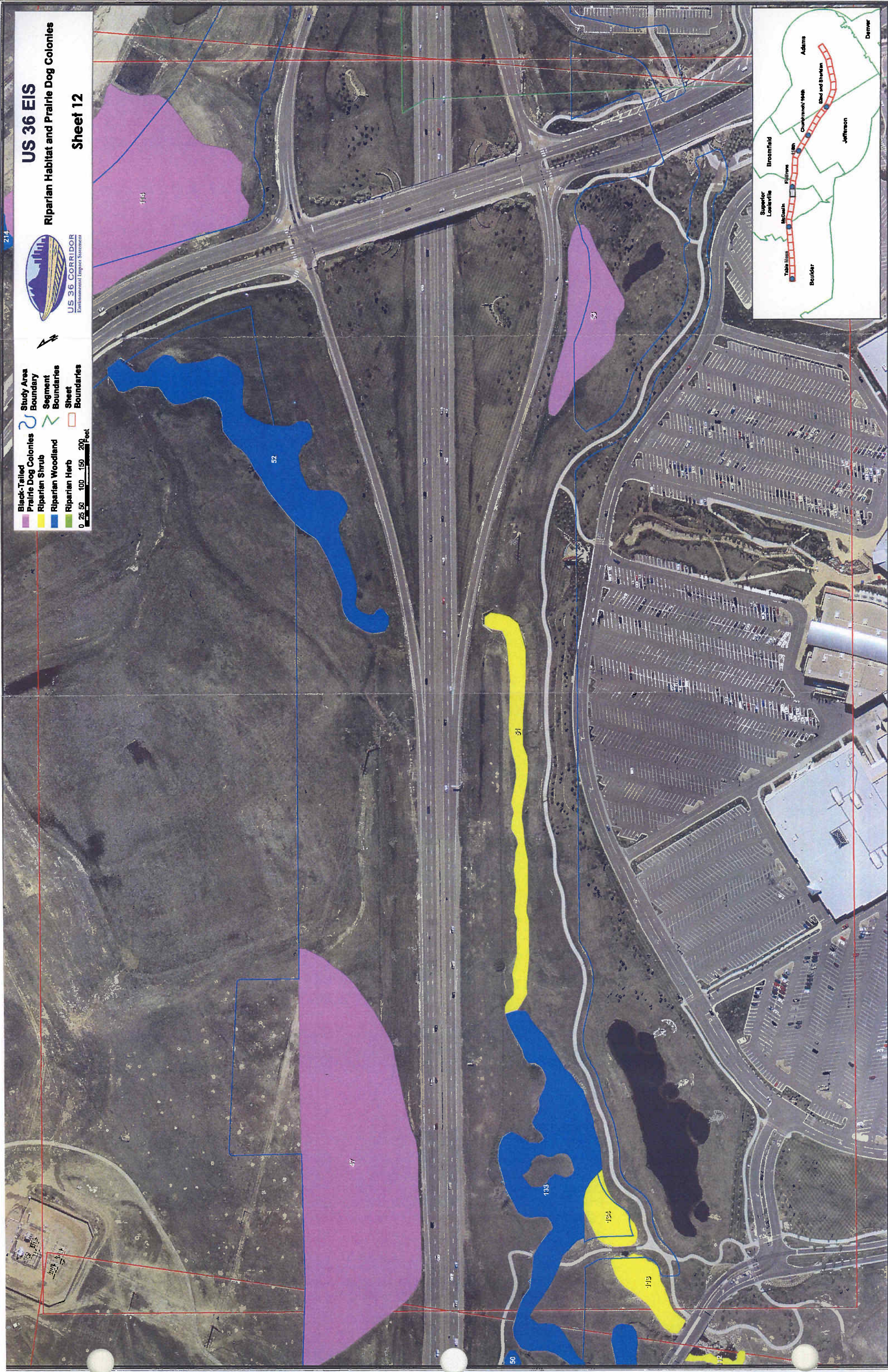
US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 12



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

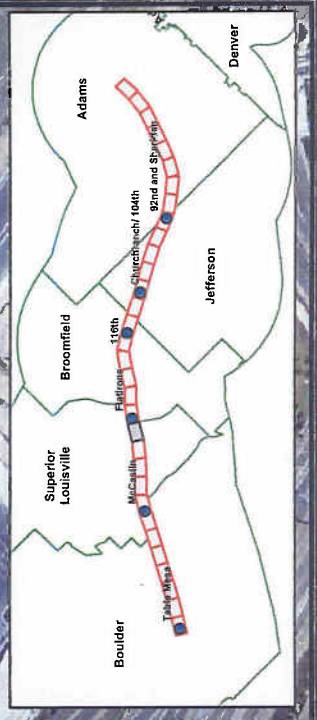
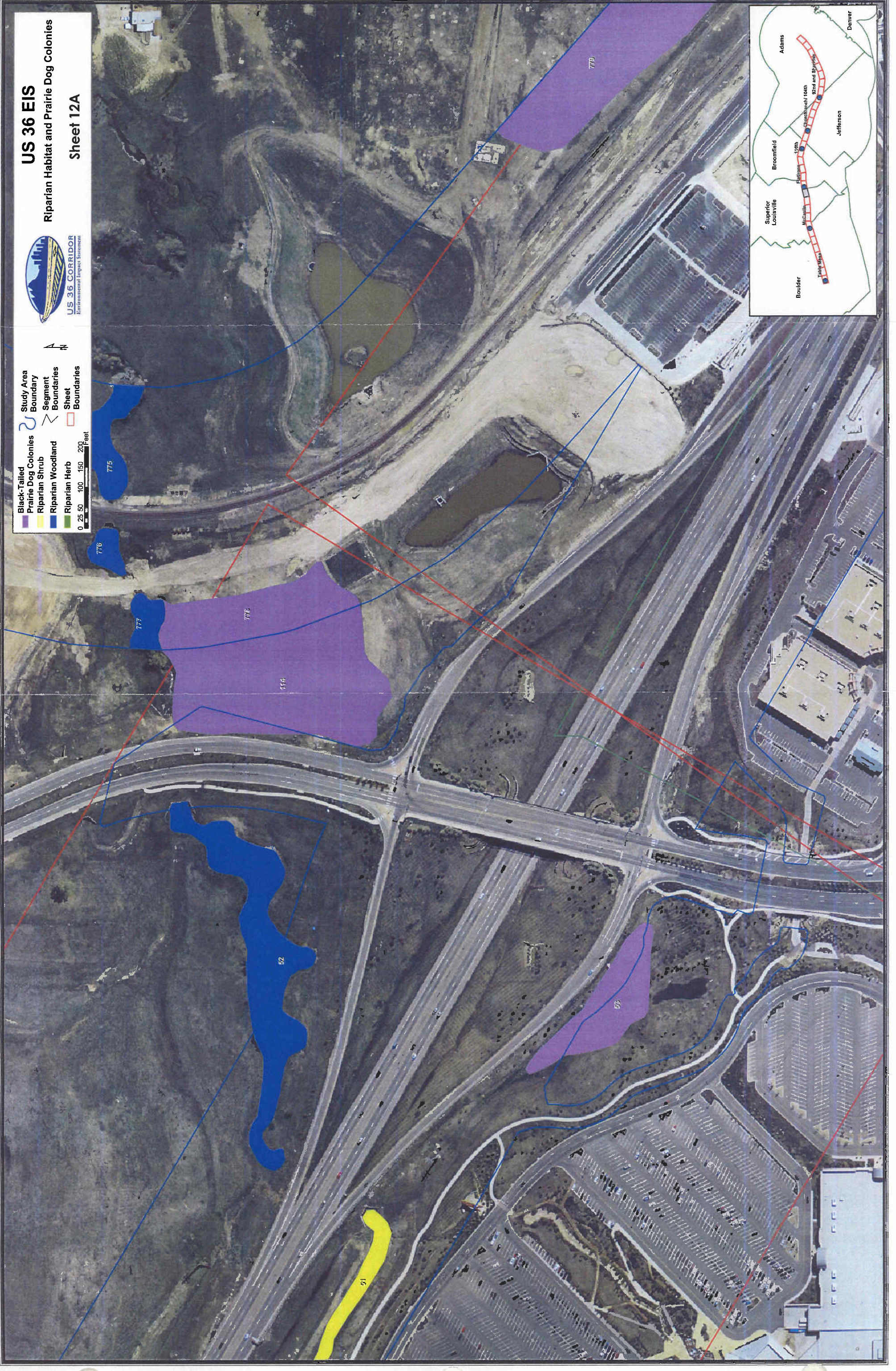


US 36 EIS
Riparian Habitat and Prairie Dog Colonies
Sheet 12A



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundary
- Sheet Boundary

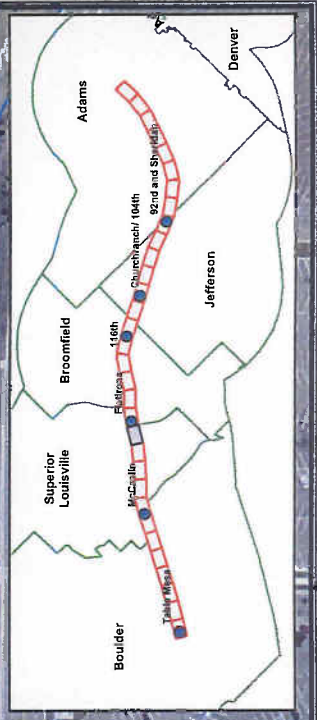
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US 36 EIS
Riparian Habitat and Prairie Dog Colonies
Sheet 12B



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 13

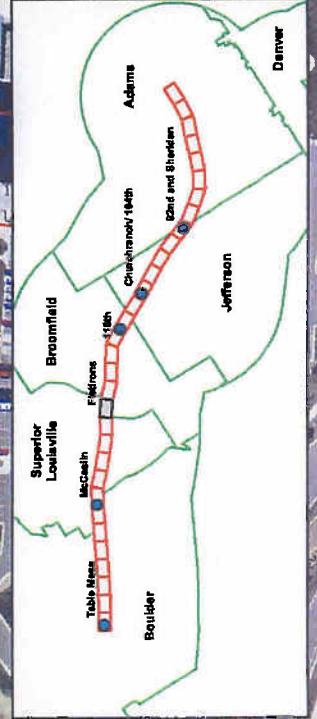


US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- 0 25 50 100 150 200 feet
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

217

216



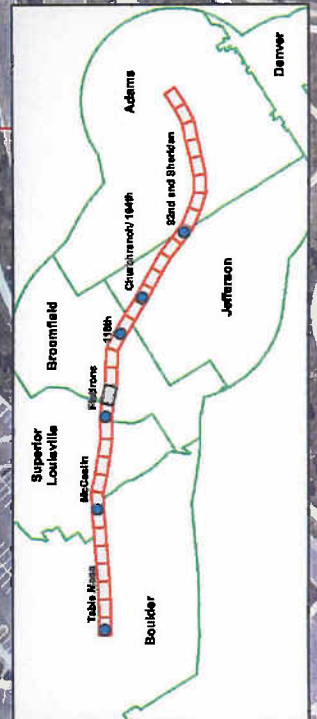
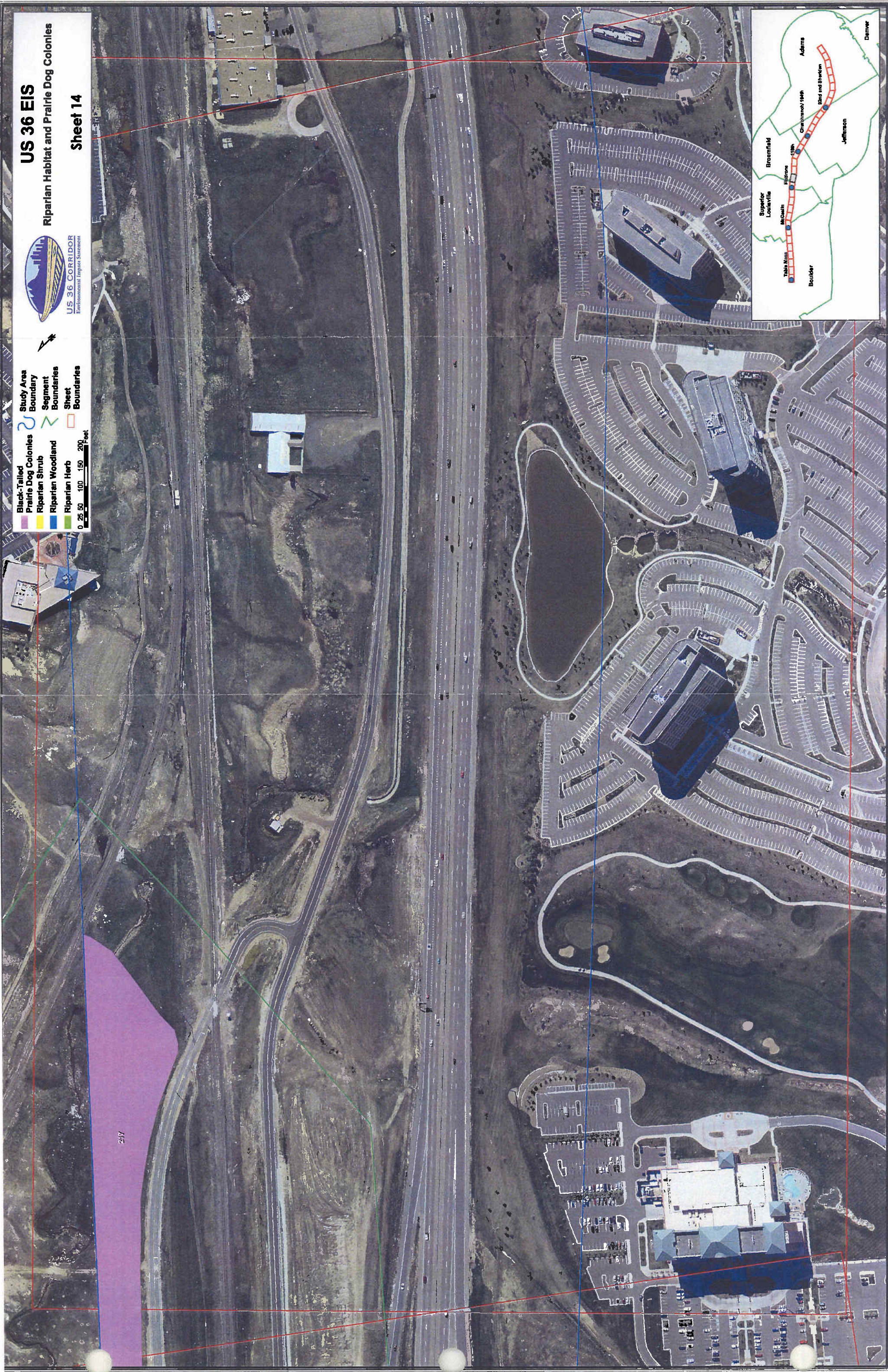
US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 14



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

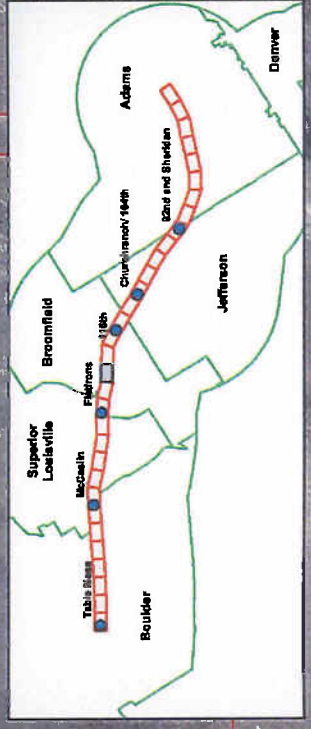
Riparian Habitat and Prairie Dog Colonies

Sheet 15



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

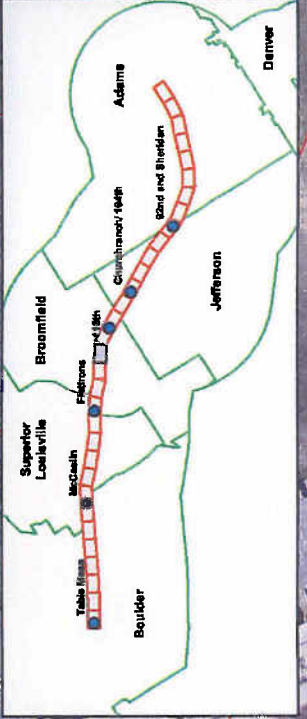
Sheet 16



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



11/22/09

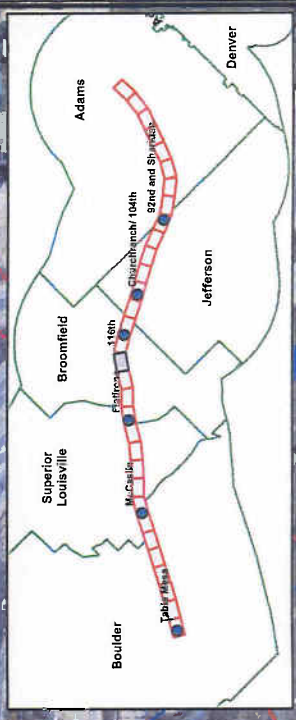
US 36 EIS Riparian Habitat and Prairie Dog Colonies Sheet 16A



