



US 50 Corridor East



US 50 Corridor East Tier 1 Final Environmental Impact Statement and Record of Decision

Biological Resources Technical Memorandum

December 2017

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1. Project Overview

The US 50 Corridor East Tier 1 Environmental Impact Statement (US 50 Tier 1 EIS) was initiated by the project's lead agencies, the Colorado Department of Transportation (CDOT) and the Federal Highway Administration (FHWA). The purpose of the US 50 Tier 1 EIS is to provide, within the framework of the National Environmental Policy Act of 1969 (NEPA), a corridor location decision for U.S. Highway 50 (US 50) from Pueblo, Colorado, to the vicinity of the Colorado-Kansas state line. The location decision will be used by CDOT and the communities along the corridor to plan and program future improvements, preserve right of way, pursue funding opportunities, and allow for resource planning efforts.

The US 50 Tier 1 EIS officially began in January 2006 when the Notice of Intent was published in the *Federal Register*. The US 50 Tier 1 EIS project area (Figure 1-1) is the area in which US 50 Tier 1 EIS alternatives were assessed. This area traverses nine municipalities and four counties in the Lower Arkansas Valley of Colorado. The nine municipalities include (from west to east) the city of Pueblo, town of Fowler, town of Manzanola, city of Rocky Ford, town of Swink, city of La Junta, city of Las Animas, town of Granada, and town of Holly. The four counties that fall within this project area are Pueblo, Otero, Bent, and Prowers counties.

The project area does not include the city of Lamar. A separate Environmental Assessment (EA), the *US 287 at Lamar Reliever Route Environmental Assessment*, includes both US 50 and U.S. Highway 287 (US 287) in its project area, since they share the same alignment. The Finding of No Significant Impact (FONSI) for the project was signed November 10, 2014. The EA/FONSI identified a proposed action that bypasses the city of Lamar to the east. The proposed action of the *US 287 at Lamar Reliever Route Environmental Assessment* begins at the southern end of US 287 near County Road (CR) C-C and extends nine miles to State Highway (SH) 196. Therefore, alternatives at Lamar are not considered in this US 50 Tier 1 EIS.



Figure 1-1. US 50 Tier 1 EIS Project Area

2. Resource Definition

Biological resources for the US 50 Tier 1 EIS include the following:

- Wildlife and plants (i.e., vegetative cover and the animals that use it as habitat)
- Noxious weeds
- Special-status species
- Wildlife crossings
- Wildlife migration routes

Wetland and riparian areas are not discussed in this document. They are evaluated in a separate technical memorandum entitled *US 50 Corridor East Tier 1 Final Environmental Impact Statement and Record of Decision, Wetland and Riparian Technical Memorandum*.

3. Applicable Laws, Regulations, and Guidance

In addition to adhering to the NEPA and its regulations (23 Code of Federal Regulations [CFR] 771), the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500–1508), and the Moving Ahead for Progress in the 21st Century Act of 2012 (MAP-21), the following laws, regulations, and guidance were followed during this analysis of biological resources. They are described in more detail below.

- Endangered Species Act of 1973
- Bald and Golden Eagle Protection Act of 1940
- Migratory Bird Treaty Act of 1918
- Fish and Wildlife Coordination Act of 1934
- Surface Transportation and Uniform Relocation Assistance Act of 1987, Section 130 (Wildflowers)
- Executive Order 13112, Invasive Species
- Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds
- FHWA Technical Advisory T6640.8A
- Colorado Noxious Weed Act
- Integrated Noxious Weed Management Plan
- CDOT Black-Tailed Prairie Dog Policy
- CDOT Shortgrass Prairie Initiative

3.1. Endangered Species Act of 1973

The purpose of the Endangered Species Act is to provide for programs to conserve the ecosystems of threatened and endangered species.

3.2. Bald and Golden Eagle Protection Act of 1940

The purpose of the Bald and Golden Eagle Protection Act is to safeguard and defend Bald and Golden Eagles by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds.

3.3. Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act was ratified for the purpose of protecting migratory birds. The Act implemented treaties related to migratory bird protection between the United States and other nations, including Canada, Mexico, Japan, and Russia.

3.4. Fish and Wildlife Coordination Act of 1934

The Fish and Wildlife Coordination Act authorizes certain agencies of the federal government to provide assistance to and cooperate with federal and state agencies to protect, rear, stock, and increase the supply of game and fur-bearing animals. It also authorizes those agencies to study the effects of pollution on wildlife.

Amendments to the Act require consultation with the U.S. Fish and Wildlife Service (USFWS) and state wildlife agencies where any water body is proposed to be modified by any agency under a federal permit or license. The purpose of this consultation is to prevent the loss of and damage to wildlife resources.

3.5. Surface Transportation and Uniform Relocation Assistance Act of 1987, Section 130 (Wildflowers)

The purpose of this section of the Surface Transportation and Uniform Relocation Assistance Act of 1987 is to encourage the use of native wildflowers in highway landscaping.

3.6. Executive Order 13112, Invasive Species

Executive Order 13112 was signed to prevent the introduction of invasive species and to provide for their control.

3.7. Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

Executive Order 13186 was signed to advance efforts to conserve migratory birds and their habitats.

3.8. FHWA Technical Advisory T6640.8A

Through Technical Advisory T6640.8A, FHWA provides guidance related to implementing requirements of NEPA. The advisory requires that a project determine the presence or absence of listed and proposed threatened and endangered species and designated and proposed critical habitat in the project area.

3.9. Colorado Noxious Weed Act

The Colorado Noxious Weed Act declares that certain undesirable plants constitute a threat to the continued economic and environmental value of the lands of the state of Colorado. It calls for those plants to be managed in a manner that is practical, the least environmentally damaging, and economically reasonable.

3.10. Integrated Noxious Weed Management Plan

CDOT implemented its Integrated Noxious Weed Management Plan in 2000 to manage existing species and eliminate new species of noxious weeds.

3.11. CDOT Black-Tailed Prairie Dog Policy

CDOT's Black-Tailed Prairie Dog Policy applies to all CDOT activities that affect black-tailed prairie dogs. The policy states that projects will be designed and constructed to avoid and minimize impacts to prairie dog colonies greater than two acres in area.

3.12. CDOT Shortgrass Prairie Initiative

The CDOT Shortgrass Prairie Initiative is an agreement between CDOT, FHWA, the USFWS, state natural resource agencies, and The Nature Conservancy that commits the participants to work to mitigate anticipated impacts to the shortgrass prairie ecosystem from CDOT projects identified in the 20-year transportation plan in advance of their construction.

4. Methodology

The US 50 Corridor East project is a Tier 1 EIS. “Tiering” for this process means that the work involved will be conducted in two phases, or tiers, as follows:

- Tier 1—A broad-based (i.e., corridor level) NEPA analysis and data collection effort. The goal of Tier 1 is to determine a general corridor location (not a roadway footprint). Data sources will include existing quantitative data, qualitative information, or both. Mitigation strategies (not necessarily specific mitigation activities) and corridor-wide mitigation opportunities will be identified. Additionally, the Tier 1 EIS will identify sections of independent utility (SIUs) and provide strategies for access management and corridor preservation.
- Tier 2—A detailed (i.e., project level) NEPA analysis and data collection effort. The goal of Tier 2 studies will be to determine an alignment location for each SIU identified in Tier 1. Data sources will include project-level data, including field data collection when appropriate. Tier 2 studies will provide project-specific impacts, mitigation, and permitting for each proposed project.

Resource methodology overviews were developed to identify and document which resource evaluation activities would be completed during the Tier 1 EIS, and which would be completed during Tier 2 studies. These overviews are intended to be guidelines to ensure that the Tier 1 EIS remains a broad-based analysis, while clarifying (to the public and resource agencies) when particular data and decisions would be addressed in the tiered process.

These overviews were approved by FHWA and CDOT in 2005, and they were agreed upon by the resource agencies during the project’s scoping process between February and April of 2006.

Each overview summarizes the following information for the given resource:

- Relevant data or information sources—the types of corridor-level data that will be collected and the sources of those data
- Data collection and analysis methodology—how the data collection and analysis will be completed
- Project area—defined as one to four miles wide surrounding the existing US 50 facility beginning in Pueblo, Colorado, at Interstate 25 (I-25) and extending to the vicinity of the Colorado-Kansas state line (resources will be reviewed within this band, and it is the same for all resources)
- Effects—the type(s) of effect(s) to be identified
- Mitigation options—how mitigation will be addressed
- Deliverables—how the activities above will be documented
- Regulatory guidance/requirements—a list of applicable laws, regulations, agreements, and guidance that will be followed during the review of the resources

These overviews were used by the project’s resource specialists as guidelines to ensure that their activities were relevant to the Tier 1 decision (i.e., corridor location). As the resource specialists conducted their work, data sources or analysis factors were added or removed. The final actions of the resource specialists are described below. The resource methodology overview for biological resources is attached to this technical memorandum as Appendix A for reference only. Additionally, abbreviations and acronyms used in this report are listed in Appendix B.