- Black-Tailed Prairie Dog Colonies
- Prairie Dog Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



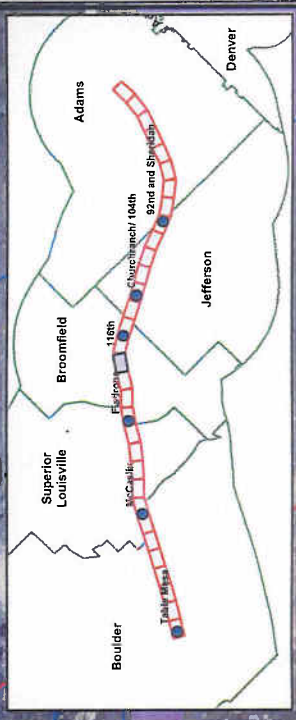
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US 36 EIS
Riparian Habitat and Prairie Dog Colonies
Sheet 16B



- | | |
|--|-----------------------------------|
| | Black-tailed Prairie Dog Colonies |
| | Riparian Shrub |
| | Riparian Woodland |
| | Riparian Herb |
-
- | | |
|--|---------------------|
| | Study Area Boundary |
| | Segment Boundaries |
| | Sheet Boundaries |



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

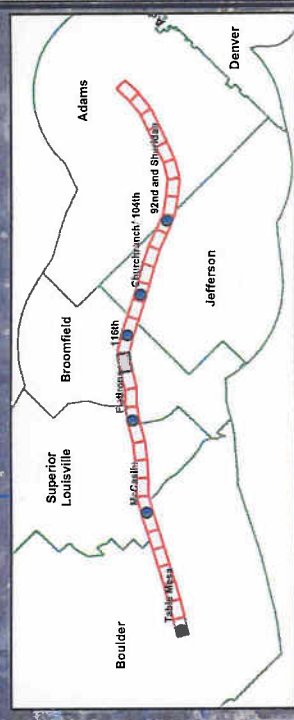
Sheet 16C



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



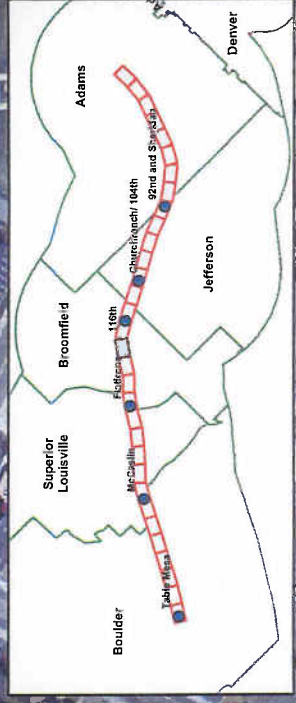
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US 36 EIS
Riparian Habitat and Prairie Dog Colonies
Sheet 16D



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

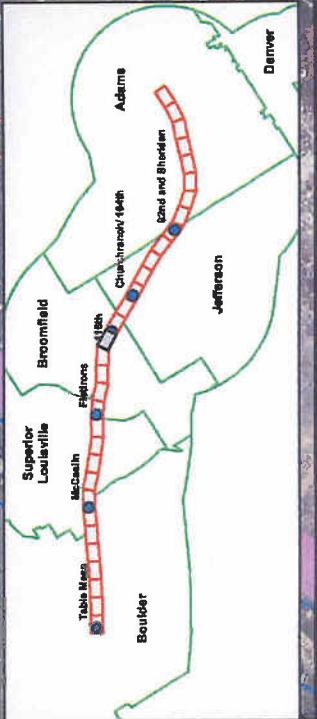




US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries

0 25 50 100 150 200 Feet



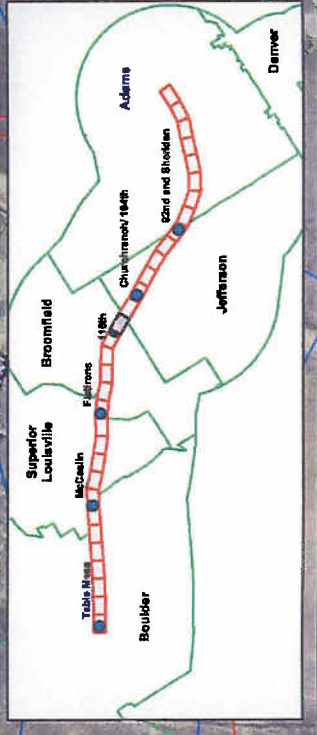
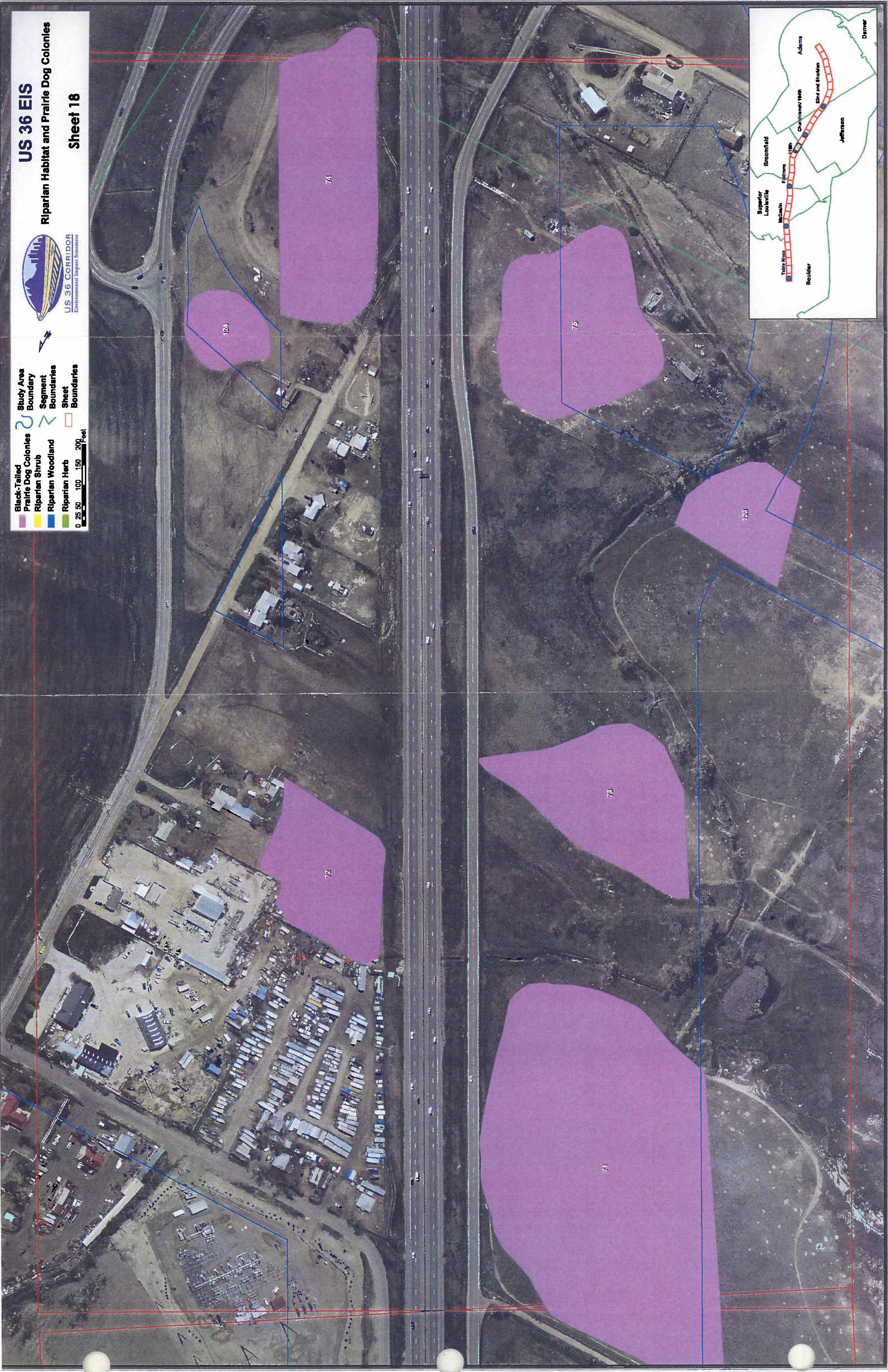
US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 18



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries



US 36 EIS

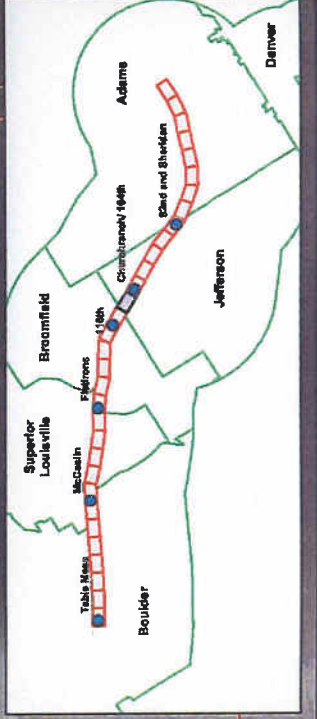
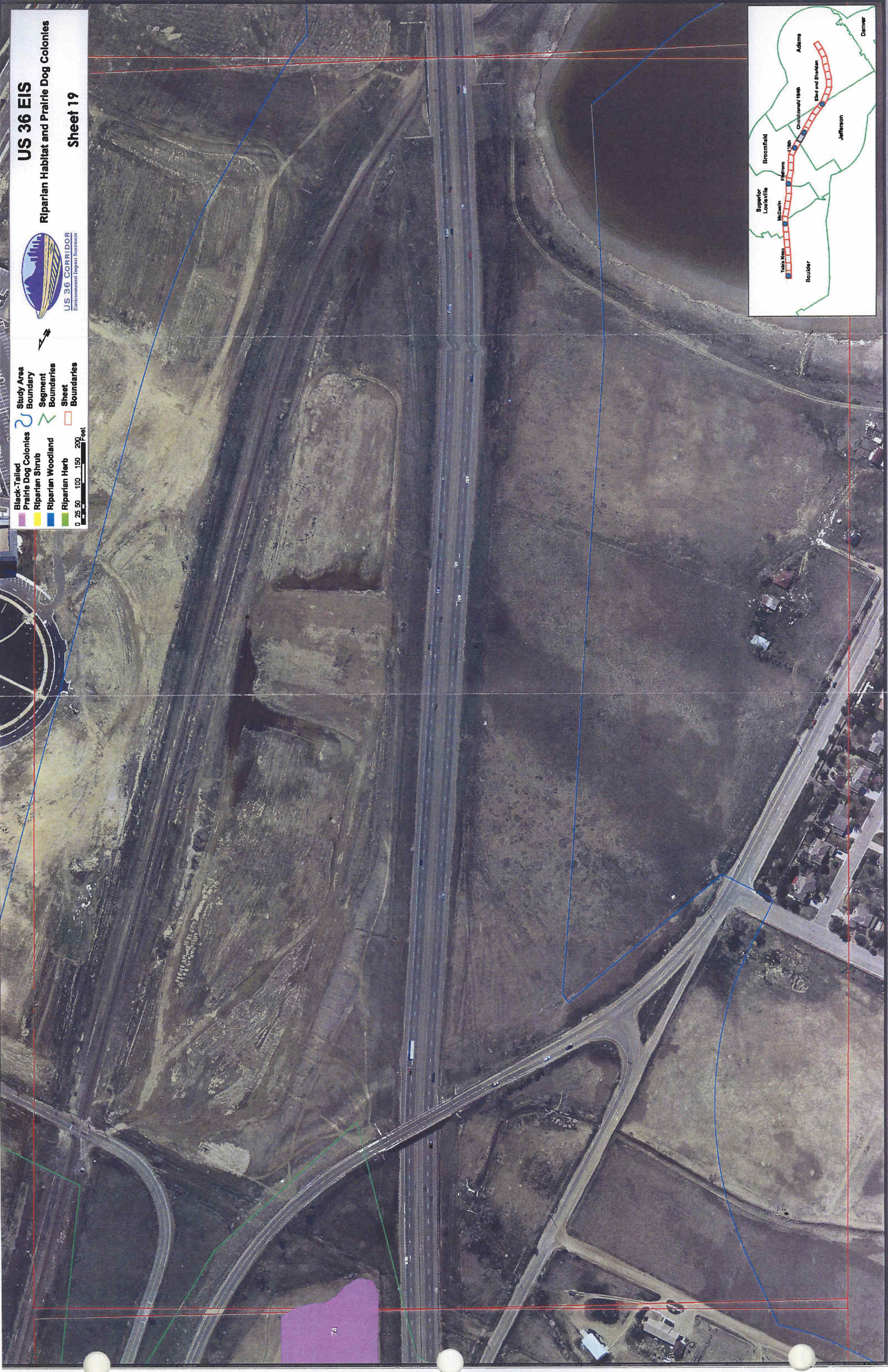
Riparian Habitat and Prairie Dog Colonies

Sheet 19



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

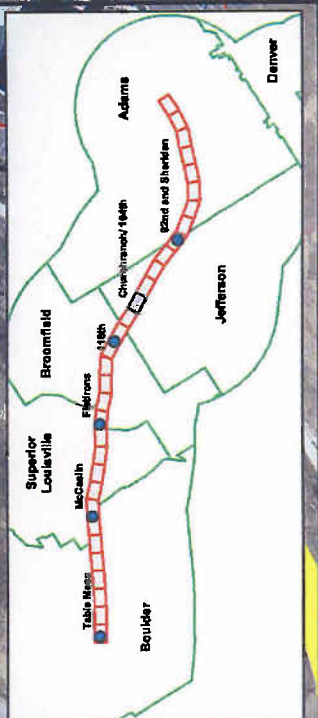
Riparian Habitat and Prairie Dog Colonies

Sheet 20



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Strub
- Riparian Woodland
- Riparian Herb
- 0 25 50 100 150 200 Feet
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

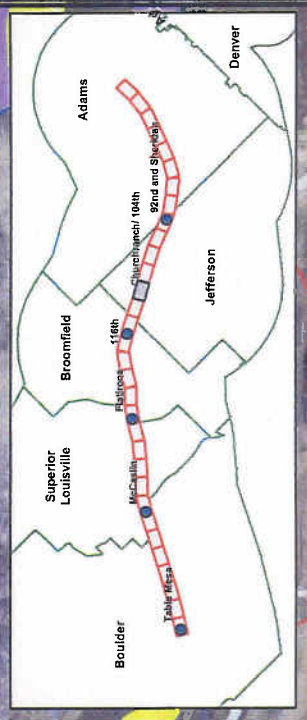


US 36 EIS
Riparian Habitat and Prairie Dog Colonies
Sheet 20A



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundary
- Sheet
- Boundaries

0 25 50 100 150 200 Feet



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

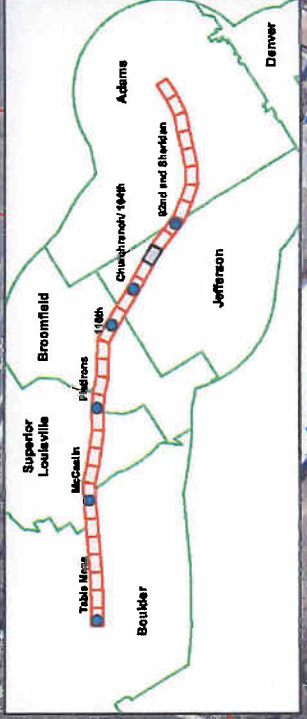
Sheet 22



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



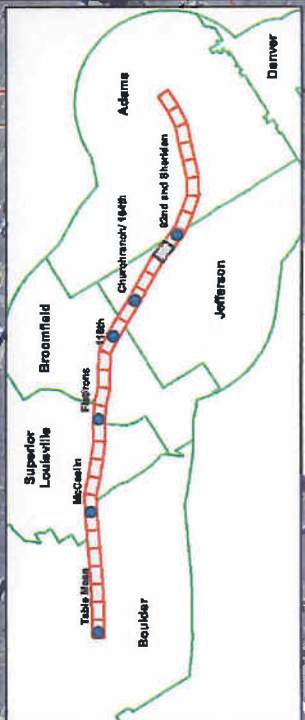
US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 23



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

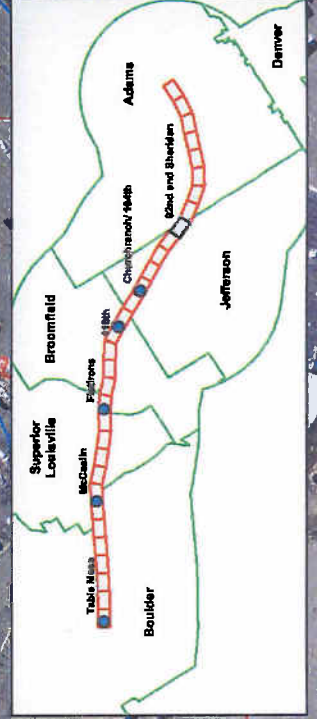
Riparian Habitat and Prairie Dog Colonies

Sheet 24



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



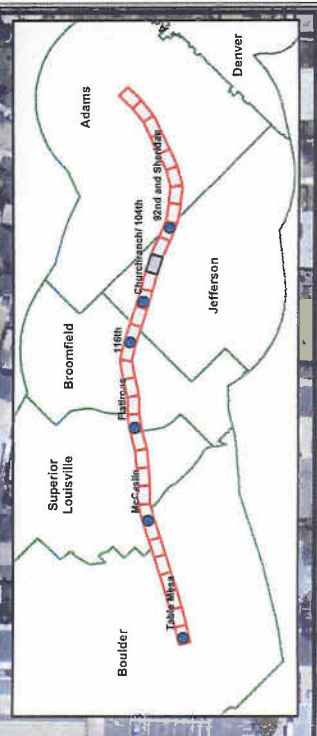
US 36 EIS
Riparian Habitat and Prairie Dog Colonies
Sheet 92nd/Sheridan



Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



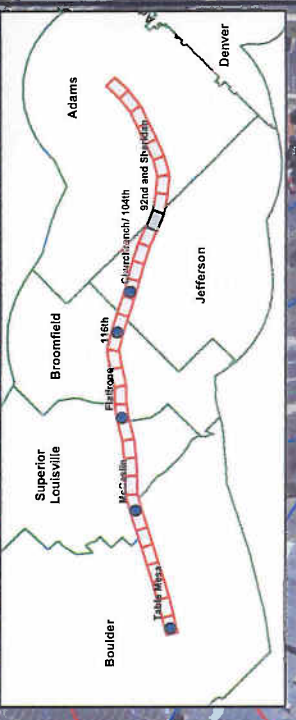
US 36 EIS
Riparian Habitat and Prairie Dog Colonies
Sheet 24A



- Black-Tailed
- Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundary
- Sheet Boundary



0 25 50 100 150 200 Feet



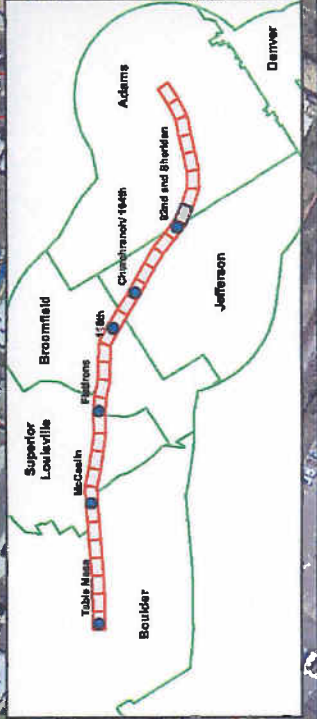
US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 25



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

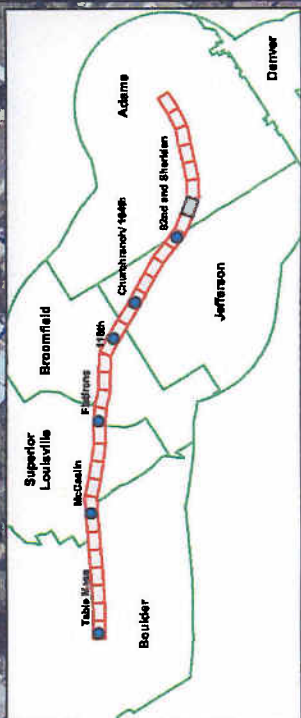
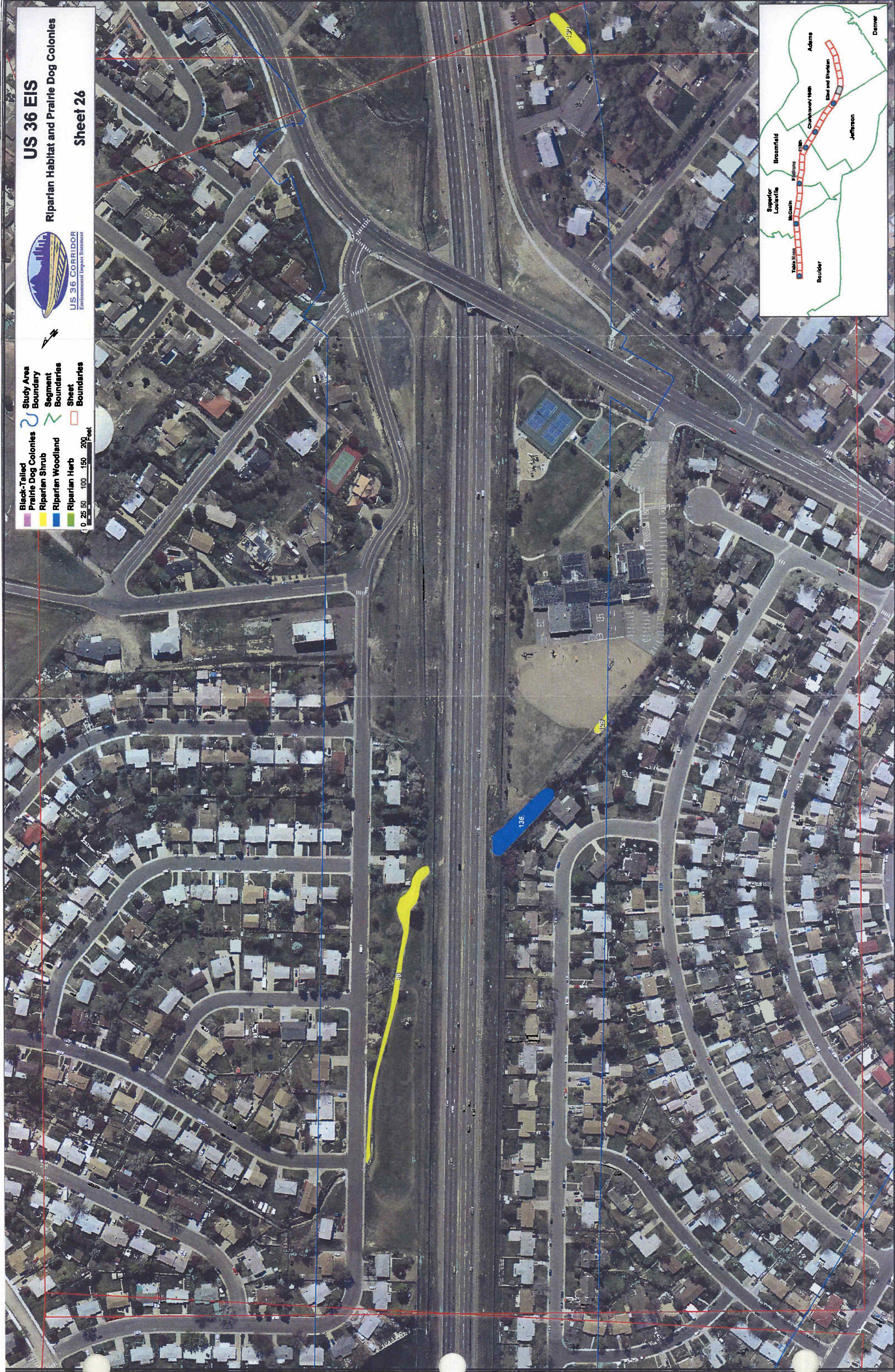
Sheet 26



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed
- Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries

0 25 50 100 150 200 Feet



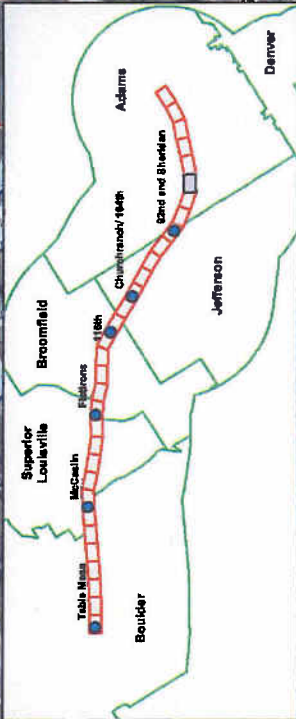
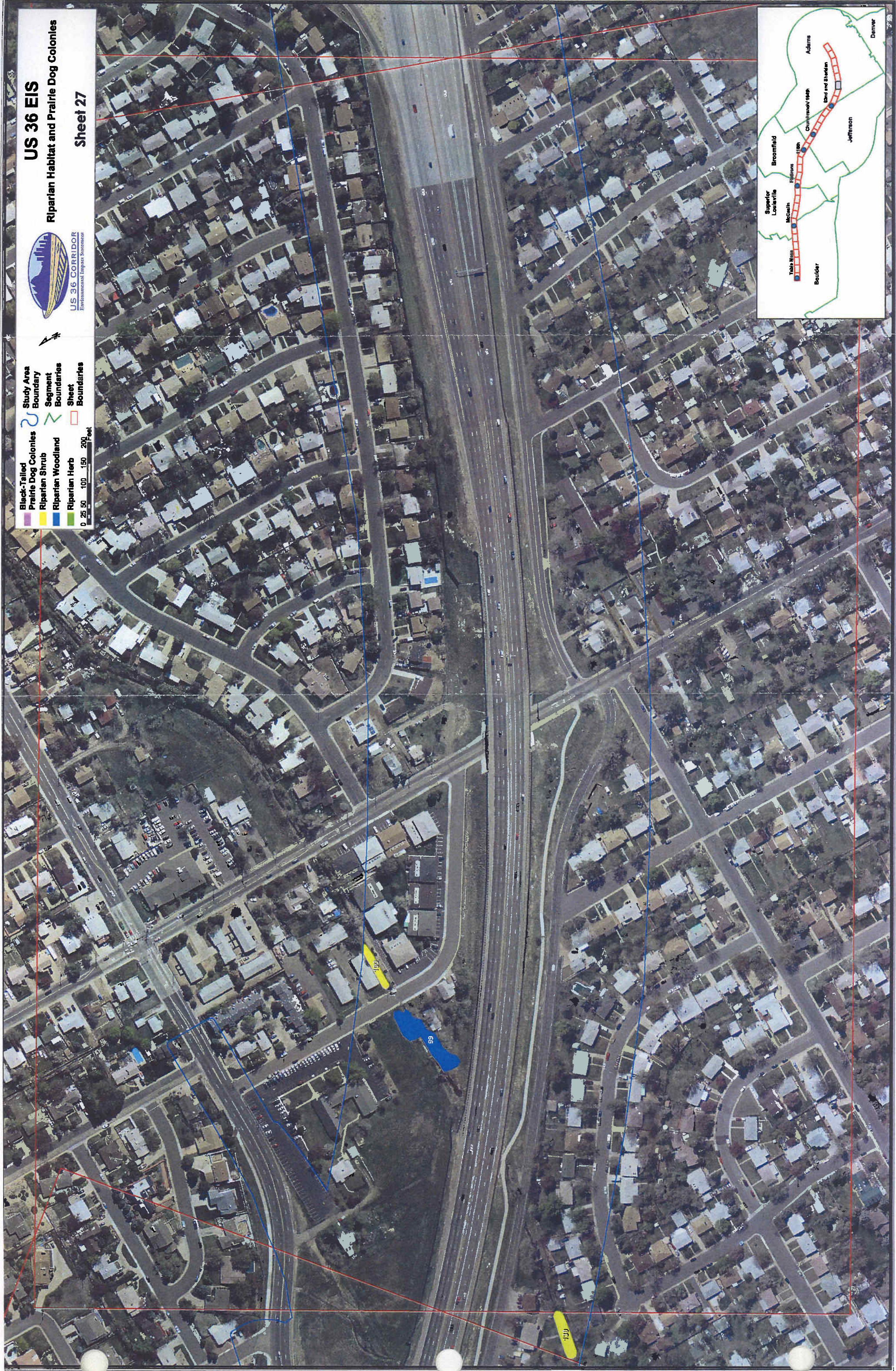
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
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- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies

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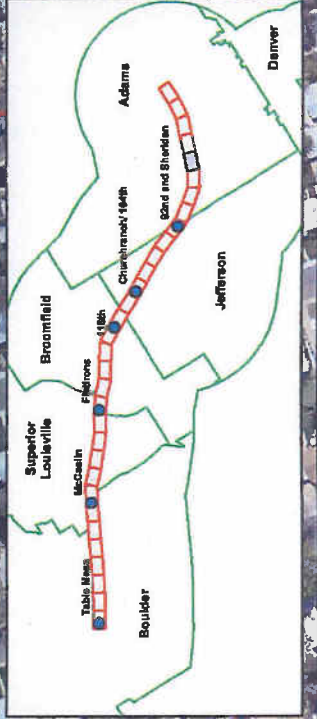


US 36 CORRIDOR
Environmental Impact Statement

Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

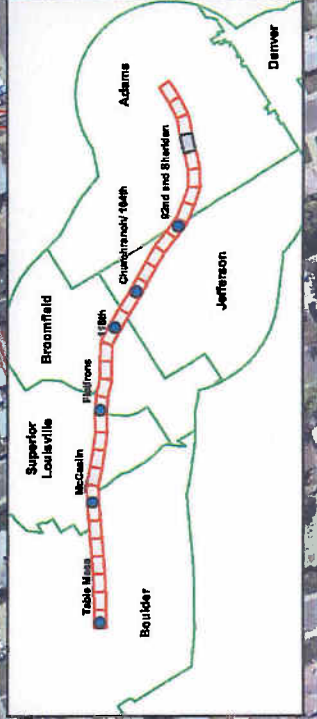
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Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



US 36 EIS

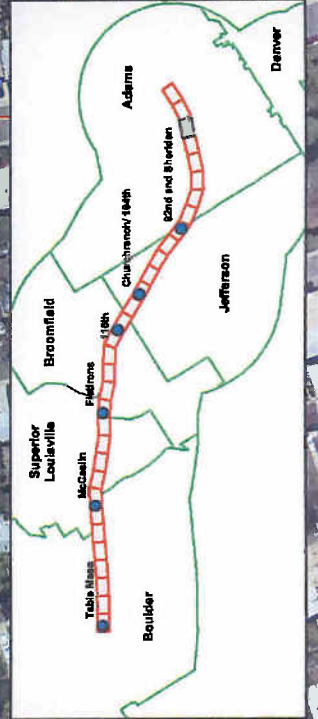
Riparian Habitat and Prairie Dog Colonies

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US 36 CORRIDOR
Environmental Impact Statement

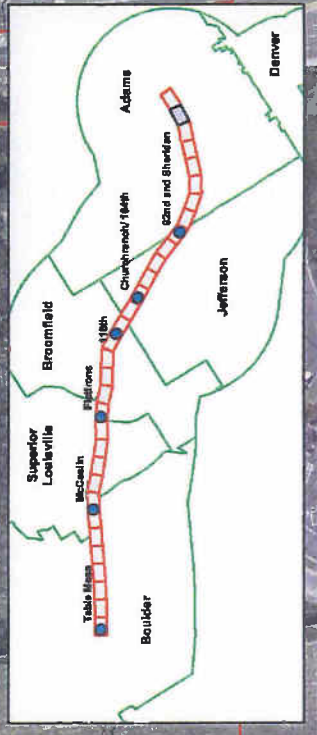
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- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies
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Black-tailed Prairie Dog Colonies
 Riparian Shrub
 Riparian Woodland
 Riparian Herb
 Study Area
 Boundary
 Segment
 Boundaries
 Sheet
 Boundaries



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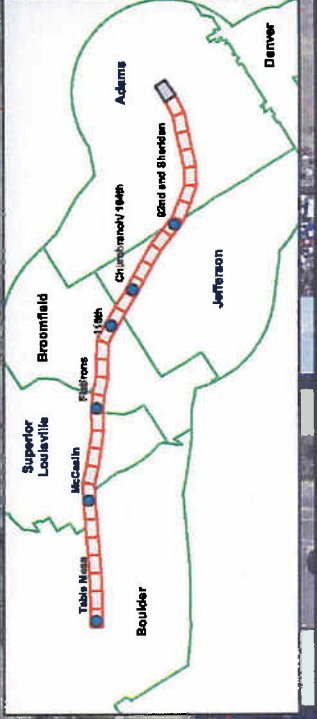
Riparian Habitat and Prairie Dog Colonies