4.1. Relevant Data or Information Sources

The following data and information were collected to review biological resources within the project area:

- Climate information from the Western Regional Climate Center (WRCC)
- Soil information from the Natural Resources Conservation Service (NRCS)

- Land use/cover information (i.e., habitat information) from a combination of Southwest Regional Gap Analysis Project (SWReGAP) data and riparian areas mapped by the Colorado Division of Wildlife (CDOW); which is now Colorado Parks and Wildlife (CPW)
- Information pertaining to habitats, wildlife and plant species, fish species, special-status species, and sensitive wildlife and plant species from the Colorado Natural Heritage Program (CNHP) and Natural Diversity Information Source (NDIS)
- Other wildlife species and habitat information
- Consultations with CPW representatives regarding fisheries, wildlife, and special-status species
- Consultation with USFWS representatives about federally listed endangered, threatened, proposed, and candidate species
- Information related to wildlife migration routes from CPW
- CDOT animal-vehicle collision data
- CDOT noxious weed data
- Consultations with county weed supervisors

4.2. Data Collection and Analysis Methodology

The following section describes information relevant to the data collection and analysis methodologies used to evaluate biological resources for the US 50 Tier 1 EIS. These issues are discussed by resource type below.

4.2.1. General Vegetation

The distribution and identification of major land use/cover categories (i.e., habitats) were extrapolated from geographic information system (GIS) vegetation mapping data performed by the SWReGAP. To facilitate discussions in the EIS, SWReGAP cover types were simplified into general land cover categories, such as grassland, shrubland, woodland, and urban, among others. Riparian and wetland areas were identified using CPW riparian mapping GIS data for the project area, combined with the SWReGAP data. Where these two datasets overlapped, the CPW riparian mapping was given precedence.

The SWReGAP vegetation mapping data were field-checked for accuracy by comparing mapped resources (i.e., polygons) to actual on-site land use/cover (i.e., vegetation) during the fall of 2006. The SWReGAP data had an overall accuracy of more than 77 percent. The CPW riparian data also had an overall accuracy of nearly 77 percent. Additional information about this accuracy assessment can be found in Appendix D, Accuracy Assessment of Southwest Regional Gap Analysis Project and Colorado Division of Wildlife Riparian Vegetation Mapping Along the US 50 Corridor.

Additionally, general habitat characteristics in the project area were determined through a combination of field reconnaissance, a review of CPW published and unpublished technical reports, regional information from the NDIS and CNHP, and consultations with area biologists.

4.2.2. Noxious Weeds

CDOT partners with the Colorado Department of Agriculture (CDOA) to identify noxious weeds along roadways. CDOA noxious weed surveys were completed between 2011 and 2012 and identified the occurrence and relative extent (i.e., percent cover) of primary weed species within the US 50 right of way. County weed supervisors (for counties in the project area) were contacted in January 2007 to provide additional details about documented noxious weeds in their respective counties.

4.2.3. Wildlife

Wildlife species composition characteristics in the project area were determined through a combination of field reconnaissance, a review of CPW published and unpublished technical reports, regional information from the NDIS and CNHP, and consultations with area biologists.

Also, a list of federally listed endangered, threatened, proposed, and candidate species (i.e., special-status species) to be considered in connection with this project was requested and received from the USFWS and

is included in Appendix C, U.S. Fish and Wildlife Service Letter Pertaining to Federally Listed Species. It should be noted that the Bald Eagle was removed from the list of threatened species in July 2007, subsequent to the list provided by the USFWS.

4.2.4. Wildlife Crossings and Migration Routes

Animal collision data from 1993 to 2006 for the entire length of the project area were obtained from CDOT and reviewed to identify potential critical roadkill areas (i.e., likely wildlife crossings). The available data for the project area includes roadkill data documented by CDOT, the Colorado State Patrol, and CPW, and may not reflect all animal collisions or areas. Additionally, information from CPW was used to identify wildlife migration routes.

4.3. Project Area

The project area for the US 50 Tier 1 EIS has been defined as one to four miles wide surrounding the existing US 50 facility and extending from Pueblo, Colorado, at I-25 to the vicinity of the Colorado-Kansas state line (Figure 1-1). The project area encompasses the study area limits, which is where the Tier 1 corridor alternatives considered by this project would be located. The study area is 1,000 feet wide centered on the corridor alternatives, beginning on or near the existing US 50 between I-25 in Pueblo, Colorado, and extending to just east of Holly, Colorado, in the vicinity of the Colorado-Kansas state line. The limits of the project were approved by the lead agencies and other project stakeholders during the US 50 Tier 1 EIS's scoping activities.

4.4. Effects

Effects to biological resources were identified through a GIS overlay process. Resources located within the Build Alternatives were considered affected by it. For any areas of habitat affected, the wildlife (including special-status species) known or likely to occupy that type of habitat were also considered affected. Wildlife crossings were considered affected if the Build Alternatives would make it more or less difficult for wildlife to cross US 50 at that location.

Because—in most areas—the Build Alternatives call for the highway to be improved on its existing alignment, note that the existing US 50 roadway lies inside the Build Alternatives. However, the acreage of the existing roadway was not removed from the effect calculations in this analysis. For this reason, estimated effects resulting from the Build Alternatives may overstate the actual effects that would occur if it is built. This approach is more conservative, providing a worst-case scenario for effects, which is appropriate for this Tier 1 broad scale analysis. Future Tier 2 studies will factor in the existing US 50 roadway and utilize more site-specific mapping for their effect calculations, making future Tier 2 estimates of effects more precise (see Figure 4-1).

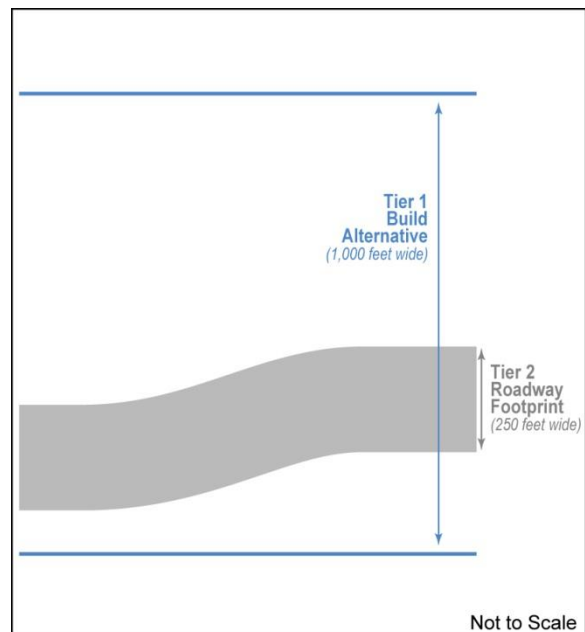


Figure 4-1. Tier 1 vs. Tier 2 Decision

The total acreage of a land use/cover type affected by the Build Alternatives at a given location was determined by overlaying the Build Alternatives boundaries on top of the mapped land use/cover types. To calculate the potential effects, this total acreage then was multiplied by the fraction, or effect, that the actual future construction footprint would represent within that specific area. The maximum width of the construction footprint was assumed to be 250 feet. Therefore, if the Tier 1 Build Alternative is 1,000 feet wide, the effect ratio of the construction footprint to the Build Alternative footprint is 0.25 (i.e., 250 feet/1,000 feet = 0.25). For

example, if the 1,000-foot-wide alternative affects 10 acres of a land cover type and the recommended ultimate typical section is 250 feet, the effect at this location would be calculated as: 10 acres x (250 feet/1,000 feet) = 2.5 acres.

The conversion factor of 0.25 reflects that only one-quarter of the alternative width would be needed for highway right of way within a 1,000-foot wide Build Alternative. However, at three locations, the Build Alternatives have a variable width—or a width less than or more than 1,000 feet. This difference creates the need for different effect ratios in these locations. Effect ratios in these areas were calculated by determining the total area of the Build Alternative at that location and dividing it by the total area of the projected construction footprint. There are three exceptions to using the 0.25 effect ratio: (1) Section 1, Alternative 2: Pueblo Existing Alignment, which uses a 1:1 effect ratio since the proposed segment corridor is only 250 feet in width, (2) Section 1, Alternative 3: Pueblo SH 47 Connection, which uses a 0.25 effect ratio for the western half since this area would be new location and is 1,000 feet wide, and uses a 1:1 effect ratio along the eastern half where this alternative uses the existing alignment, and (3) Section 7, Alternative 1: Rocky Ford North which uses a 0.31:1 effect ratio to account for a wider construction footprint (approximately 310 feet) associated with the adjacent railroad corridor.

4.5. Mitigation Options

Resource mitigation options will focus on actions taken during alternatives development to avoid effects, minimize effects, or both, and on ideas for compensatory mitigation, which could include early mitigation and the development of a regional conservation bank.