Sheet 32



US 36 CORRIDOR
Environmental Impact Statement

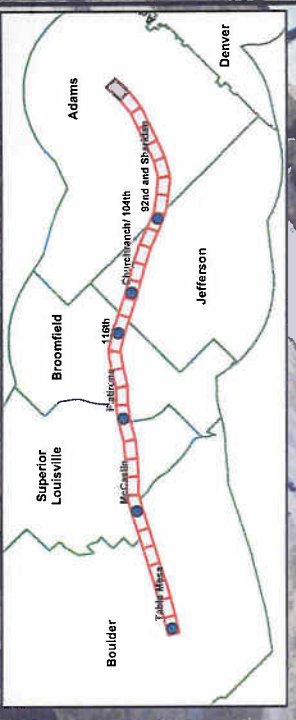
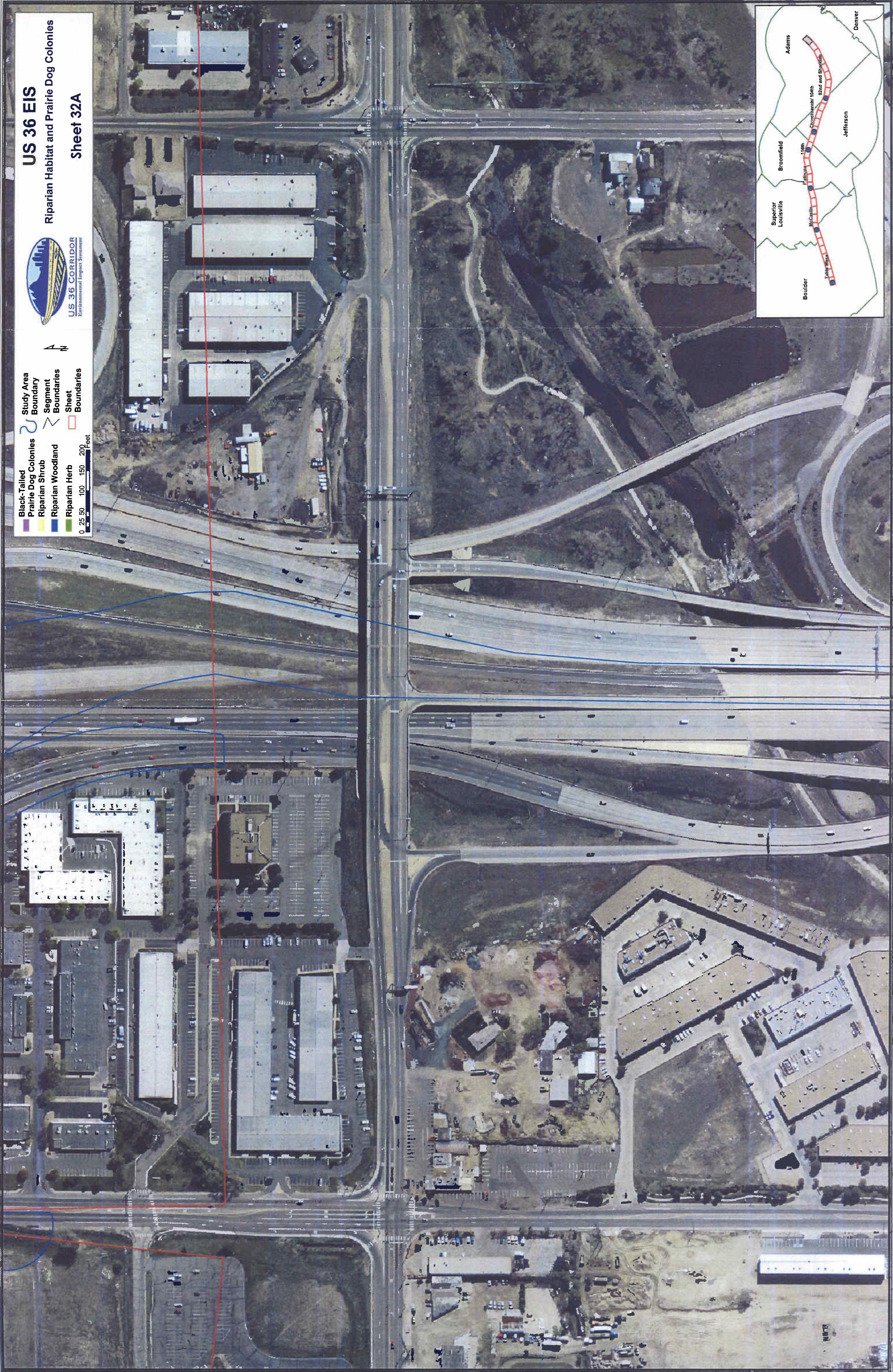
- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies
Sheet 32A



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries





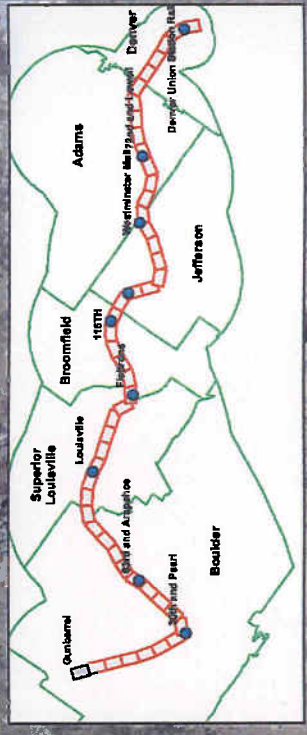
US 36 CORRIDOR
Environmental Impact Statement

BNSF Corridor

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Riparian Habitat and Prairie Dog Colonies
Sheet 1



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundary
- Sheet Boundary



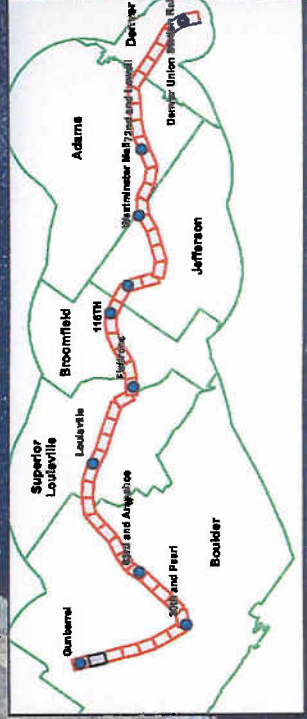
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Riparian Habitat and Prairie Dog Colonies

Sheet 2



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

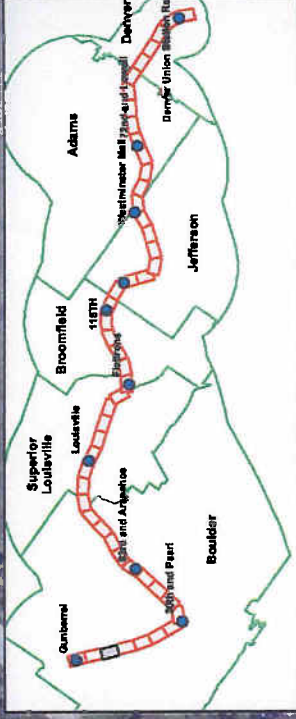
Riparian Habitat and Prairie Dog Colonies

Sheet 3



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- 0 25 50 100 150 200 Feet

- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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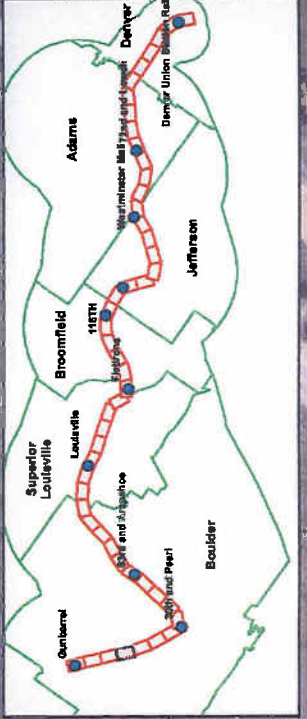
Riparian Habitat and Prairie Dog Colonies

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Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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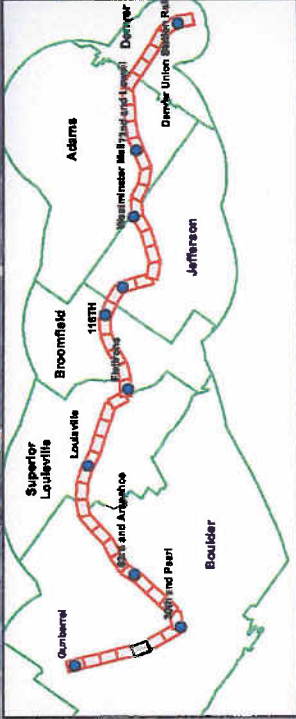
Riparian Habitat and Prairie Dog Colonies

Sheet 5



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



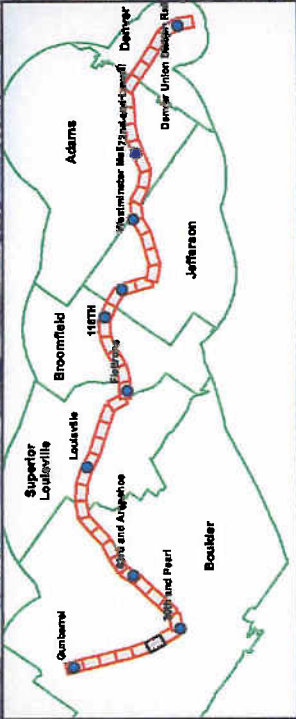
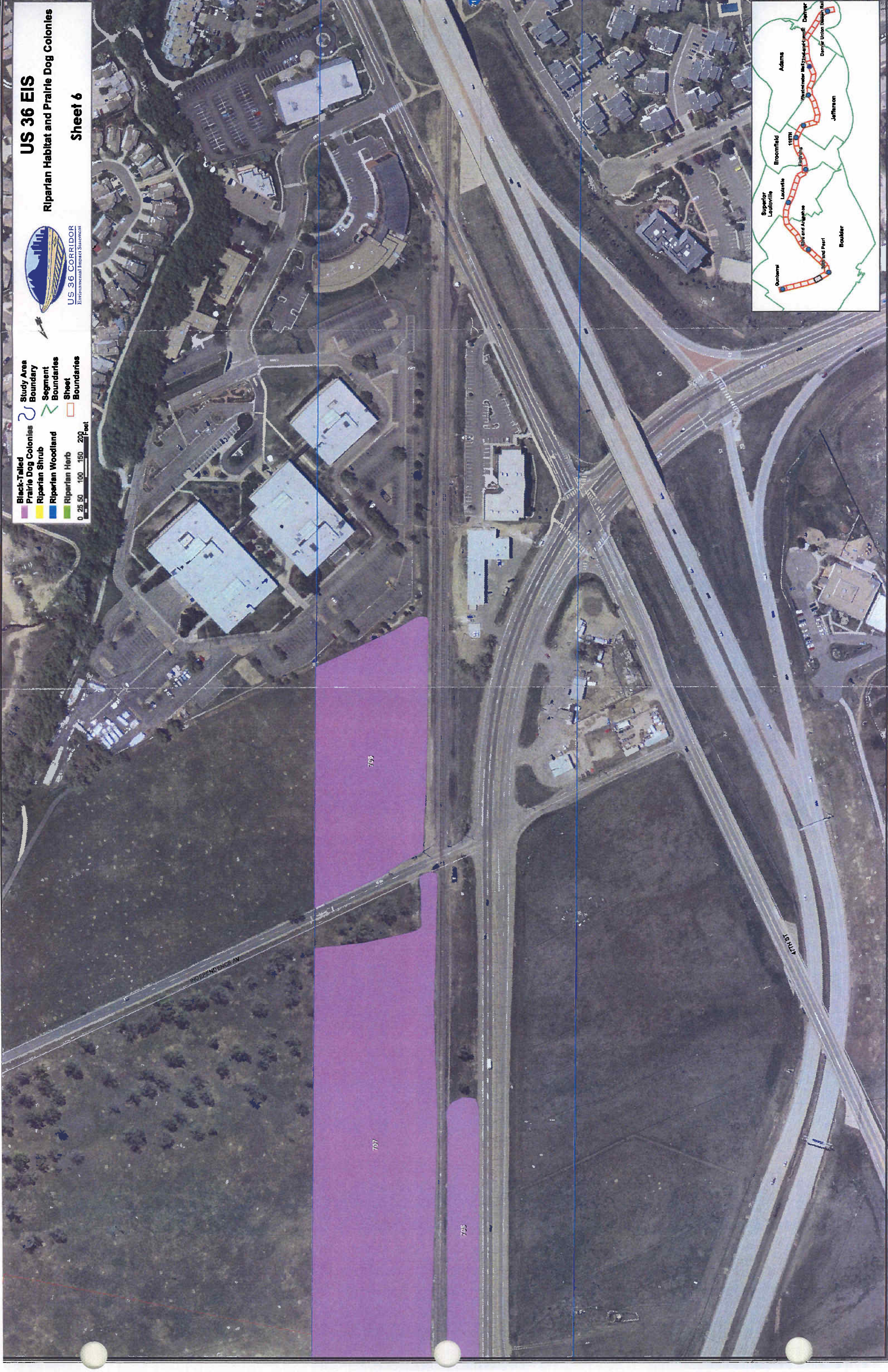
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Riparian Habitat and Prairie Dog Colonies

Sheet 6



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



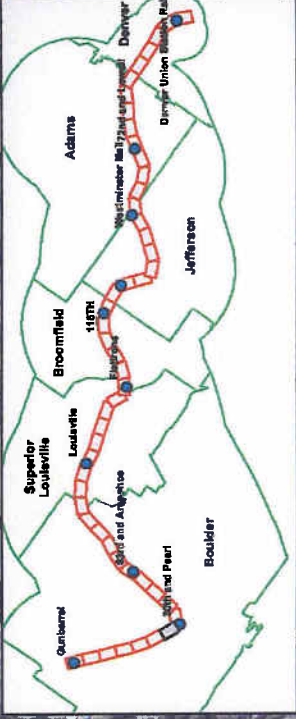
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Riparian Habitat and Prairie Dog Colonies

Sheet 7



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



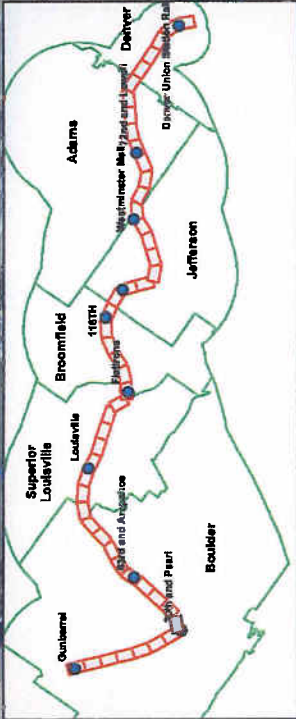
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Riparian Habitat and Prairie Dog Colonies

Sheet 8



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies

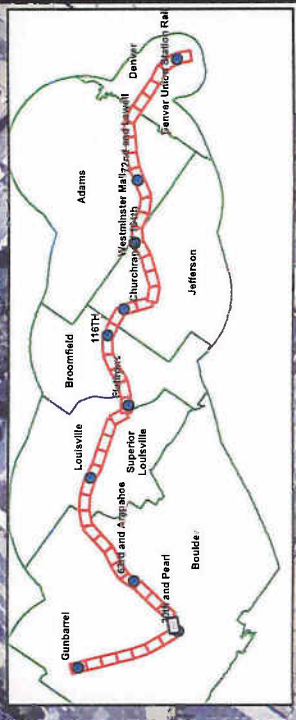
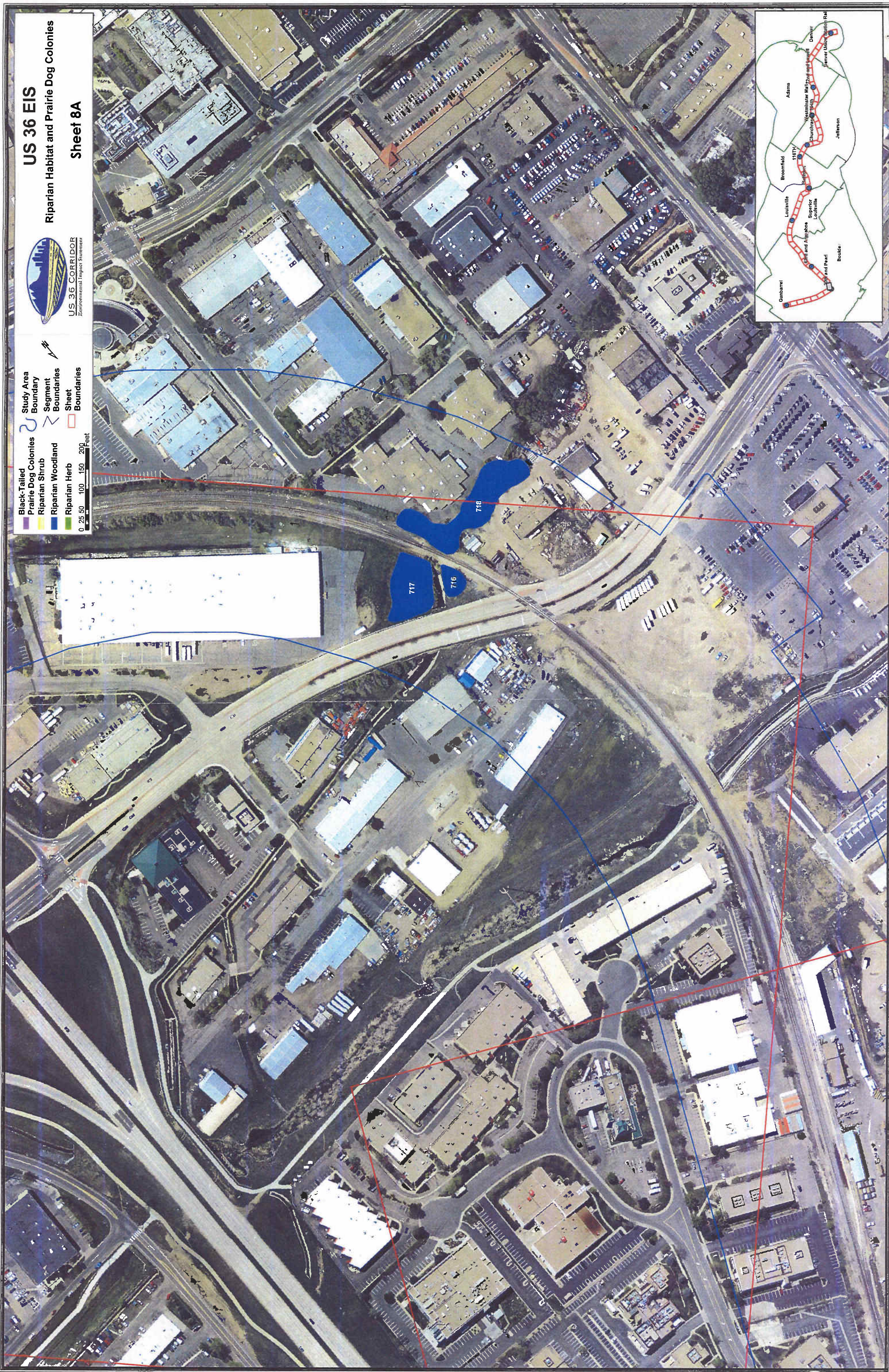
Sheet 8A



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



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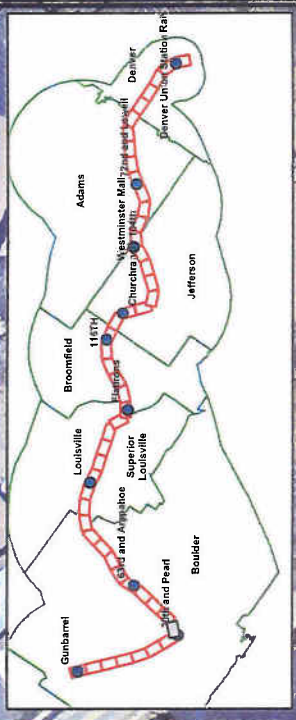
Riparian Habitat and Prairie Dog Colonies

Sheet 8B



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies

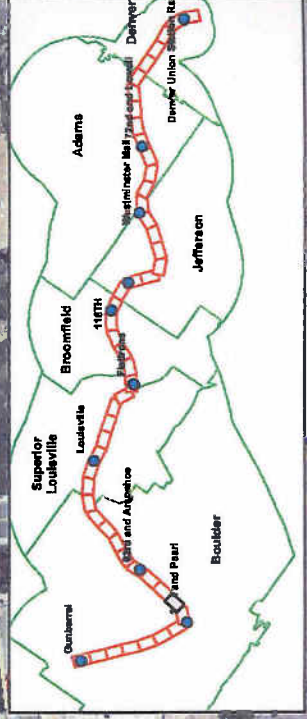
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Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



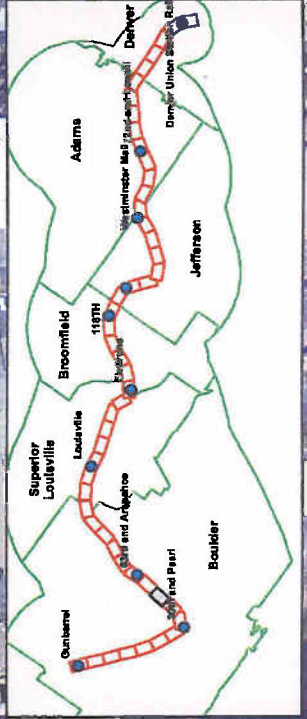
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Riparian Habitat and Prairie Dog Colonies

Sheet 10



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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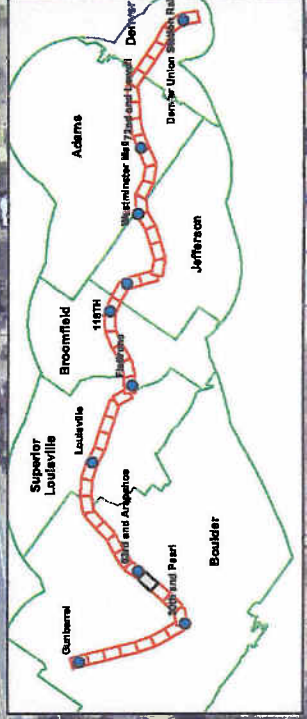
Riparian Habitat and Prairie Dog Colonies

Sheet 11



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries



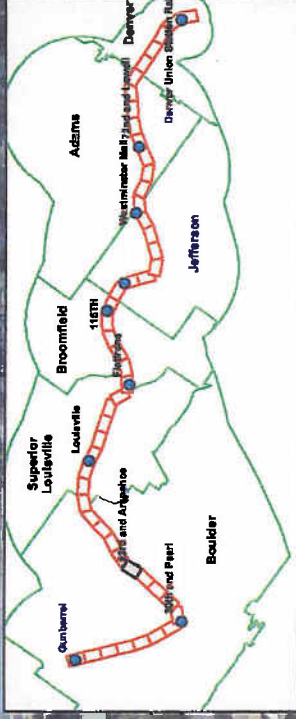
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Riparian Habitat and Prairie Dog Colonies

Sheet 12



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies

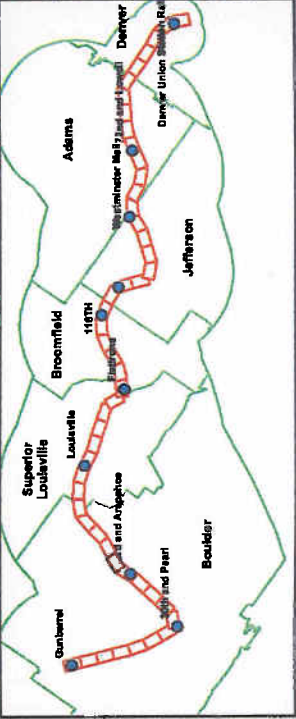
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US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
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- Sheet Boundaries

0 25 50 100 150 200 Feet



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Riparian Habitat and Prairie Dog Colonies

Sheet 13A



Black-Tailed
Prairie Dog Colonies

Riparian Shrub

Riparian Woodland

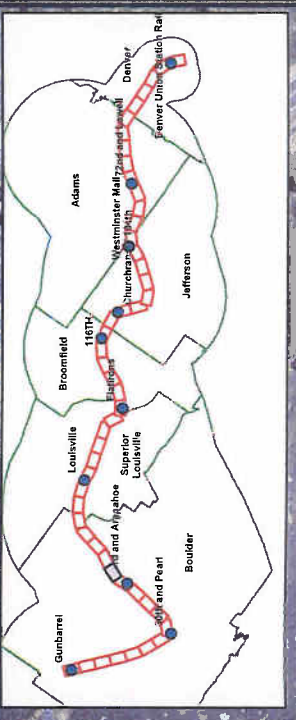
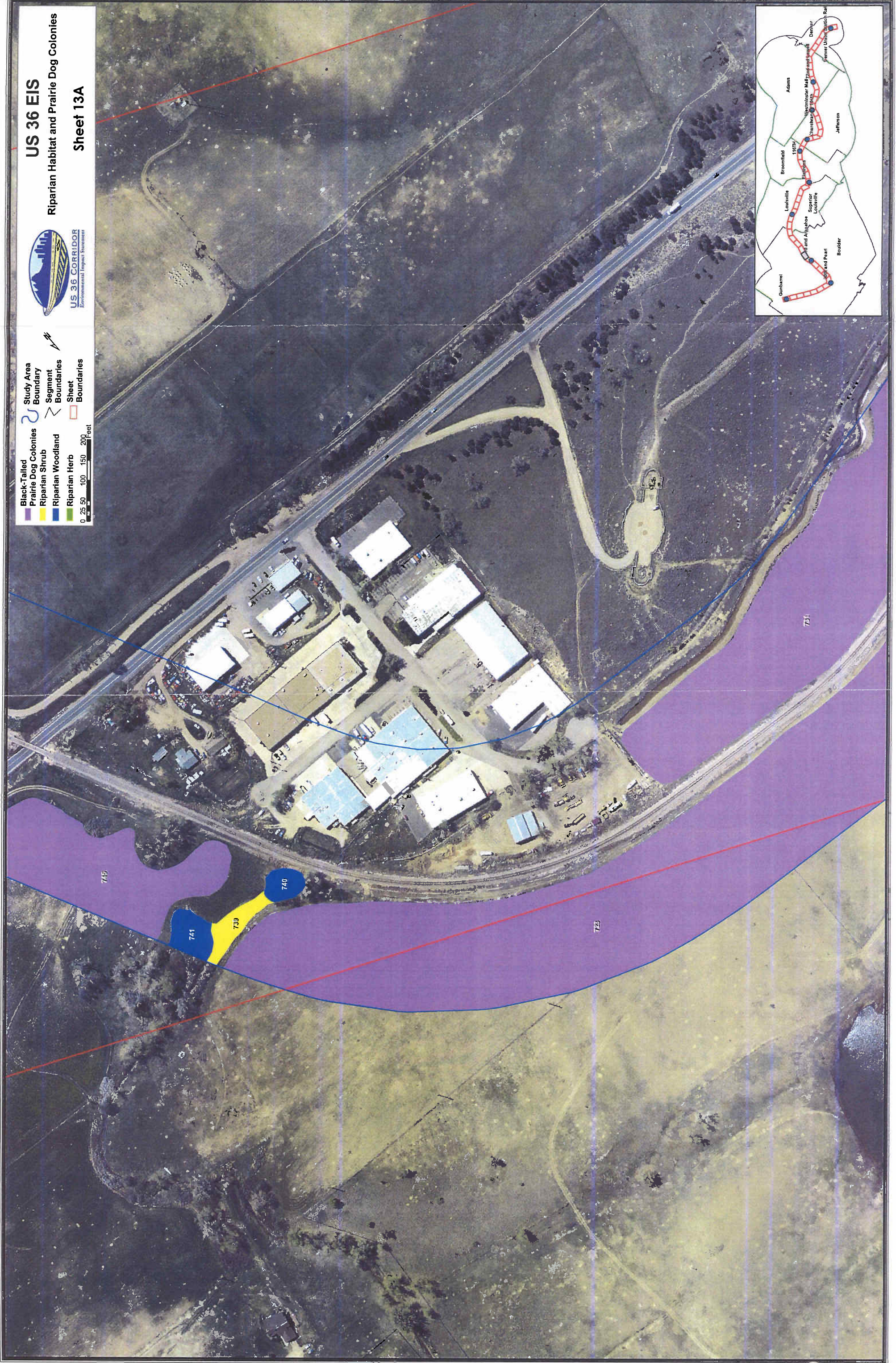
Riparian Herb

Study Area Boundary

Segment Boundaries

Sheet Boundaries

0 25 50 100 150 200 Feet



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Riparian Habitat and Prairie Dog Colonies

Sheet 14

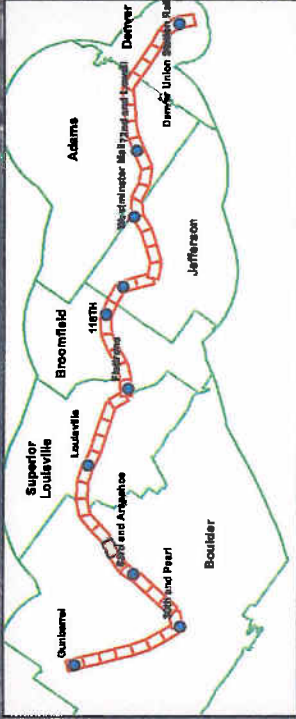


US 36 CORRIDOR
Environmental Impact Statement

Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



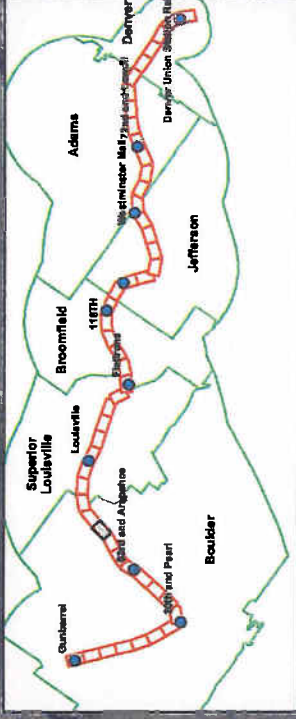
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
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Riparian Habitat and Prairie Dog Colonies

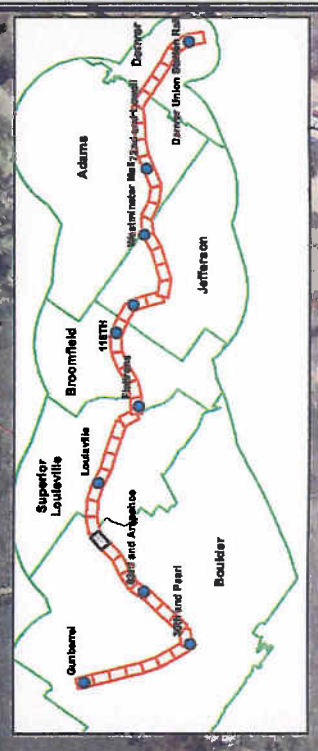
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Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



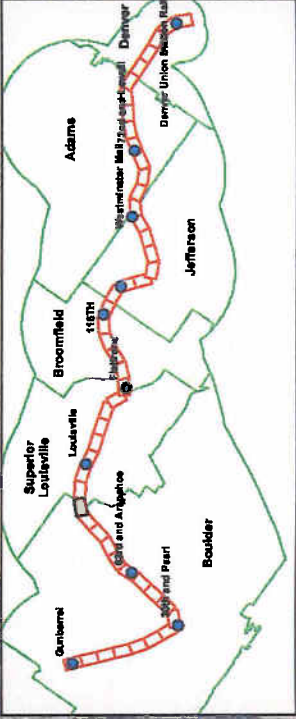
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Riparian Habitat and Prairie Dog Colonies

Sheet 17



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- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



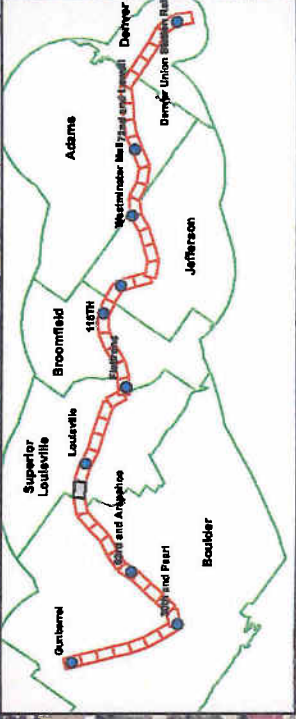
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Riparian Habitat and Prairie Dog Colonies

Sheet 18



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



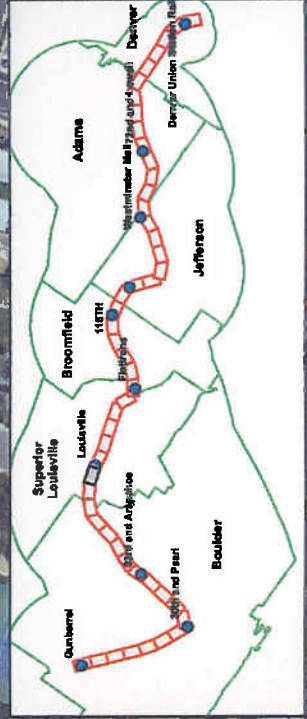
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries



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Riparian Habitat and Prairie Dog Colonies

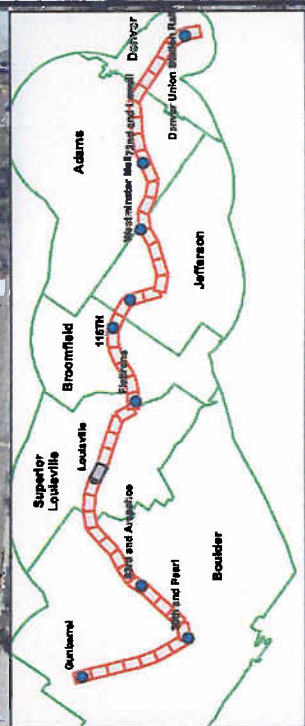
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US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



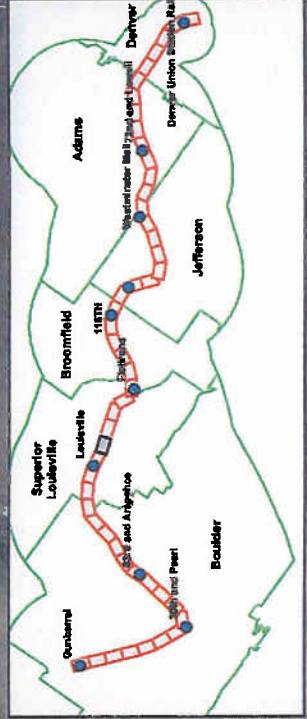
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Riparian Habitat and Prairie Dog Colonies