4.6. Deliverables

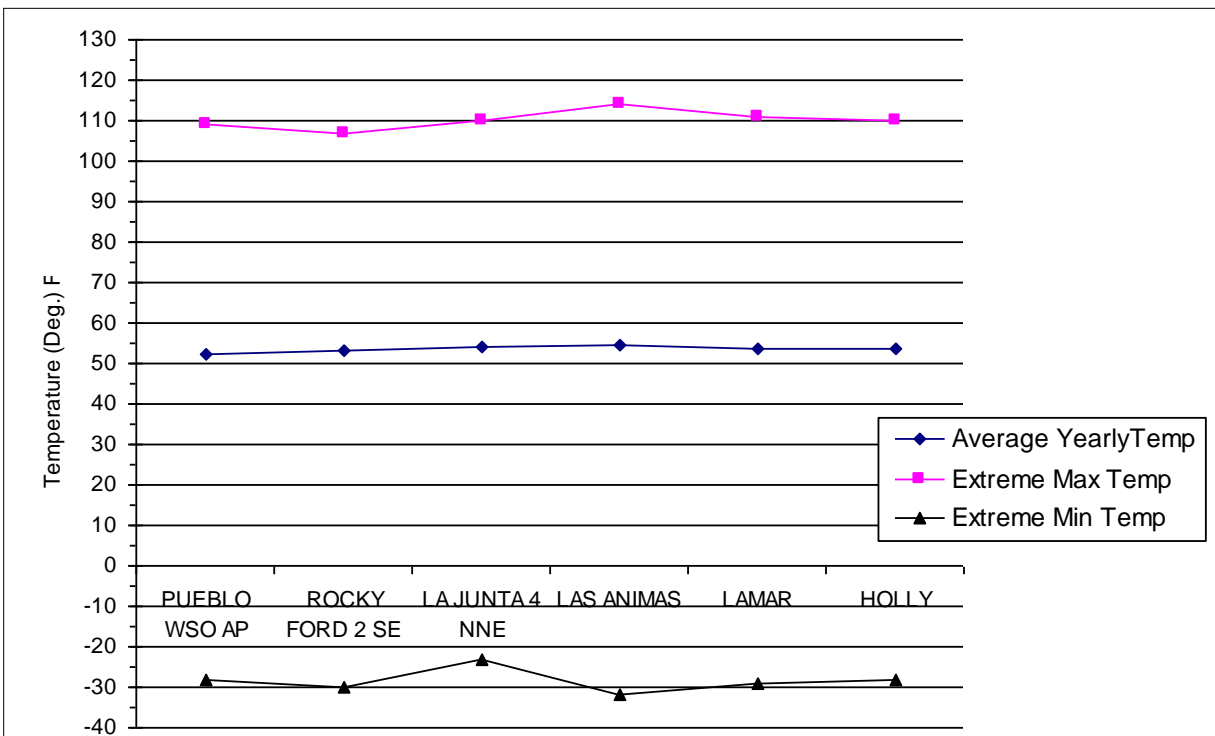
This Biological Resources Technical Memorandum is the primary deliverable being produced for this analysis of biological resources for the US 50 Tier 1 EIS. This memorandum will form the basis for a biological assessment, conducted during Tier 2 studies, for any federally protected species that may be affected by the Build Alternatives.

5. Existing Conditions

The majority of the project area occurs within the Piedmont and Tablelands Level IV ecoregion. The eastern portion of the project area also includes the Sand Sheets Level IV ecoregion, and near the Colorado-Kansas state line, the Flat to Rolling Plains Level IV ecoregion (Chapman et al. 2006). The Piedmont and Tablelands ecoregion is characterized as having irregular and dissected plains underlain by shale and sandstone and dominated by shortgrass prairie. The Sand Sheets ecoregion was formed by aeolian and alluvial deposits of sand. It is comprised of rolling plains with sand sheets and low sand dunes stabilized by sandsage prairie. The Flat to Rolling Plains ecoregion is more level, less dissected, and generally dominated by dryland farming and irrigated cropland (Chapman et al. 2006). The project area ranges in elevation from 4,400 feet at Pueblo to 3,400 feet at Holly.

5.1. Climate

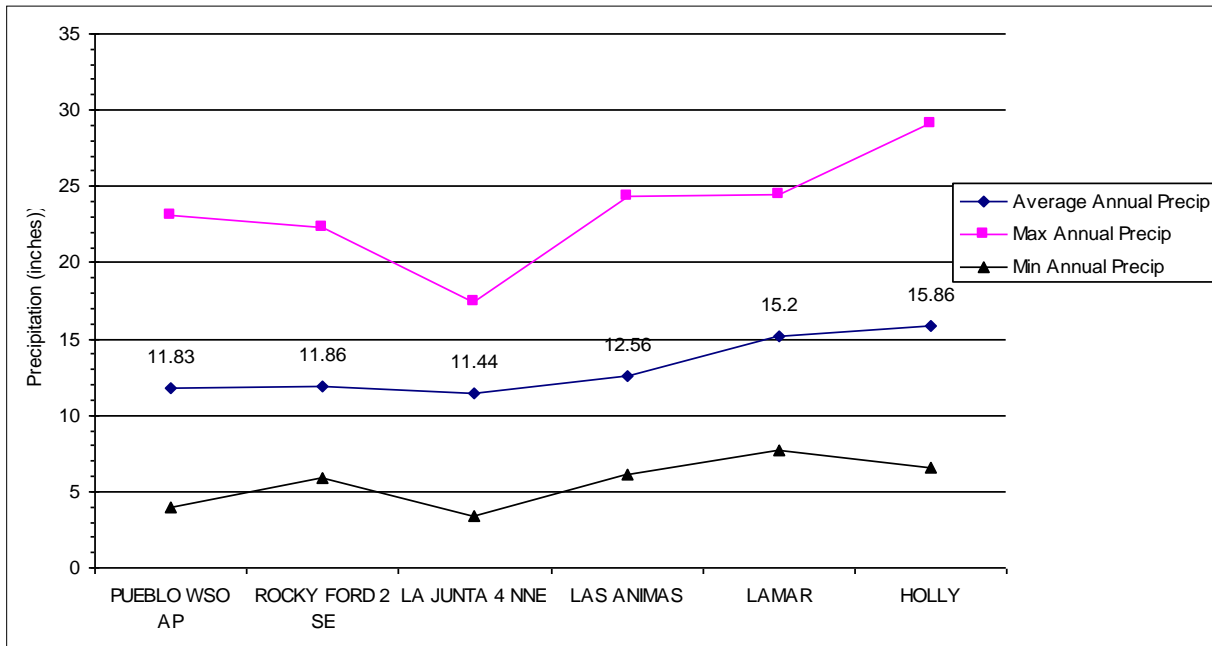
Eastern Colorado lies within the rain shadow east of the Rocky Mountains. The climate of the Great Plains grasslands is a semi-arid regime with characteristic low relative humidity, abundant sunshine, infrequent rains and snow, moderate to high wind movement, and a large seasonal range in temperature (Colorado Climate Center [CCC] 2007). Winters are cold and dry, and summers are warm to hot. The mean annual temperature is approximately 54° F (degrees Fahrenheit) throughout most of the project area and ranges from roughly 52° F at Pueblo to 55° F at Las Animas (WRCC 2006) (Figure 5-1). The average annual maximum temperature is nearly 72° F compared to an average annual minimum temperature of roughly 36° F (WRCC 2006). Extreme summer temperatures can be above 100° F, and extreme winter temperatures can fall below 0° F (WRCC 2006) (Figure 5-1).



Source: WRCC 2006

Figure 5-1. Average, Maximum, and Minimum Annual Temperatures for the Project Area

The mean annual precipitation ranges from more than 11 inches per year at La Junta to nearly 16 inches at Holly, and the average mean is about 13 inches across the project area (WRCC 2006). Extreme fluctuations in annual precipitation occur, and have been recorded from a low of almost four inches at La Junta to a high of just over 29 inches at Holly (Figure 5-2). The majority of the precipitation (70 percent to 80 percent) occurs as rain from April through September. Periods of high winds occur in late February, March, and April. The frost-free period ranges from 100 days at Pueblo to more than 170 days at Holly (WRCC 2006). The moisture and soil temperature regimes are described as ustic or aridic and mesic (NRCS 2006).



Source: WRCC 2006

Figure 5-2. Average, Maximum, and Minimum Annual Precipitation for the Project Area

5.2. General Vegetation

Existing land uses/cover (i.e., vegetation cover types) within the project area fall into 10 general classifications:

- Agricultural land
- Grassland
- Shrubland
- Woodland
- Wetland and riparian areas
- Open water
- Rock outcrops
- Urban
- Rural
- Disturbed

This analysis identified the locations of each land use/cover type and its relative abundance by county (Figure J-1 through Figure J-4, located in Appendix J, Figures) and the estimated acreages and associated percentages of the total land area within the project area (Table 5-1).

Table 5-1. Estimates for Land Use/Cover within the Project Area

Land Use/Cover Types	Acres	Percent Cover
Agricultural Land ^a	98,000	50
Grassland	43,000	22
Shrubland	13,000	7
Woodland	50	< 1
Wetland/riparian areas	27,600	14
Open water	770	< 1
Rock outcrops	1	0
Urban	3,100	2
Rural	8,200	4
Disturbed	900	< 1
Total area	194,700	100

^aOther land use/cover types also may be used for agricultural activities (primarily ranching)

Sources: McLean 2006, SWReGAP 2006

Note: Acreage is rounded

5.2.1. Agricultural Land

Agricultural land represents approximately 50 percent of the current land use/cover within the project area (Tranel 2008a). The land use/cover from Lamar east to Holly is mostly agricultural with large areas of grasslands and shrublands scattered between the two communities (Figure J-1 through Figure J-4, located in Appendix J).

Agricultural land within the project area consists primarily of cultivated crops, as well as ranch lands or native pastures sometimes used for hay production that includes grasses, alfalfa, or mixtures planted for livestock grazing. Major crops grown in the Lower Arkansas Valley include corn for grain, corn for silage, dry edible beans (excluding limas), forage, sorghum for silage, vegetables, and wheat for grain. While the majority of these crops are grown in all four project counties, individual counties stand out as major growers of particular crops on that list, as shown in Table 5-2.

Table 5-2. State Rank (Top 10 Only) for Acres of Crop Production by County

Project County	Crop ^a	State Rank	Universe ^b
Pueblo	Vegetables	10	47
Pueblo	Dry edible beans	8	20
Pueblo	Sorghum for silage	9	19
Pueblo	Haylage, alfalfa	6	39
Otero	Vegetables	8	47
Otero	Sorghum for sillage	10	19
Otero	Hay, alfalfa	7	58
Bent	Sorghum for silage	4	19
Bent	Sorghum for grain	10	22
Bent	Hay, alfalfa	5	58
Prowers	Sorghum for silage	5	19
Prowers	Sorghum for grain	3	22
Prowers	Oats	10	32
Prowers	Hay and haylage	3	63
Prowers	Hay, alfalfa	2	58
Prowers	Grain	6	50
Prowers	Corn, silage	9	37

^aVegetable ranked by acres in production per year; grain measured in dollar sales; all other crops ranked by acres harvested per year.

^bThe number of Colorado counties producing this item—out of 64 counties

Source: 2007 Census of Agriculture[a]

Most of the irrigated agricultural land is located on the valley floors adjacent to rivers or tributaries. These areas are characterized by gentle terrain, relatively deep soil, relatively moist conditions, and the availability of water for irrigation (Bent County, City of Las Animas 2002).

Ranch lands are very similar to grassland, but have been altered enough by past or present land management practices so as to be classified under agricultural land rather than grassland by the SWReGAP. Rangeland is grazed by livestock and can function very similarly to natural grassland. For this reason, further refinement of the agricultural land use/cover type may be needed during Tier 2 studies.

5.2.2. Grasslands

Grassland is a major land use/cover type in the project area, representing approximately 22 percent (43,000 acres) of the total land use/cover. Large areas of grasslands within the project corridor occur from Pueblo east to the county line, east of the Timpas River to west of Las Animas, north of John Martin Reservoir, and east of Holly (Figure J-1 through Figure J-4, located in Appendix J, Figures). Grassland is used primarily for grazing of domestic livestock (mostly beef cattle), but also provides forage and cover for wildlife.

Plant species in the grasslands within the project area varies in relation to topography, substrate, and intensity of use. Based on the SWReGAP data, the western Great Plains shortgrass prairie is the most abundant grassland cover type, comprising 98 percent (approximately 42,900 acres).

The western Great Plains shortgrass prairie occurs primarily on flat to rolling uplands with loamy, ustic soils ranging in texture from sandy to clayey (NRCS 2006). Native, drought-resistant species form the basis of this ecosystem, with key species such as blue grama (*Bouteloua gracilis*) dominating. Associated graminoids may include three-awn (*Aristida purpurea*), side-oats grama (*B. curtipendula*), hairy grama (*B. hirsute*), buffalograss (*Buchloe dactyloides*), needle and thread (*Hesperostipa comata*), prairie junegrass (*Koeleria*

cristata), western wheatgrass (*Agropyron smithii*), alkali sacaton (*Sporobolus airoides*), and sand dropseed (*S. cryptandrus*) (SWReGAP 2006, Nature Serve Explorer [NSE] 2007). Sandy soils generally support a high cover of green needlegrass, sand dropseed, and yucca (*Yucca* species). Scattered shrub and dwarf shrub species such as sand sagebrush (*Artemisia filifolia*), fringed sagebrush (*Artemisia frigida*), big sagebrush (*Artemisia tridentata*), fourwing saltbush (*Atriplex canescens*), wild buckwheat (*Eriogonum* species), broom snakeweed (*Gutierrezia sarothrae*), and pale wolfberry (*Lycium pallida*) also may be present (NSE 2007).

The western Great Plains foothill and Piedmont grasslands are best characterized as a mixed-grass prairie system found where increased soil moisture favors tall and mid-height grasses (NRCS 2006). Common species include big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), mountain muhly (*Muhlenbergia montana*), green needlegrass (*Nessella viridula*), western wheatgrass, blue grama, and needle and thread (SWReGAP 2006).

The shortgrass prairie of eastern Colorado is, and has been, an important component of the state's agricultural productivity, ecological diversity, and unique culture and character for more than 150 years (CDOW 2003a). Although livestock production remains high throughout the region, conversion of native grasslands to agricultural cropland and pastureland, over-grazing leading to homogenous habitats, and the invasion of non-native grasses and urban development have altered the character and size of the shortgrass prairie region, especially near rivers (CDOW 2003a). Grasslands in combination with associated wetland systems represent one of the richest areas for mammals and birds (Andrews and Righter 1992). For these reasons, concern has grown over the past several years for the long-term sustainability, diversity, and integrity of the many components of the shortgrass prairie ecosystem.

5.2.3. Shrublands

This land use/cover type represents 7 percent, or roughly 13,000 acres, within the project area. It is also referred to as a "steppe." In general, shrubland is similar to grassland except for the abundance and visual dominance of woody plants. The prominence of shrubs influences the types of birds and mammals likely to use an area. Shrublands in the project area are used primarily to graze domestic livestock (mostly beef cattle), but also provide important forage and cover for wildlife.

Plant species in the shrublands within the project area varies in relation to topography, substrate, moisture, and intensity of use. Based on the SWReGAP data, major shrubland cover types include the western Great Plains sandhill shrubland (70 percent) and the intermountain basins mixed salt desert scrub (26 percent). These shrubland habitat types are described below. Other minor shrubland types identified from the SWReGAP data collectively represent 500 acres, or 4 percent of the total shrubland acreage. These include (listed in descending order of abundance or acreage) intermountain basins greasewood flat, intermountain basins wash, intermountain basins semi-desert shrub steppe, and the Rocky Mountain lower montane-foothill shrubland.

The western Great Plains sandhill shrubland, also known as "sand sage," represents 70 percent of the total shrubland cover, or approximately 9,080 acres, within the project area. Large areas of sandhill shrublands are found east of Pueblo between La Junta and Las Animas, and between Lamar and Granada south of US 50 (Figure 5-3). This cover type occurs on well-drained, deep sandy soils that often are associated with dune systems or historic floodplains. It is characterized by a sparse to moderately dense woody layer dominated by sand sage (SWReGAP 2006). In addition to sand sage, other shrub species also may be present, including soapweed yucca (*Yucca glauca*), mesquite (*Prosopis glandulosa*), skunkbrush sumac (*Rhus trilobata*), and chickasaw plum (*Prunus angustifolia*).



Figure 5-3. Sand Sage Habitat near the Granada State Wildlife Area in Prowers County

Common graminoids include sand bluestem (*Andropogon hallii*), little bluestem, sand dropseed, prairie sandreed (*Calamovilfa gigantean*), needle and thread, and grama species (NSE 2007).

The intermountain basin's mixed salt desert scrub occupies approximately 3,410 acres within the project area, primarily east of Pueblo, east of the Huerfano River, and west of Las Animas. This open-canopy shrubland is typically found on saline, calcareous, medium- to fine-textured alkaline soils. The vegetation is characterized by open to moderately dense shrubs and generally is comprised of one or more saltbush species (*Atriplex* species), such as shadescale (*A. confertifolia*), four-winged saltbush, or spiny hopsage (*A. spinosa*). Other shrubs that may co-dominate include Wyoming big sagebrush (*Artemisia tridentata* subspecies *wyomingensis*), green rabbitbrush (*Chrysothamnus viscidiflorus*), Nevada ephedra (*Ephedra nevadensis*), winterfat (*Krascheninnikovia lanata*), wolfberry, or horsebrush (*Tetradymia* species) (NRCS 2006). The herbaceous layer varies from sparse to moderately dense and is dominated by perennial graminoids such as Indian ricegrass (*Achnatherum hymenoides*), blue grama, thickspike wheatgrass (*Elymus lanceolatus* subspecies *lanceolatus*), western wheatgrass, galleta (*Pleuraphis jamesii*), sandberg bluegrass (*Poa secunda*), or alkali sacton (SWReGAP 2006).

5.2.4. Woodlands

Woodlands represent 50 acres (0.03 percent) of the land use/cover within the project area. According to SWReGAP data, two woodland types occur within the project area. The first is the southern Rocky Mountain juniper woodland, which is characterized as occurring on flatter terrain with widely spaced mature juniper trees (NSE 2007). The second is the southern Rocky Mountain pinyon-juniper woodland, which is found on steeper terrain and ridges (SWReGAP 2006).