Sheet 21



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



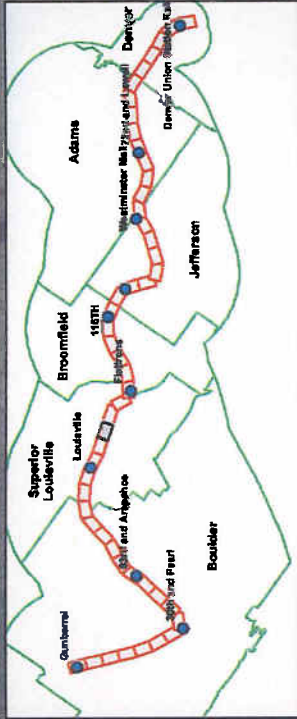
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
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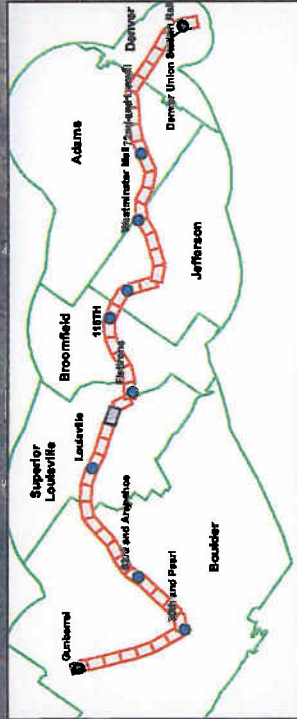
Riparian Habitat and Prairie Dog Colonies

Sheet 23



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



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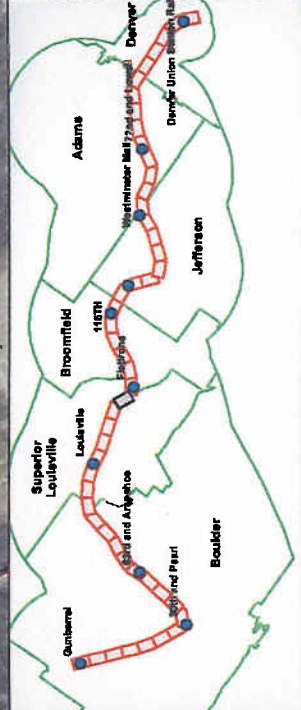
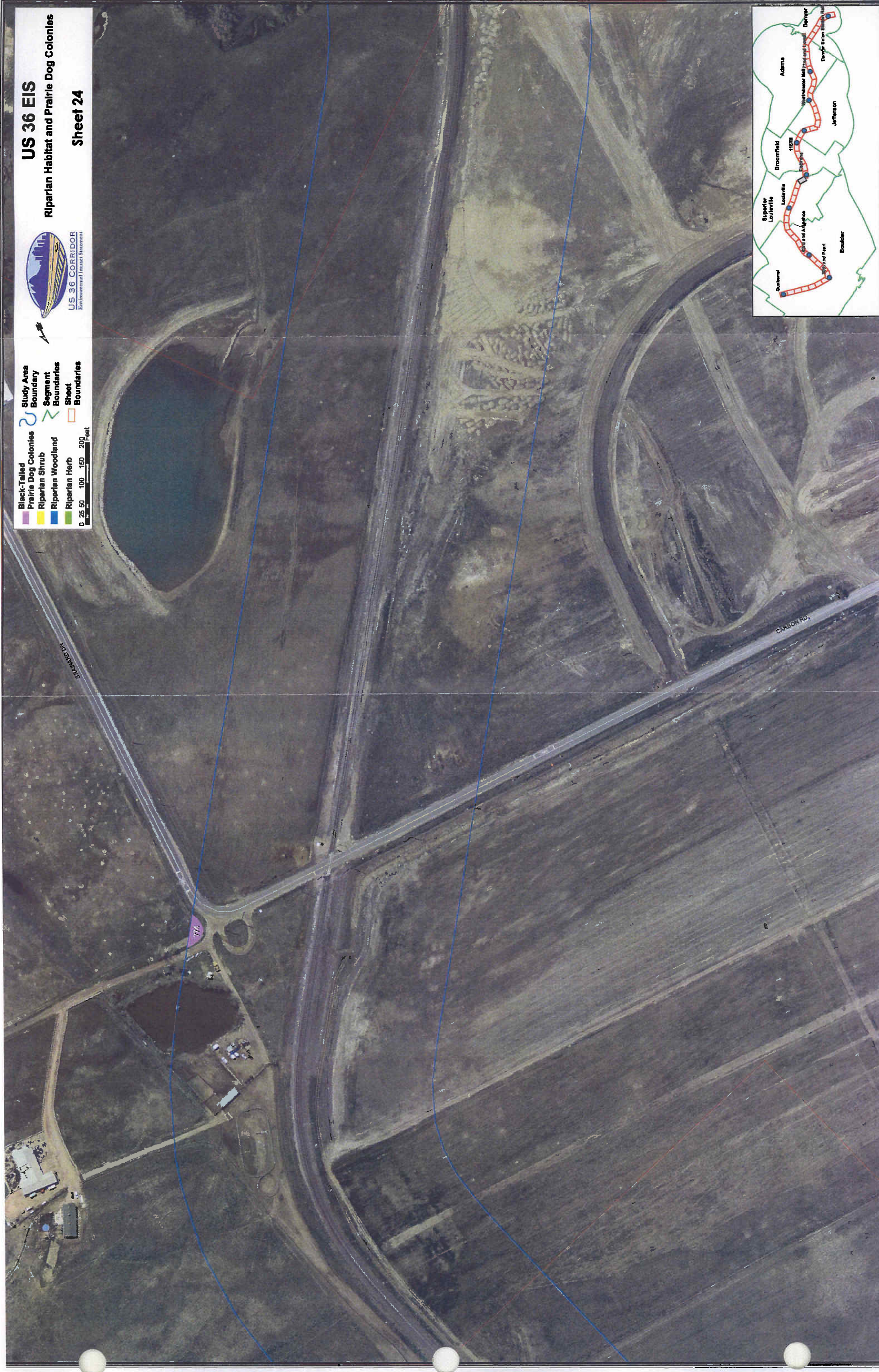
Riparian Habitat and Prairie Dog Colonies

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Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- 0 25 50 100 150 200 Feet
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- Segment Boundaries
- Sheet Boundaries



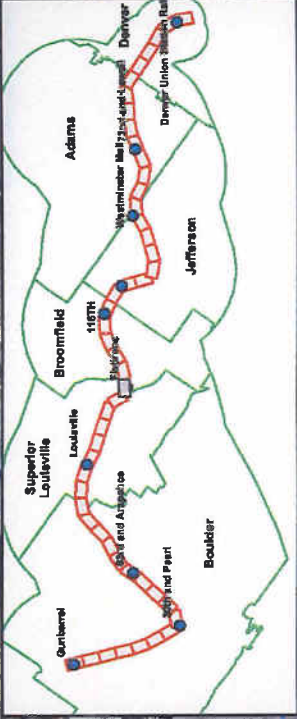
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Riparian Habitat and Prairie Dog Colonies

Sheet 25



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
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Riparian Habitat and Prairie Dog Colonies

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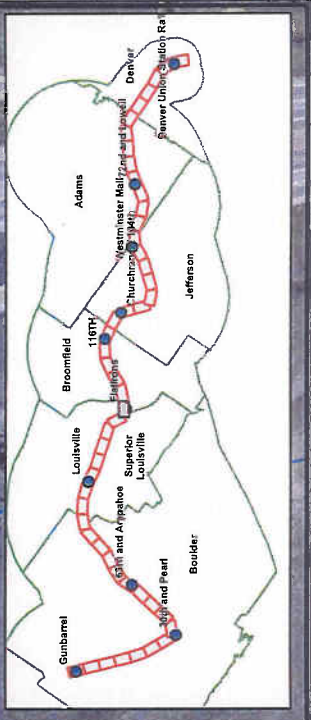


US 36 CORRIDOR
Environmental Impact Statement

Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



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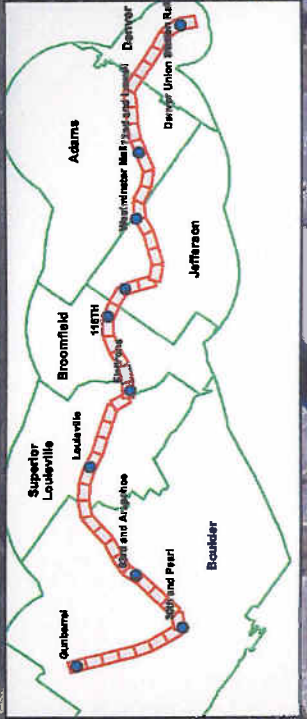
Riparian Habitat and Prairie Dog Colonies

Sheet 26



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
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- Riparian Herb
- Study Area Boundary
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0 25 50 100 150 200 Feet



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Riparian Habitat and Prairie Dog Colonies

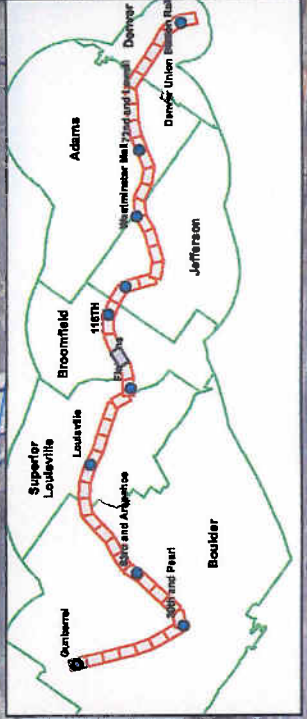
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US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
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0 25 50 100 150 200 Feet



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Riparian Habitat and Prairie Dog Colonies

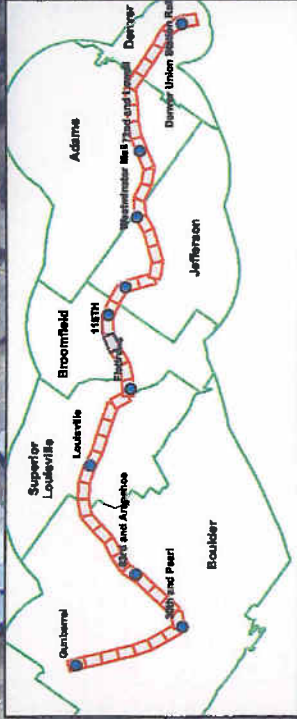
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US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries

0 25 50 100 150 200 Feet



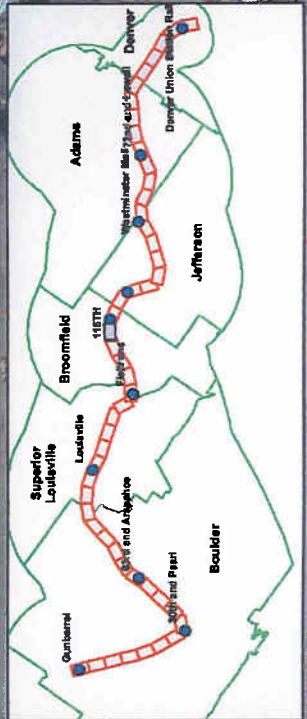
US 36 EIS

Riparian Habitat and Prairie Dog Colonies

Sheet 29



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- 0 25 50 100 150 200 Feet
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies

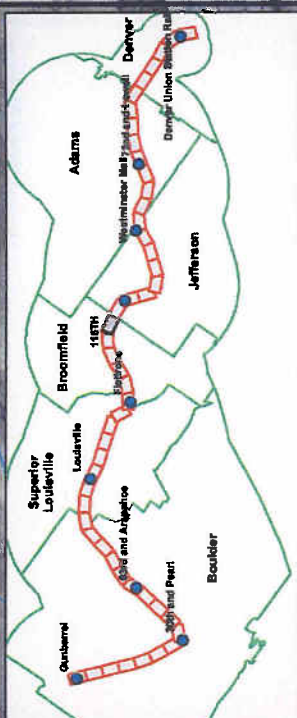
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US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
 - Riparian Shrub
 - Riparian Woodland
 - Riparian Herb
- Study Area Boundary
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- Sheet Boundaries

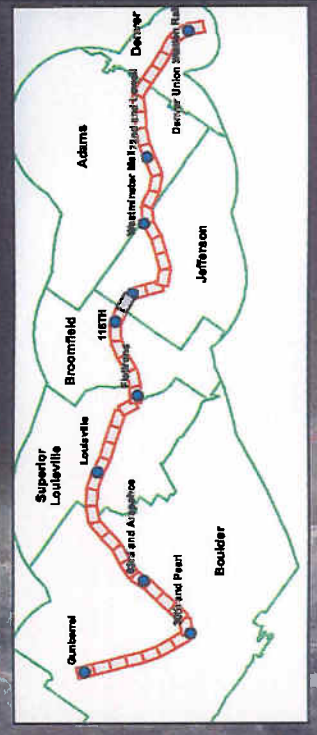
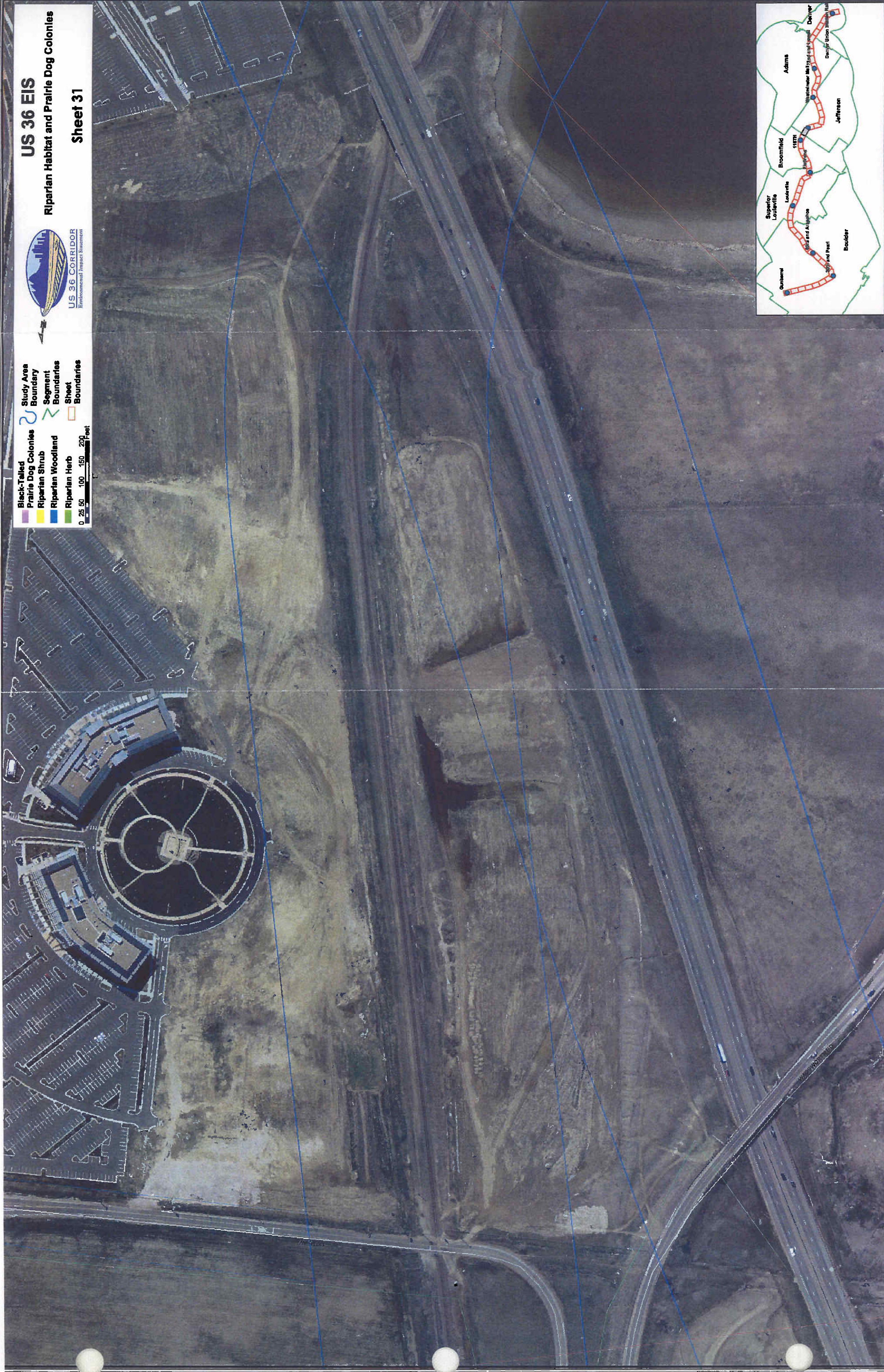
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Riparian Habitat and Prairie Dog Colonies
Sheet 31