Most of the woodlands in the project area occur in the western portion and consist primarily of mature Rocky Mountain juniper (*Juniperus scopulorum*). On more exposed slopes, mesas, plateaus, and ridges, pinyon pine (*Pinus edulis*) is the dominant species. Canopy cover and tree density ranges from sparse to fairly close depending on site-specific conditions. Composition of the understory also is variable, most often being controlled by the substrate. Areas of deep, heavy-textured, fertile soils tend to support a well-developed shrub layer, while areas with stony coarse-textured or shallow soils tend to support a grassy understory (SWReGAP 2006).

5.2.5. Wetland and Riparian Areas

Wetland and riparian areas represent approximately 14 percent of the total project area (approximately 27,600 acres). The density of trees and width of the riparian corridor are typically greatest along the larger perennial streams, such as the Arkansas River, Purgatoire River, Huerfano River, Big Sandy Creek, Apishapa River, and Timpas Creek. Intermittent streams often support a discontinuous riparian community in which trees occur as small collections and often are replaced by riparian shrubs. Wetlands characterized by frequent saturation or inundation typically support emergent vegetation, some of which has been invaded by salt cedar (also known as tamarisk).

Wetland and riparian areas generally are considered to be among the most ecologically sensitive and important land use/cover types in the western United States. They play a major role in controlling water quantity and quality, maintaining stable streambanks, and providing habitat for a variety of plant and animal species that do not occur in other prairie habitats. A detailed discussion of wetland and riparian areas can be found in the Wetland and Riparian Technical Memorandum, which was prepared as part of this US 50 Tier 1 EIS.

5.2.6. Open Water

Open or standing water accounts for less than half a percent (about 770 acres) within the project area. This includes natural and created ponds, lakes, and other reservoirs, but it does not include the flowing portions of the Arkansas River itself. This habitat type also includes the mudflats and beaches that frequently occur adjacent to open water at different times of the year due to drawdown, evaporation, or both.

5.2.7. Rock Outcrops

This cover type represents a very small percentage of the project area, approximately one acre. This system includes cliffs and rock outcrops consisting of sandstone and limestone. Vegetation is restricted to shelves, cracks, and crevices in the rock. Grass and shrub species can occur at greater than 10 percent cover. Common species in this system include skunkbush sumac, sagebrush, and mixed grasses consisting of side oats grama, blue grama, and prairie sandreed. Drought and wind erosion are the most common natural dynamics affecting this habitat.

5.2.8. Urban Areas

The urban vegetation type represents landscaped areas associated with residential, commercial, and industrial development. These areas collectively represent approximately 2 percent (approximately 3,100 acres) of the land use/cover within the project area. Medium-intensity development includes a mixture of constructed material and vegetation. Impervious surface (i.e., streets, sidewalks, driveways) accounts for approximately 50 percent to 80 percent of the total cover in the medium-intensity development areas (SWReGAP 2006). These areas generally include single-family housing units with landscaped areas (e.g., lawns). High-intensity developed lands include a higher number of people in a confined area, such as apartment complexes and commercial or industrial businesses. Impervious surfaces account for 80 percent to 100 percent of the total cover in these areas. Significant urban areas in the project area include Pueblo (the city of), Fowler, Manzanola, Rocky Ford, La Junta, Las Animas, Granada, and Holly.

5.2.9. Rural Areas

Lands classified as rural in the project area represent approximately 4 percent (approximately 8,200 acres) of land use/cover. This typically includes large lots with single-family housing units, parks, golf courses, and vegetation planted for recreation, erosion control, and aesthetic value.

5.2.10. Disturbed Areas

Disturbed areas occur in the project area where the original vegetation or soil has been removed, substantially altered, or replaced. Two general categories of disturbed areas include physical alteration, such as mining or burned lands. Disturbed areas represent around 0.01 percent (approximately 900 acres) within the project area. This land use/cover type does not include areas dominated by salt cedar. Salt cedar-dominated areas are discussed in the noxious weed section of this report.

Though not considered a noxious weed in the state of Colorado, halogeton (*Halogeton glomeratus*) is an invasive weed that, if not prevented, will establish on denuded or disturbed soils in the semi-arid shrublands of Colorado. This species provides poor forage value for livestock and most wildlife (Dittberner and Olson 1983, Kern and Dobrowolski 1990). In fact, halogeton is especially poisonous to sheep and also can affect cattle (Whitson et al. 1996). In addition, halogeton alters the soil chemistry and soil structure, making it more difficult for desirable species to establish. Studies have shown increases in soil pH, exchangeable sodium, potassium, magnesium, electrical conductivity, and decreased water percolation in halogeton-infested soils (Allen and Allen 1988, Harris 1990).

Kochia (*Kochia scoparia*) and Russian thistle (*Salsola* spp.) have the potential to invade and spread quickly on disturbed semi-arid soils. Both species have received favorable and unfavorable reviews from agronomists over the past 50 years. They do provide cover for small mammals, songbirds, game birds, and waterfowl; have a "fair" palatability rating for livestock; and aid in the reduction of soil erosion due to the extensive cover (prolific seed producer) on disturbed areas (Cincotta et al. 1989, Anderson 1994, Carman and Brotherson 1982, Fleharty 1972, Forcella 1985, 1992). These two species, however, have the potential to invade deteriorated rangeland and compete with crops and native grass species for space, water, and nutrients (Steppuhn and Wall 1993). Due to their high seed production, they can become a monoculture on disturbed areas and exclude desirable, native, or both types of species (Boerboom 1993, Iverson et al. 1981). Management practices and revegetation plans need to consider the favorable and negative aspects of these two species on disturbed soils within the project area (Larson 1993, Lindauer 1983, Steppuhn and Wall 1993).

5.3. Noxious Weeds

Noxious weeds are a statewide concern as a result of their negative impacts on the productivity and ecological health of native plant communities. Invading weeds can disrupt the succession of native species due to their ability to out-compete natives with specific traits or combinations of traits that provide growth and reproductive advantages. In addition, noxious weeds can survive under more harsh conditions, such as drought, than most native plants and quickly invade disturbed sites that lack competition.

Infestations of noxious weeds are initially established on public and private lands from weed seeds carried by vehicles, hay, humans, heavy equipment, birds, livestock, wildlife, or contaminated commercial seed. Weeds typically invade and colonize disturbed areas such as roadsides, riparian areas, or heavily grazed rangeland.

Field bindweed (*Convolvulus arvensis*), a Category C noxious weed, is the most commonly occurring weed species. This analysis identifies the state-listed noxious weeds (i.e., vegetation) found within the Build Alternatives (Table 5-3) and their locations (Figure J-5 through Figure J-8, located in Appendix J, Figures). A complete list of CDOT noxious weeds (statewide) is located in Appendix E. Noxious weeds commonly found in the Build Alternatives, as identified by county weed supervisors, are summarized below.

Table 5-3. State-Listed Noxious Plant Species Documented in the Build Alternatives

Common Name	Scientific Name	Weed Category ^a	County	Within Current CDOT Right of Way in Project Area?
Canada thistle	<i>Cirsium arvense</i>	B	Pueblo	Yes
Chicory	<i>Cichorium intybus</i>	C	Pueblo	No
Cutleaf teasel	<i>Dipsacus laciniatus</i>	B	Pueblo	No
Field bindweed	<i>Convolvulus arvensis</i>	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Hoary cress	<i>Cardaria draba</i>	B	Bent	Yes
			Prowers	Yes
Johnsongrass	<i>Sorghum halepense</i>	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
Musk thistle	<i>Carduus nutans</i>	B	Pueblo	No
Perennial pepperweed	<i>Lepidium latifolium</i>	B	Pueblo	No
Prickly lettuce	<i>Latuca serriola</i>	C	Bent	Yes
			Otero	Yes
			Prowers	Yes
Puncturevine	<i>Tribulus terrestris</i>	C	Pueblo	Yes
			Otero	Yes
			Prowers	No
			Pueblo	Yes

Common Name	Scientific Name	Weed Category ^a	County	Within Current CDOT Right of Way in Project Area?
Russian knapweed	<i>Acroptilon repens</i>	B	Bent	Yes
			Otero	Yes
			Pueblo	Yes
Russian olive	<i>Elaeagnus angustifolia</i>	B	Bent	No
			Otero	No
			Prowers	No
			Pueblo	Yes
Salt cedar (Tamarisk)	<i>Tamarix ramosissima</i>	B	Bent	Yes
			Otero	Yes
			Prowers	Yes
			Pueblo	Yes
Scotch thistle	<i>Onopordum tauricum</i>	B	Otero	Yes
			Pueblo	No

^a Type B: Develop and implement state noxious weed management plans to stop the spread of a species.

Type C: Develop and implement state noxious weed management plan designed to support local efforts.

Source: CDOA 2013, CDOT Noxious Weed List, 2013, CDOT Noxious Weed GIS Data

By far the most problematic and extensive noxious weed species in the Build Alternatives is salt cedar. For this reason, it is appropriate to discuss it in more detail. Salt cedar represents just over 11,300 acres, or nearly 6 percent, of the Build Alternatives (SWReGAP 2006), and is one of the most widely distributed and troublesome non-native, invasive species along water courses in the southwestern United States (DeLoach and Carruthers 2004). Salt cedar was first noted in the Arkansas Valley near Lamar in 1913, and since then, it has spread quickly, contributing to the reduction of native riparian trees and shrubs in the area (U.S. Army Corps of Engineers [USACE] 1999). Along the Arkansas River, salt cedar is a major component of a mixed community type including various combinations of plains cottonwood (*Populus deltoides* subspecies *monilifera*) and coyote willow (*Salix exigua*), as well as other species, such as boxelder (*Acer negundo*), Russian olive, green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*) (Lindauer 1983). Currently, the lower Arkansas River floodplain is heavily infested with nearly 29,300 total acres of salt cedar. The Purgatoire River floodplain also has a significant infestation, totaling over 9,900 acres (Colorado Water Conservation Board [CWCB] 2006).

Salt cedar is a tree with a deep, extensive root system that extends to the water table, and is capable of extracting water from unsaturated soil layers (a facultative phreatophyte). As a facultative phreatophyte and halophyte (salt-loving), salt cedar has a competitive advantage over native, facultative wet, and obligate phreatophytes (e.g., cottonwood and willows), especially in saline soils and in areas where water tables are depressed (Busch and Smith 1993, Mouinsif et al. 2002, Smith et al. 1998). The encroachment of salt cedar also increases soil salinity, which impairs germination and establishment of many native species (Busch et al. 1993).

Salt cedar produces a dense monoculture with little regeneration of other species in the absence of disturbance (Cleverly et al. 1997). Dense stands of salt cedar negatively influence the shape and water movement of river channels. It does this by trapping and stabilizing alluvial sediments, which results in reduced channel width and decreased channel depth, thereby decreasing the overall area of river channels. This can increase the frequency and severity of overbank flooding (Dudley et al. 2000). It widens floodplains, clogs stream channels, and increases sediment deposits (USACE 1999). Depletion of water; a deeper, narrow channel stabilized by releases from John Martin Reservoir; and invasion of salt cedar all have contributed to the rapid loss of cottonwoods along the lower Arkansas River in eastern Colorado (Synder and Miller 1991).

Significant water losses occur as salt cedar occupies upland areas within the floodplain that normally would support dryland vegetation, such as grasses, sage, and rabbitbrush. For much of the lower Arkansas River floodplain, these upland areas are infested with approximately 80 percent cover of salt cedar (CWCB 2006). Salt cedar has high transpiration rates, and its stands have been reported to use more water than native vegetation, thus drawing down water tables, desiccating floodplains, and lowering flow rates of waterways (Brotherson and Field 1987). It is estimated that current water losses from salt cedar exceed native vegetation use along the Arkansas River by approximately 53,800 acre-feet per year (salt cedar minus the water used by native plants) (CWCB 2006).

Riparian floodplains typically support some of the highest concentrations of breeding bird species in both abundance and diversity. However, the replacement of native woody vegetation with non-native, invasive species such as salt cedar may result in a reduction in avian diversity and species richness (Farley et al. 1994). Salt cedar provides habitat nest sites for some wildlife (doves), but most researchers conclude that it has little value to most native amphibians, reptiles, birds, and mammals (Lovich and DeGouvenain 1998).

Though salt cedar in the lower Arkansas River Valley is undoubtedly one of the most problematic noxious weed issues in the state, partnerships comprised of federal, state, and local agencies, community organizations, and land owners are working toward a solution. A few of these partnerships, and their strategies and accomplishments are described below.

In 2007, the Arkansas River Watershed Invasive Plants Partnership (ARKWIPP) was formed through the leadership of the Southeastern Colorado Water Conservancy District (SECWCD) to develop a strategic plan for riparian areas impacted by invasive species. The ARKWIPP Strategic Plan was completed in 2008 along with watershed mapping of tamarisk and Russian olive. From 2009 to 2011 approximately 3,643 acres of tamarisk was treated with an integrated management approach that included biocontrol developed with the Colorado Department of Agriculture's Insectary. Tamarisk leaf beetles were released into the watershed with the hope that over time the insects will serve as the primary control mechanism of tamarisk. The beetles damage and/or kill tamarisk through repeated leaf defoliation.

The Tamarisk Coalition has been working to help people manage invasive plant species and to restore native riparian vegetation since 1999. The organization focuses on a landscape-scale approach to address tamarisk impacts rather than the more conventional site by site approach. They have been instrumental in the development of numerous strategic restoration plans and helped develop a coordinated monitoring program to document the dispersal of the tamarisk leaf beetle.

Formed in 2004, a group called Tackling Tamarisk on the Purgatoire River is a collaborative effort between public agencies, nonprofit organizations, and private landowners. In 2008 they developed a comprehensive plan to control woody invasive species in the Purgatoire watershed and have since treated approximately 1,411 acres.

In Pueblo County, salt cedar control efforts have included state and federal lands, the city of Pueblo, and a few private companies and landowners (Campbell 2007). The Pueblo Chemical Depot agreed to fund an eradication program for Chico Creek, which is located along the western boundary of the depot (Norton 2006). Control measures for salt cedar in Otero County include cutting the plants, followed by spraying herbicides, primarily along the Arkansas River near Bent's Old Fort National Historic Site (Schultz 2007). In addition, the CPW has implemented salt cedar control on several of its state wildlife areas.

5.4. Terrestrial Wildlife

Wildlife occurrence and use patterns in the project area are influenced primarily by migration patterns (i.e., occurs on a principal route of the central flyway); habitat, including vegetation; topography; proximity to surface water; current land use; and human disturbance. In general, wildlife habitat along the Build Alternatives consist of:

- Irrigated and non-irrigated pasture and cropland along the broad valley floors

- Sand sage shrublands, native grasslands, riparian woodlands along perennial streams, and intermittent tributaries
- Herbaceous wetlands along drainages/ditches and adjacent to highway right of way
- Limited residential development

Approximately 320 different bird species, 10 amphibian species, 40 reptile species, and 70 mammal species could potentially occur in the Build Alternatives (NDIS 2007). A list of species likely to occur in the Build Alternatives on a relatively regular basis, and the primary habitats that they occur in, is included in Appendix F, Animals, Fish, and Plant Species Likely to Occur in the Project Area. The likely occurrence and habitat affinities of selected terrestrial wildlife species are summarized in the following subsections.

Many of the bird species that have been observed in the project area only occur during the spring and/or fall migrations. The project area occurs along a principal route of the central flyway, which is shown in Figure 5-4. The central flyway is a key migration route for many bird species between breeding grounds in the north and wintering areas in the south.



Figure 5-4. The Central Flyway

Different bird species migrate to different locations along the flyway, depending on their species-specific requirements. The Central Flyway Council (CFC) was officially formed in 1952 to assemble and disseminate monitoring data so that the U.S., Canadian, and Mexican governments could better manage the migratory bird (mainly waterfowl) resource on the North American continent (CFC 2008).

5.4.1. Agricultural Land

Agricultural land includes irrigated and non-irrigated cropland and ranch lands along the project corridor. Typically, these highly modified habitats are used by wildlife that prefer open terrain and tolerate relatively high levels of human activity.

During the spring and fall seasons, agricultural land provides important habitat for migrating birds. During the summer and winter, agricultural land supports fewer bird species, except where fields are interspersed or edged with houses, shelterbelts and windbreaks, riparian forests, or wetlands that support a wider variety of birds. Among the most common are the American Kestrel (*Falco sparverius*), Ring-necked Pheasant (*Phasianus colchicus*), Mourning Dove (*Zenaidura macroura*), Western Meadowlark (*Sturnella neglecta*), Red-winged Blackbird (*Agelaius phoeniceus*), and Common Grackle (*Quiscalus quiscula*). Mourning Doves are important game birds and nest throughout the corridor (CDOW 2006). Dickcissels (*Spiza americana*) are also common in alfalfa. Stubble wheat fields are an important winter habitat for the Horned Lark (*Eremophila alpestris*). Corn fields interspersed with grasslands provide habitat for Lesser Prairie Chickens (*Tympanuchus pallidicinctus*) in winter. Agricultural land, especially cornfields with interspersed tall trees, will support Lewis' Woodpeckers (*Melanerpes lewis*). Migrant Cranes (*Grus* species) often feed in fields (Andrews and Righter 1992). Many of these wildlife species rely on nearby habitats (i.e., shade trees, woodlands or stand grass areas) for cover and reproduction but use agricultural land for feeding or hunting. Buildings, bridges, and other structures are used for nesting by the Say's Phoebe (*Sayornis saya*), Barn Swallow (*Hirundo rustica*), and Cliff Swallow (*Petrochelidon pyrrhonoto*).

Pastures or areas that are seasonally flooded may support breeding by amphibians, such as the plains spadefoot toad (*Spea bombifrons*), Great Plains toad (*Bufo cognatus*), and the Woodhouse's toad (*Bufo woodhousii*) (Hammerson 1999).

Native mammal species typically occurring on agricultural land include the white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*), gray fox (*Urocyon cinereoargenteus*), striped skunk (*Mephitis mephitis*), house mouse (*Mus musculus*), desert cottontail (*Sylvilagus audubonii*), deer

mouse (*Peromyscus maniculatus*), raccoon (*Procyon lotor*), and thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*) (NDIS 2007). Trees and buildings also provide roosting habitat for bats.