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
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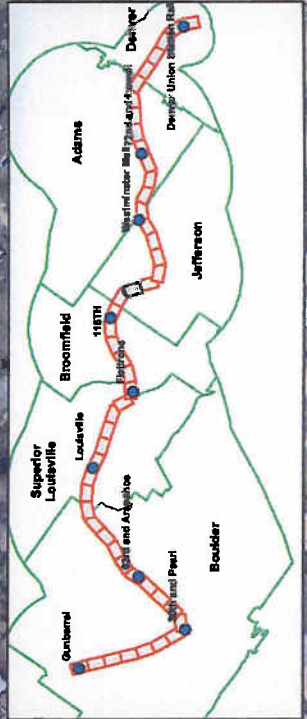
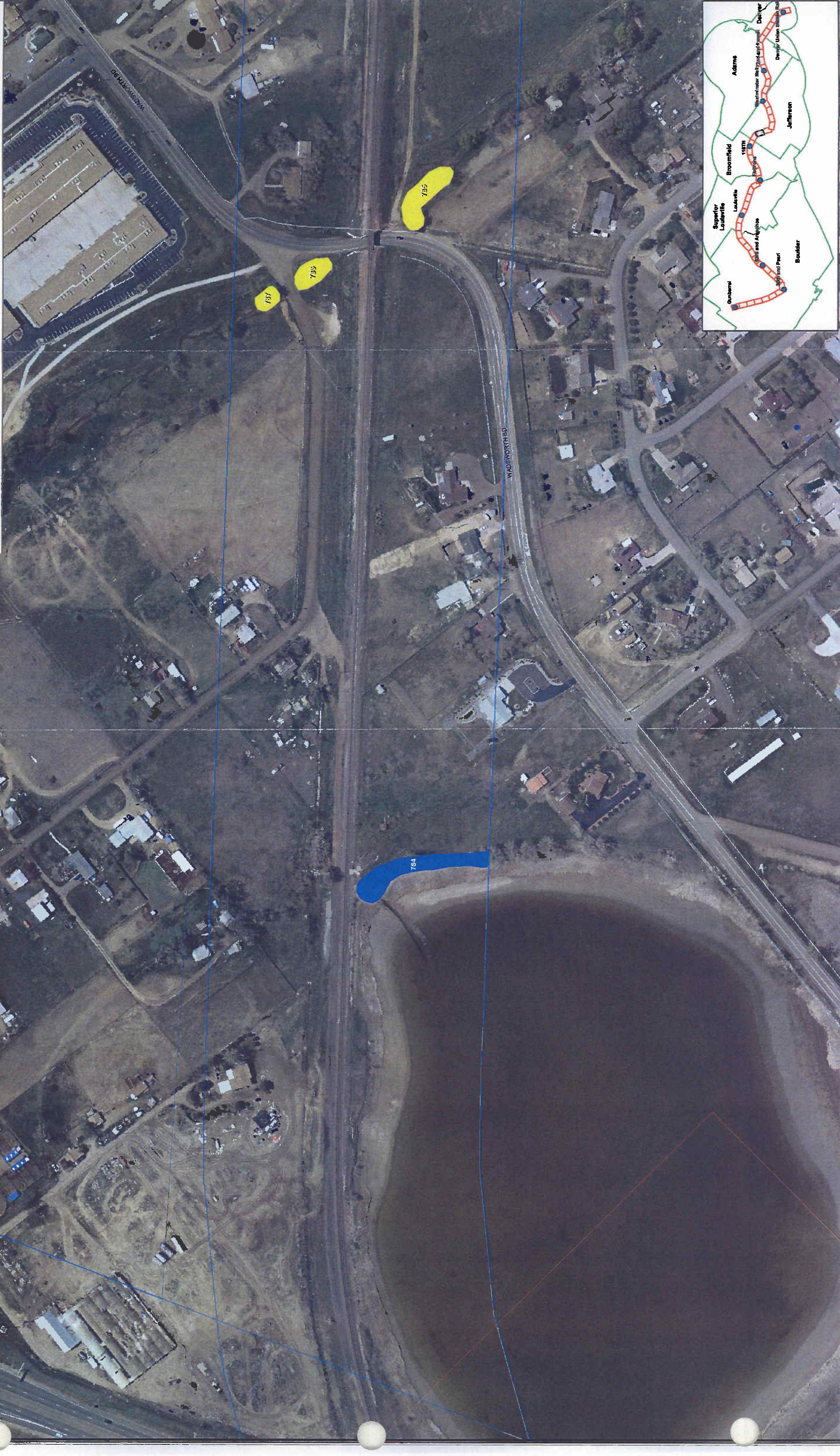
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

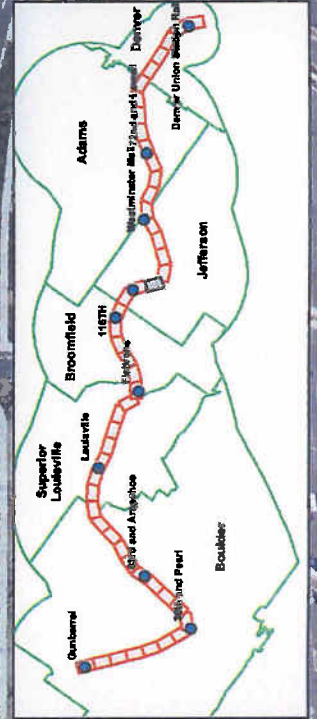
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Black-Tailed Prairie Dog Colonies
Riparian Shrub
Riparian Woodland
Riparian Herb

Study Area Boundary
Segment Boundaries
Sheet Boundaries

0 25 50 100 150 200 Feet



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Riparian Habitat and Prairie Dog Colonies

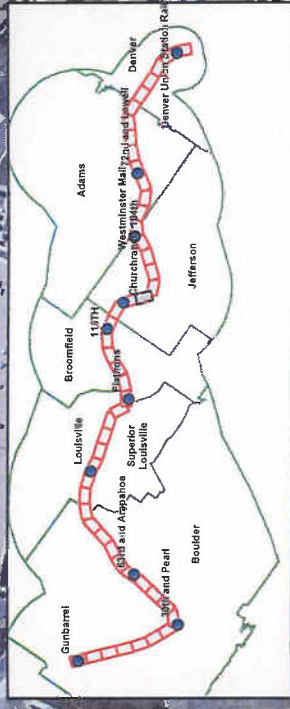
Sheet 33A



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Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



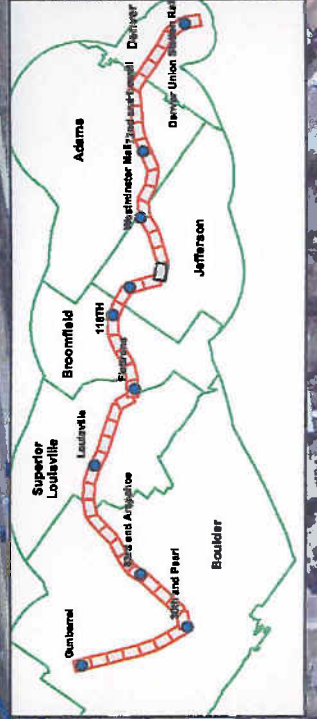
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



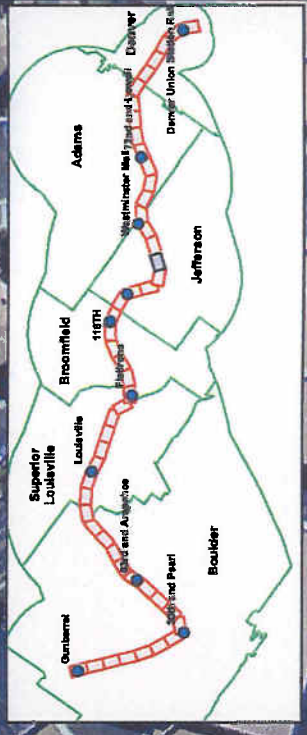
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

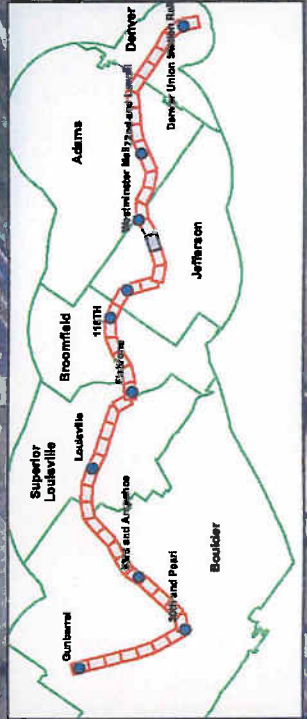


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Riparian Habitat and Prairie Dog Colonies
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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 feet



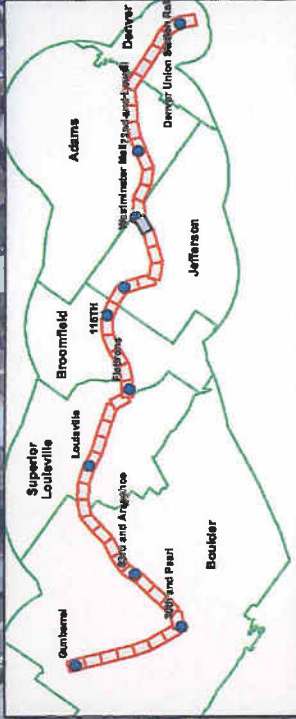
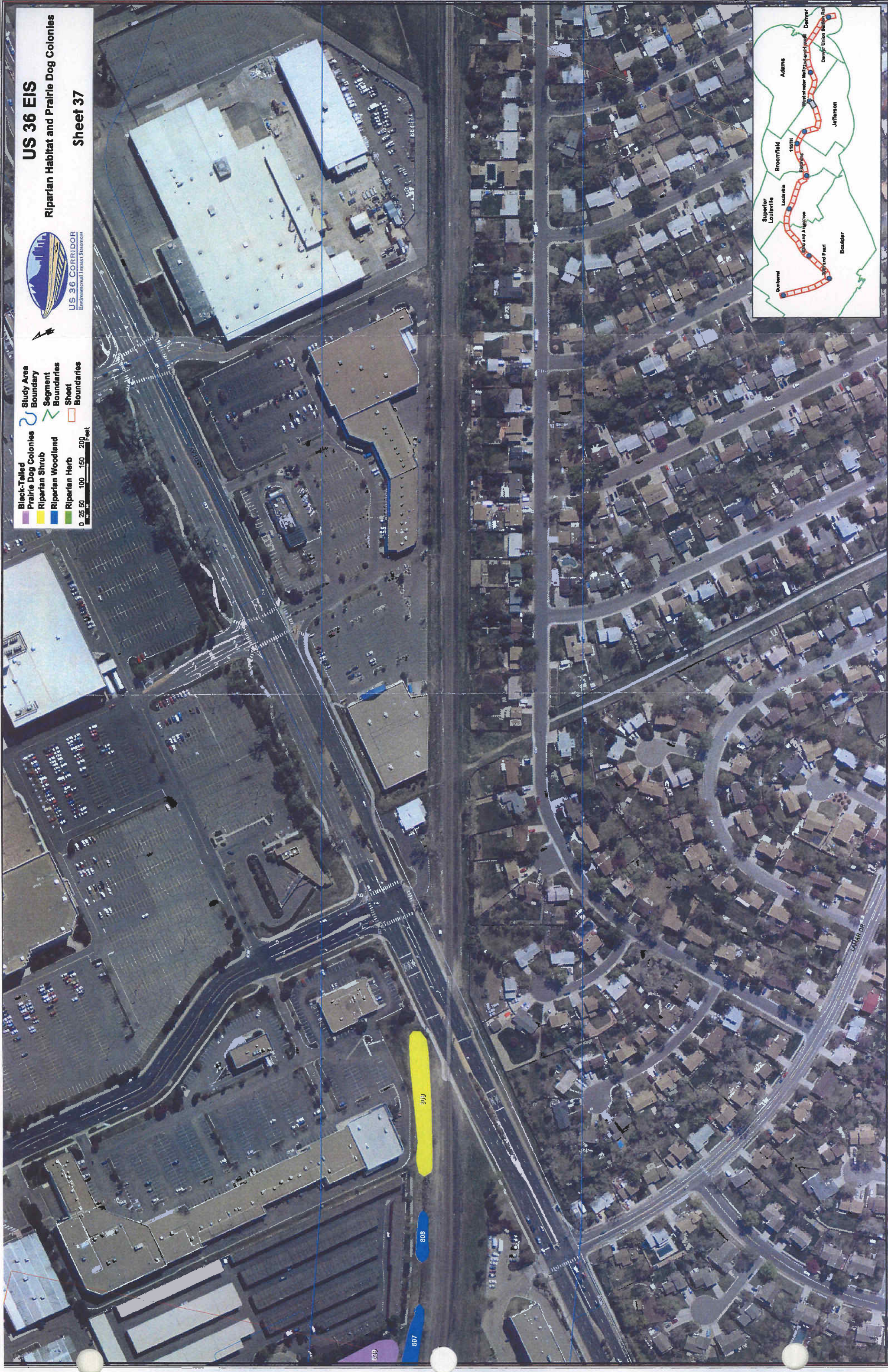
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Riparian Habitat and Prairie Dog Colonies

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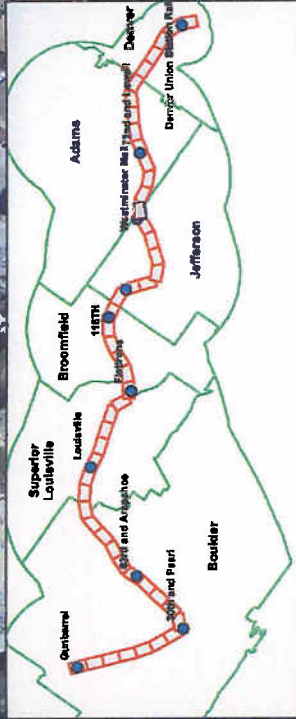
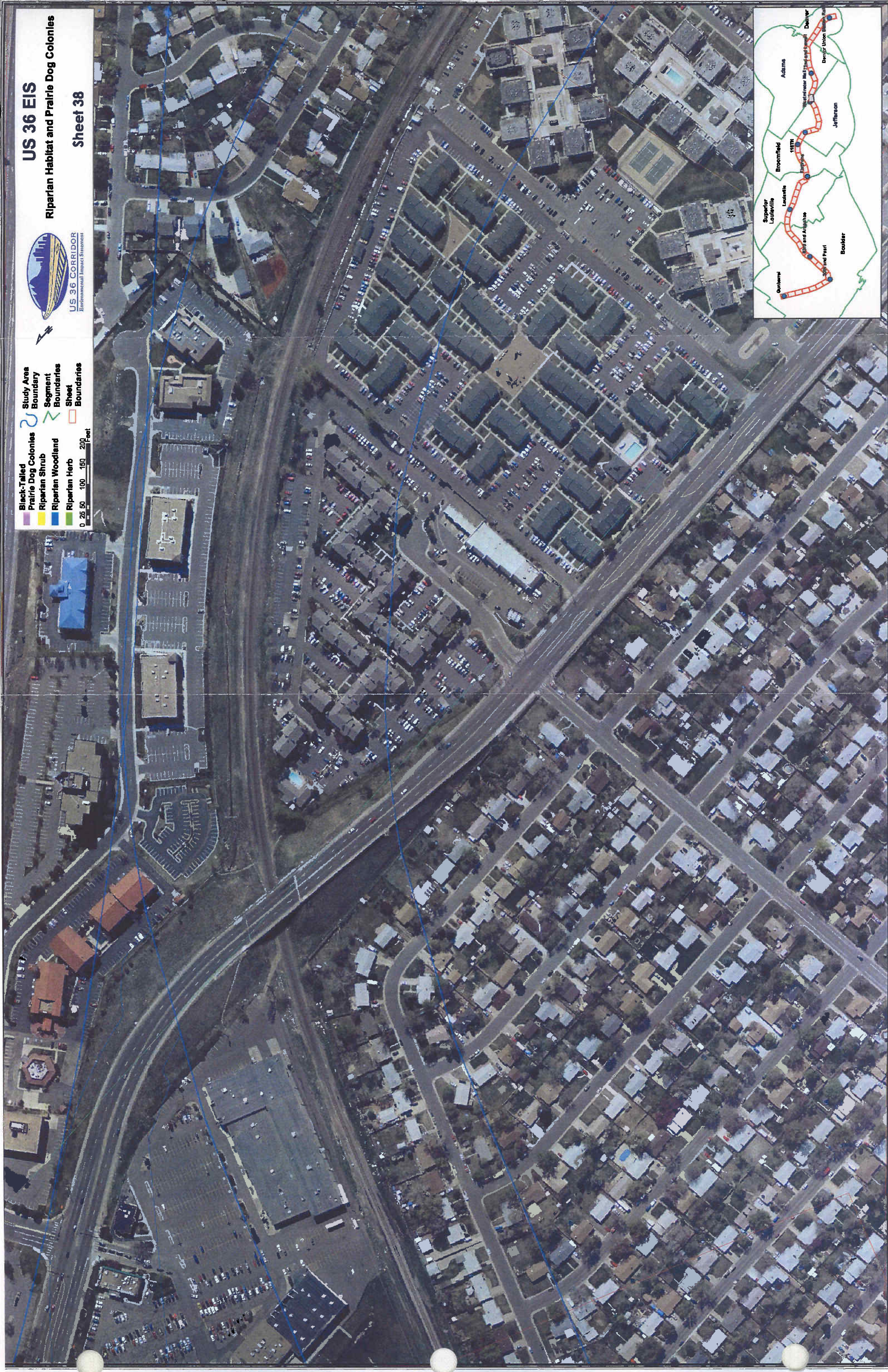


- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries





- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



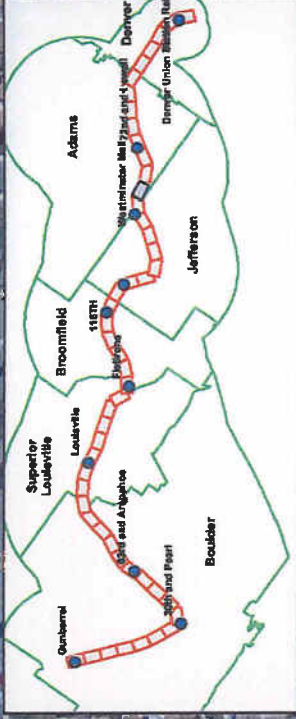
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Riparian Habitat and Prairie Dog Colonies

Sheet 39



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



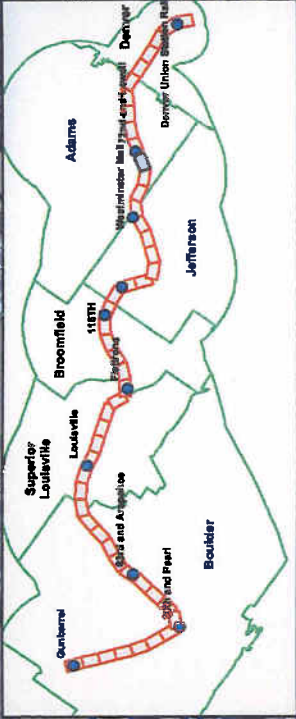
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies

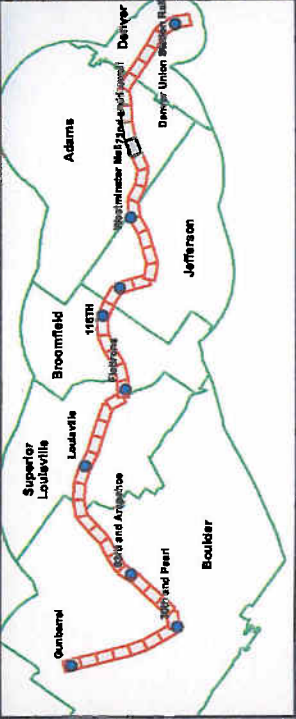
Sheet 42



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



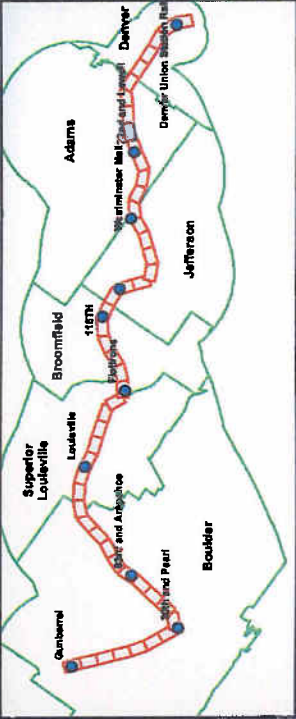
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



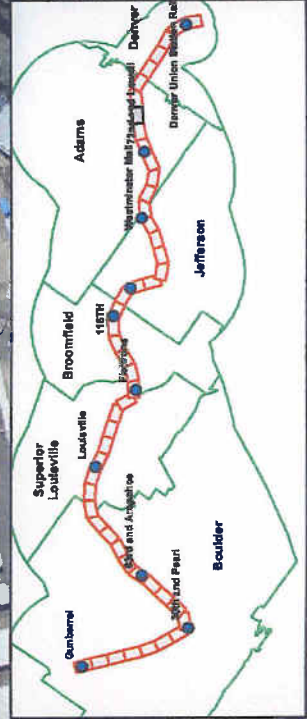
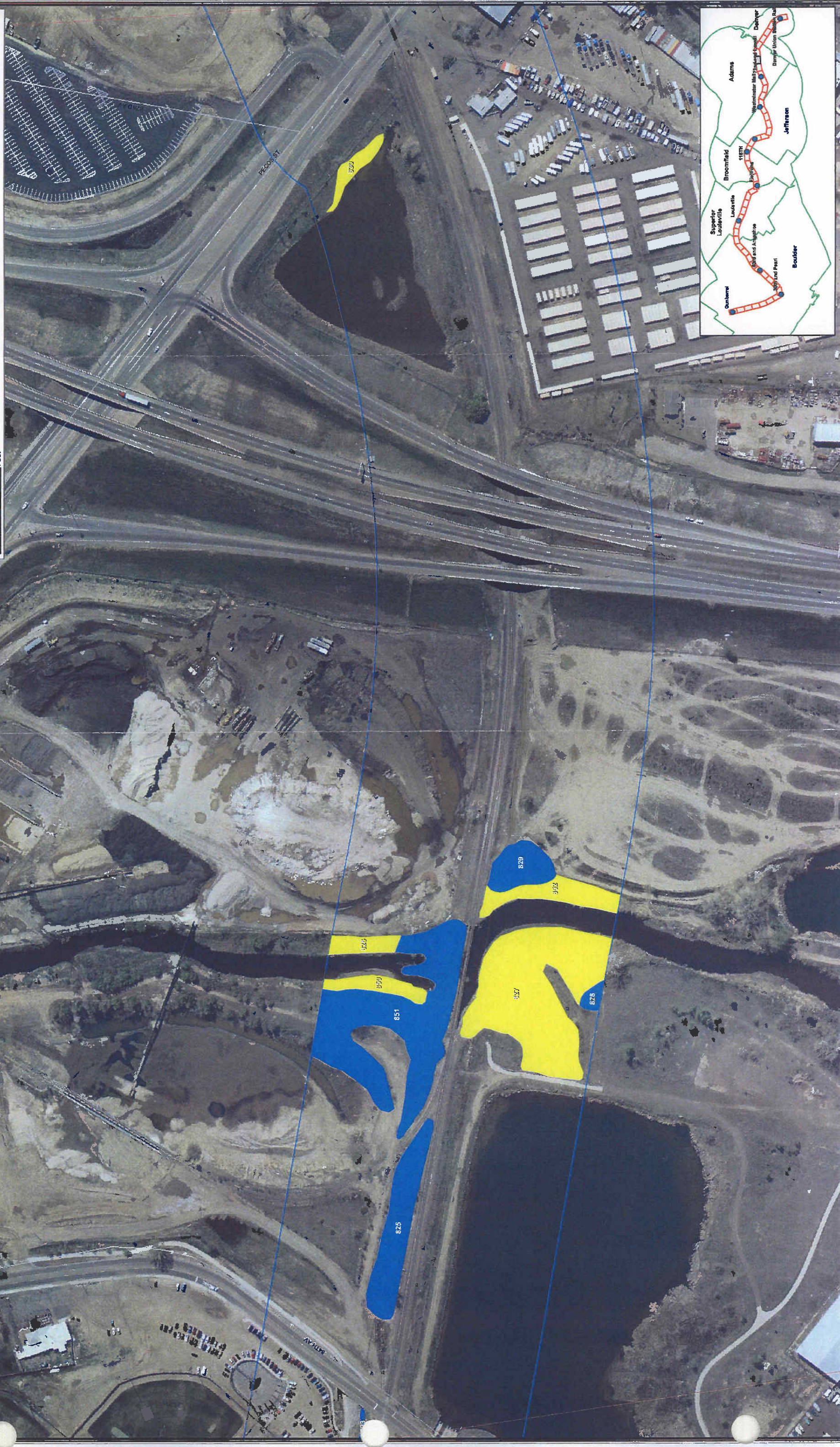
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Riparian Habitat and Prairie Dog Colonies

Sheet 44



- Black-Tailed
- Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- 0 25 50 100 150 200 Feet
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries



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Riparian Habitat and Prairie Dog Colonies

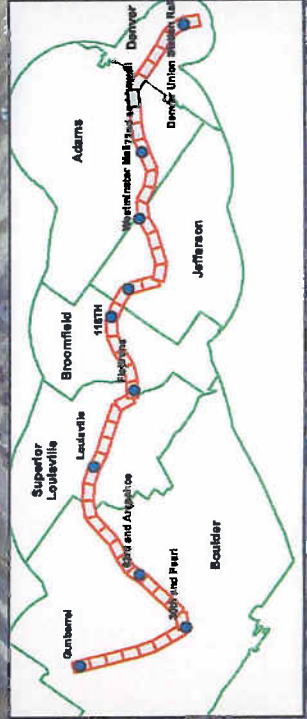
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US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries

0 25 50 100 150 200 Feet



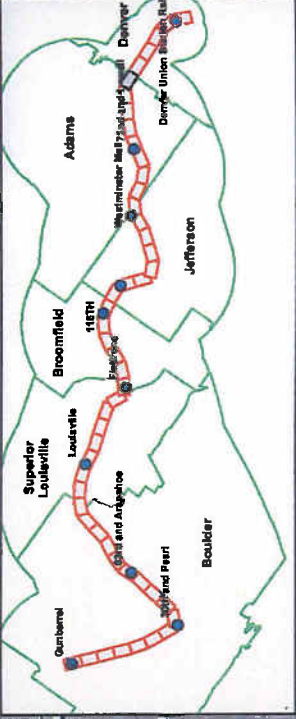
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Riparian Habitat and Prairie Dog Colonies

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- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries



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Riparian Habitat and Prairie Dog Colonies

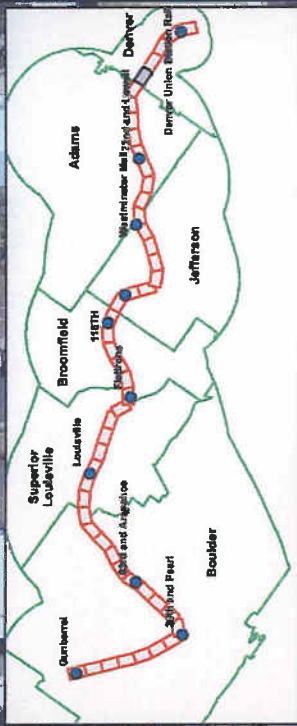
Sheet 47



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries

0 25 50 100 150 200 Feet



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Riparian Habitat and Prairie Dog Colonies

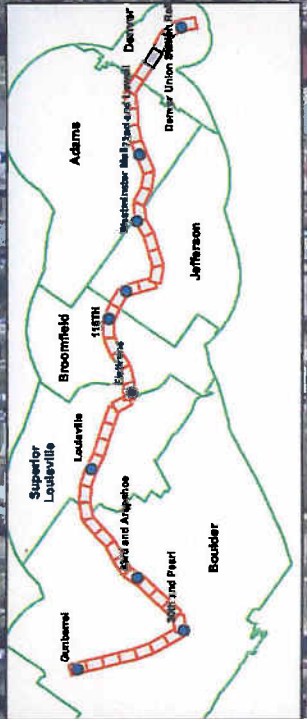
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US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 feet



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Riparian Habitat and Prairie Dog Colonies

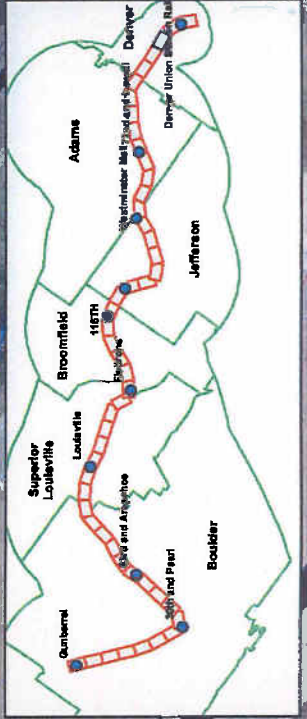
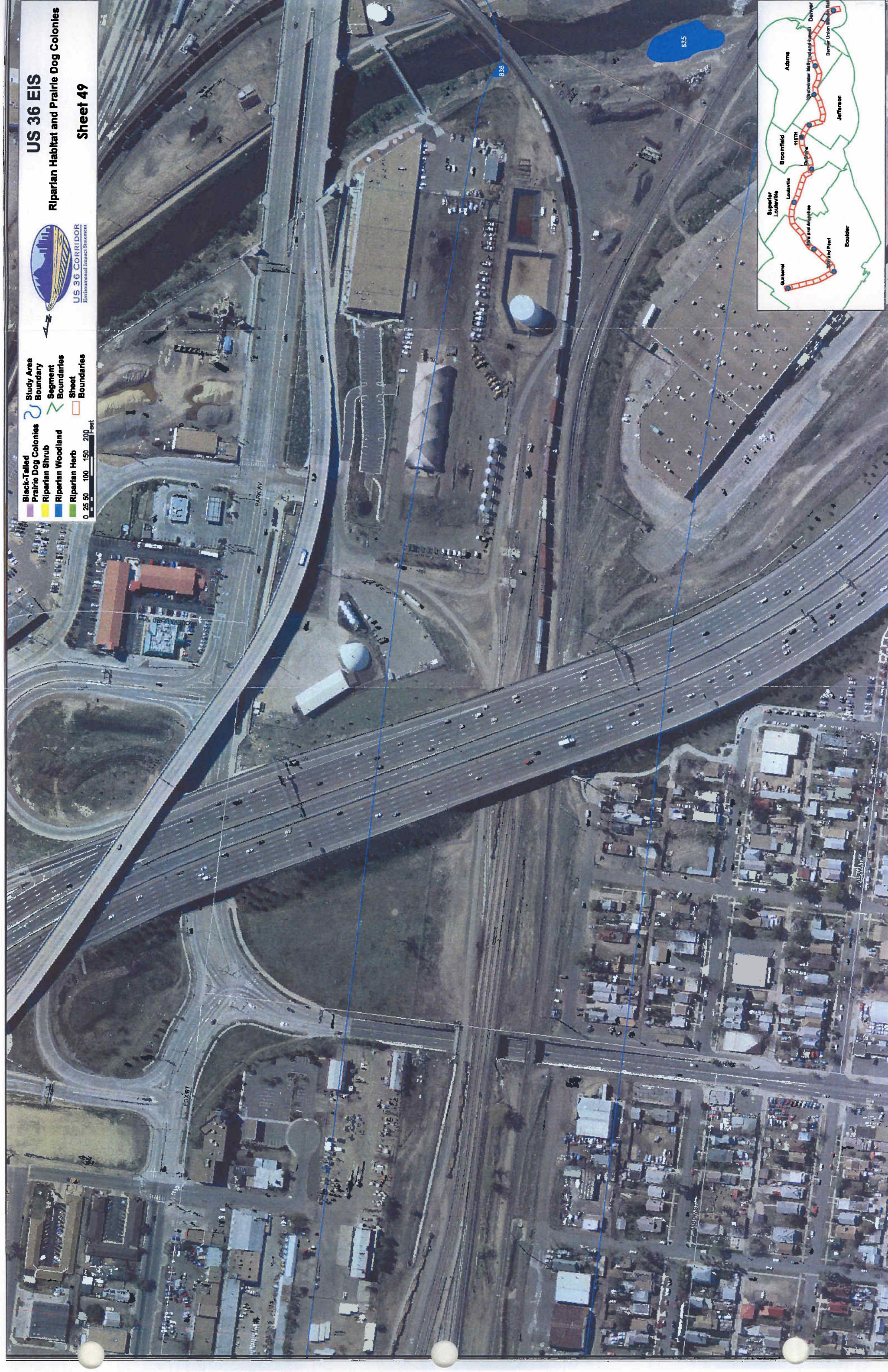
Sheet 49



US 36 CORRIDOR
Environmental Impact Statement

- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

0 25 50 100 150 200 Feet



US 36 EIS

Riparian Habitat and Prairie Dog Colonies

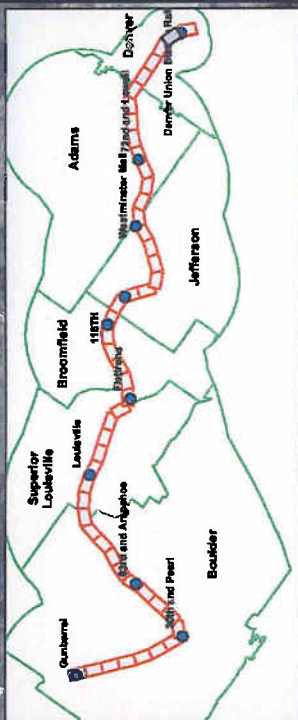
Sheet 50



- Black-Tailed
- Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb



- Study Area
- Boundary
- Segment
- Boundaries
- Sheet
- Boundaries



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Riparian Habitat and Prairie Dog Colonies

Sheet 51



- Black-Tailed Prairie Dog Colonies
- Riparian Shrub
- Riparian Woodland
- Riparian Herb
- Study Area Boundary
- Segment Boundaries
- Sheet Boundaries