Wildlife diversity generally is much lower in cropland than pastureland and native habitats because of the greater degree of disturbance and lower plant species diversity. For the same reasons, wildlife diversity in pastureland generally is lower than in native habitats, including grasslands. Special-status species potentially occurring in agricultural habitat are listed in Appendix G, Special-Status Species Potentially Occurring in the Project Area.

5.4.2. Grasslands

The second largest cover type within the Build Alternatives consist of shortgrass prairie grassland. Herbaceous species in the area varies depending on topography and soils, but generally plains grasslands are dominated by two sod-forming grasses: buffalo grass and blue grama. The destruction or modification of native eastern Colorado grasslands has caused a serious decline in some grassland bird species. Studies completed by the Rocky Mountain Bird Observatory in 2005 documented over 110 different bird species in the native shortgrass prairie of eastern Colorado, of which more than 20 were listed as species of concern (Sparks et al. 2005). The most common and widespread species include the Horned Lark and the Lark Bunting (*Calamospiza melanocorys*). Other species include the Western Meadowlark, the Cassin's Sparrow (*Aimophila cassinii*), and the Grasshopper Sparrow (*Ammodramus savannarum*). Some raptors, such as the Swainson's Hawk (*Buteo swainsoni*) and the Ferruginous Hawk (*Buteo regalis*), occur primarily in grassland. These raptors breed locally where trees and bluffs provide nesting sites. Burrowing Owls (*Athene cunicularia*) are found mostly in prairie dog towns, along with Ferruginous Hawks, Bald Eagles (*Haliaeetus leucocephalus*) (in winter), and Mountain Plovers (*Charadrius montanus*). The Mountain Plover and Long-Billed Curlew (*Numenius americanus*) are both less numerous and more locally distributed than they were a century ago (CDOW 2003a). The Mountain Plover and McCown's Longspur (*Calcarius mccownii*) are unique to the shortgrass prairies east of the Rocky Mountains (Bailey 1995).

Eastern Colorado plains grasslands support a diverse amphibian and reptile fauna (Hammerson 1999). Under typical grazing, the plains grassland is maintained as a dense, short turf with areas of sparse vegetation or bare soil. Protection of these vulnerable native grasslands is a key conservation need of the Colorado herpetofauna (Hammerson 1999). Some of the more typical species of the plains grasslands are the plains spadefoot toad, Woodhouse's toad, Texas horned lizard (*Phrynosoma cornutum*), lesser earless lizard (*Holbrookia maculate*), prairie lizard (*Sceloporus undulates*), ornate box turtle (*Terrapene ornate*), glossy snake (*Arizona elegans*), coachwhip (*Masticophis flagellum*), and western rattlesnake (*Crotalus viridis*). Amphibians are most common in grasslands near ponds or streams or in broad valleys (Hammerson 1999).

Overall, the pronghorn (*Antilocapra americana*) is probably the most abundant large mammal within this province, with mule deer (*Odocoileus hemionus*) and whitetail deer common in tall shrub cover along stream corridors (Ecosystem Provinces 2007). The blacktail jackrabbit (*Lepus californicus*), black-tailed prairie dogs (*Cynomys ludovicianus*), and several other small rodents are preyed upon by coyotes and other mammalian and avian predators. One—the black-footed ferret (*Mustela nigripes*)—is classified as a federal and state endangered species. However, the occurrence of the ferret in the Build Alternatives is highly unlikely.

Common mammals found in grasslands within the Build Alternatives include pronghorn, black-tailed prairie dog, coyote, American badger (*Taxidea taxus*), and mountain cottontail (*Sylvilagus nuttallii*). Concentrated pronghorn areas primarily occur in the western portion of the Build Alternatives to approximately four miles west of Las Animas (CDOW 2006). The swift fox (*Vulpes velox*) is a resident of the shortgrass prairie and currently sustains stable populations in the Build Alternatives (CDOW 2006). Desert cottontails often are associated with black-tailed prairie dog colonies and grassland habitat with scattered shrubs. Grassland also provides habitat for the thirteen-lined ground squirrel, white-tailed jackrabbit, and black-tailed jackrabbit in the Build Alternatives. Other small mammals found in grassland habitats include the northern grasshopper mouse (*Onychomys leucogaster*), the prairie vole (*Microtus ochrogaster*), plains pocket mouse (*Perognathus flavescens*), deer mouse, and the western harvest mouse (NDIS 2007).

Black-tailed prairie dog towns are an integral part of prairie ecosystems and many other wildlife species interact with, or are dependent on, the prairie dog colonies. Black-tailed prairie dog populations are stable in southeastern Colorado (CDOW 2006). The results of the CPW 2003 aerial inventory of the black-tailed prairie dog show approximately 80,500 acres of active prairie dog colonies in Bent County, followed by roughly 66,900 acres in Prowers County, 45,500 acres in Pueblo County, and 23,300 acres in Otero County (CDOW 2003a) (Figure J-9 through Figure J-12, located in Appendix J, Figures). Wildlife species commonly associated with prairie dogs include Ferruginous Hawks, Burrowing Owls, Bald Eagles, Mountain Plover, black-footed ferret (unlikely to occur in the project corridor), badgers, and western rattlesnakes (*Crotalus viridis*).

Bird species endemic to the shortgrass system may constitute one of the fastest-declining bird populations (Andrews and Righter 1992). Concerns over other wildlife species, primarily the black-tailed prairie dog and associated species, the Mountain Plover, Burrowing Owl, swift fox, and Ferruginous Hawk have triggered the development and implementation of conservations plans. The Conservation Plan for Grassland Species in Colorado (CDOW 2003a) and Partners in Flight North American Landbird Conservation Plan (Rich et al. 2004) are two examples of plans with goals to work toward the protection and sustainability of grasslands and grassland-dependent wildlife in Colorado. In addition, CDOT, along with FHWA, the USFWS, The Nature Conservancy (TNC), the Colorado Department of Natural Resources (DNR), and CPW implemented the Shortgrass Prairie Initiative in 2005. The Shortgrass Prairie Initiative is a large scale, multi-species, habitat-based conservation effort. It addresses all of CDOT's routine roadway maintenance through 2025 for 38 species of concern. Special-status species potentially occurring in grassland habitat are listed in Appendix G, Special-Status Species Potentially Occurring in the Project Area.

5.4.3. Shrublands

The use of shrubland by bird species varies based on the percent of shrub cover within the shrubland ecosystem. Studies completed by the Rocky Mountain Bird Observatory show greater numbers of bird species in habitat with shrub cover less than 3 percent compared to areas with greater than 10 percent shrub cover (Sparks et al. 2005). Common bird species in this habitat include Horned Lark, Brewer's Sparrow, Lark Sparrow, Western Meadowlark, and Vesper Sparrow. Other birds include the Cassin's Sparrow, Mourning Dove, Green-Tailed Towhee (*Pipilo chlorurus*), Lark Bunting, Sage Thrasher (*Oreoscoptes montanus*), Sage Sparrow (*Amphispiza belli*), Loggerhead Shrike (*Lanius ludovicianus*), and Black-Throated Sparrow (*Amphispiza bilineata*) (Sparks et al. 2005). Lesser Prairie Chickens occur east of Lamar in sand sage areas (CDOW 2007a) and south of Holly. Where they serve as ecotones between grasslands and woodlands, shrublands provide habitat for the Scaled Quail (*Callipepla squamata*), Bell's Vireo (*Vireo bellii*), American Tree Sparrow (*Spizella arborea*), and the Harris' Sparrow (*Zonotrichia querula*) (Sparks et al. 2005).

Semi-desert shrubland supports a number of reptile species, including the collared lizard (*Crotaphytus collaris*), prairie lizard (*Sceloporus undulatus*), and gopher snake (*Pituophis catenifer*). The sandy soil of the sand sage ecosystem provides habitat for the plains spadefoot toad, Woodhouse's toad, Great Plains toad, ornate box turtle, lesser earless lizard, prairie lizard, six-lined racerunner (*Cnemidophorus sexlineatus*), many-lined skink (*Eumeces multivirgatus*), western hognose snake (*Heterodon nasicus*), milk snake (*Lampropeltis triangulum*), and western rattlesnake. Massasauga snakes may occur in the sand sage habitats in the project corridor (CDOW 2006).

Mammals found within shrublands in the Build Alternatives include pronghorn, elk (*Cervus elaphus*), white-tailed deer, coyote, badger, red fox, desert cottontail, mountain cottontail, white-tailed jackrabbit, thirteen-lined ground squirrel, plains pocket mouse, deer mouse, western harvest mouse, northern grasshopper mouse, prairie vole, and desert shrew. Large areas of pronghorn habitat occur north and south of Manzanola and south of Lamar. Mule deer also occur in shrubland, especially where topography or trees provide cover, primarily east of Pueblo along the Arkansas River and along waterways north and south of La Junta to Holly (NDIS 2007). Special-status species potentially occurring in shrubland habitat are listed in Appendix G, Special-Status Species Potentially Occurring in the Project Area.

5.4.4. Woodlands

Pinyon-juniper ecosystems typically occupy rocky canyons or slopes of broken basalt within areas otherwise dominated by grasslands. This habitat is used by a number of bird species, including the Gray Flycatcher (*Empidonax wrightii*), Pinyon Jay (*Gymnorhinus cyanocephalus*), Bushtit (*Psaltriparus minimus*), Gray Vireo (*Vireo vicinior*), and Black-Throated Gray Warbler (*Dendroica nigrescens*). In the fall and winter, the pinyon cone crops provide food for the Steller's Jay (*Cyanocitta stelleri*). The berry-like cones of the junipers attract birds such as the Townsend's Solitaire (*Myadestes townsendi*), Western Bluebird (*Sialia mexicana*), Mountain Bluebird (*Sialia currucoides*), American Robin (*Turdus migratorius*), and Pine Grosbeaks (*Pinicola enucleator*) in the fall and winter (NDIS 2007, Andrews and Righter 1992).

Reptiles found in woodlands in the Build Alternatives can include the collared lizard, night snake (*Hypsiglena torquata*), and western rattlesnake. Red-spotted toads (*Bufo punctatus*) commonly range into woodlands near intermittent streams (NDIS 2007, Hammerson 1999).

The presence of trees and rocks provides habitat for wildlife such as mule deer and bobcat (*Lynx rufus*) that normally do not venture far from cover. Smaller mammals associated with the wooded areas include striped skunk, mountain cottontail, porcupine (*Erethizon dorsatum*), least chipmunk (*Tamias minimus*), white-throated woodrat (*Neotoma albigula*), and white-footed mouse (*Peromyscus leucopus*). The trees and cliff ledges in this habitat type also provide habitat for a variety of bat species (NDIS 2007). Special-status species potentially occurring in the woodland habitat are listed in Appendix G, Special-Status Species Potentially Occurring in the Project Area.

5.4.5. Wetland and Riparian Areas

Riparian areas generally are the richest communities in bird diversity (Bottorff 1974). Important breeding species include Eastern and Western Screech-Owls (*Otus asio* and *O. kennicottii*), Great Horned Owl (*Bubo virginianus*), Red-Headed Woodpecker (*Melanerpes erythrocephalus*), Northern Flicker, (*Colaptes auratus*), Eastern Kingbird (*Tyrannus tyrannus*), House Wren, Brown Thrasher (*Toxostoma rufum*), Yellow Warbler (*Dendroica petechia*), and Orchard Oriole (*Icterus spurius*). Many species of migratory birds frequent riparian woodlands, such as Flycatchers (*Empidonax* species), Blue Jays (*Cyanocitta cristata*), Common Grackle, Thrushes (*Catharus* species), Warblers (*Vermivora* species), and Sparrows (*Melospiza* species). Though of diminished overall habitat value, stands of salt cedar provide habitat for Bewick's Wren (*Thryomanes bewickii*) and Blue Grosbeak (*Guiraca caerulea*) (Andrews and Righter 1992).

Hawks and other raptors are plentiful in the project corridor (CDOW 2006). The Arkansas River bottom is especially important to nesting raptors due to the occurrence of large cottonwood trees. Great Blue Heron rookeries and foraging areas also occur along the Arkansas River. Active Bald Eagle nest sites were identified northeast of US 50's crossing of the Arkansas River in Pueblo County and west of Lamar. A winter roost site east of the unincorporated area known as Hasty also was identified (CDOW 2006).

The main breeding species found in wetland and riparian areas are American Bittern (*Botaurus lentiginosus*), Virginia Rail (*Rallus limicola*), Marsh Wren (*Cistothorus palustris*), Red-Winged Blackbird, and Yellow-Headed Blackbird (*Xanthocephalus xanthocephalus*) (Andrews and Righter 1992). Where emergent wetlands border ponds or lakes, other species—such as several grebe species and the Black Tern—use the areas. Black Rails (*Laterallus jamaicensis*) occur in cattail habitat and have been identified in roadside wetlands adjacent to US 50 in the Higbee State Wildlife Area (CDOW 2007a) and in emergent wetlands near Hasty.

Some of the amphibian species most closely associated with forested or shrubby wetland and riparian corridors include the plains and northern leopard frogs (*Rana blairi* and *R. pipiens*), northern water snake (*Nerodia sipedon*), and common garter snake (*Thamnophis sirtalis*). The red-spotted toad (*Bufo punctatus*) occurs primarily in riparian zones in rocky canyon bottoms (Hammerson 1999).

Emergent wetlands (marshes, edges of streams) with aquatic vegetation provide habitat for the tiger salamander (*Ambystoma tigrinum*), western chorus frog (*Pseudacris triseriata*), plains and northern leopard frogs, bullfrogs (*Rana catesbeiana*), snapping turtle (*Chelydra serpentina*), painted turtle (*Chrysemys picta*),

and northern water snakes (*Nerodia sipedon*). Open water (i.e., pools, reservoirs) provide habitat for tiger salamanders, yellow mud turtles (*Kinosternon flavescens*), and the red-spotted toad (NSE 2007).

Mammals commonly associated with riparian habitats include the white-tailed deer, red fox, raccoon (*Procyon lotor*), mink (*Mustela vison*), mountain cottontail, beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), white-footed mouse, meadow vole, and a variety of bats. The overall range for white-tailed deer

is primarily along river corridors with concentrated habitat north and east of Las Animas to Holly (NDIS 2007). Special-status species potentially occurring in the wetland and riparian habitat are listed in Appendix G, Special-Status Species Potentially Occurring in the Project Area.

5.4.6. Open Water

The greatest concentration of reservoirs in eastern Colorado is found along the South Platte and Arkansas rivers (Andrews and Righter 1992). Most species of loons, grebes, ducks, gulls, and terns in Colorado occur on these reservoirs. Most shorebird species also occur in these areas, found primarily around irrigation reservoirs that have low water levels and exposed mud flats in late summer or early fall. American White Pelicans (*Pelecanus erythrorhynchos*) are associated with lakes and reservoirs in the area (CDOW 2006). Double-Crested Cormorants (*Phalacrocorax auritus*) and Great Blue Herons (*Ardea herodias*) nest in tall trees standing in reservoirs. Reservoirs in southeastern Colorado that have exposed alkaline shorelines support small nesting populations of the Snowy Plover (*Charadrius alexandrinus*), Piping Plover (*Charadrius melodus*) (special-status species), and Least Tern (*Sterna antillarum*) (special-status species). Piping Plovers and the Least Tern nest at John Martin Reservoir, Queens Lake, and Blue Lake (CDOW 2006). Reservoirs that remain free of ice during the winter support wintering waterfowl, such as Canada Geese (*Branta canadensis*), Mallards (*Anas platyrhynchos*), Common Mergansers (*Mergus merganser*), and Bald Eagles.

Dabbling Ducks and other waterfowl are common in the area during spring and fall migrations. Three varieties of geese utilize the Build Alternatives, including Canada Geese, Ross's Geese (*Chen rossii*), and Snow Geese (*Chen caerulescens*) (CDOW 2007a). Canada Geese are abundant during the spring and fall migration and are common winter residents throughout the eastern plains of Colorado (Andrews and Righter 1992). Ross' Geese inhabit reservoirs, marsh edges, wet meadows, and cropland (especially cornfields). They are rare to uncommon during the spring and fall migrations and as a winter resident on eastern plains. White Morph Snow Geese are abundant spring and fall migrants and winter residents in the Arkansas River Valley from Crowley and Otero counties eastward. Blue Morphs are uncommon to fairly common during the spring and fall migrations in the Arkansas River Valley from Crowley and Otero counties eastward (NDIS 2007). Also, the Lesser Sandhill Crane (*Grus canadensis*) migrates through the area. The cranes roost along the river during migrations and feed in nearby agricultural lands during the day. Peak migration is from the end of September until the middle to end of November (CDOW 2006).

Open water habitat typically receives little use by large mammals except as a source of water. However, common resident mammals associated with this habitat include American beaver and muskrat. Other species associated near open water, or found along the open water perimeter, include red fox, raccoon, mink, long-tailed weasel (*Mustela frenata*), and a variety of bats (NDIS 2007). Special-status species potentially occurring in open water habitat are listed in Appendix G, Special-Status Species Potentially Occurring in the Project Area.

5.4.7. Urban Areas

Some parts of the Build Alternatives include residential and limited commercial or industrial development. These developed areas are most extensive along the existing US 50 facility. In general, wildlife in urban areas consists mostly of a few "urban" or generalist species such as the striped skunk, raccoon, house mouse, American Robin, European Starling, and House Sparrow. Areas with more extensive plantings of shade trees may attract a larger array of songbirds and, potentially, raptors such as the Great Horned Owl and American Kestrel (Andrews and Righter 1992).

5.4.8. Rural Areas

Animal species found in rural areas in the Build Alternatives will be similar to those found on urban and agricultural land. In general, wildlife species typically occurring in rural areas include the white-tailed deer, raccoon, striped skunk, and a variety of mice. Common birds may include American Robin, European Starling, and House Sparrow. Buildings, bridges, and other structures provide nesting for Say's Phoebe, Barn Swallow, and Cliff Swallow. Trees (e.g., shade trees, shelterbelts) also may provide roosting habitat for some bat species.

5.4.9. Disturbed Areas

Vegetated disturbed areas can provide cover for small mammals, birds, waterfowl, amphibians, and reptiles. Small mammals may include the northern grasshopper mouse, the prairie vole, plains pocket mouse, deer mouse, and the western harvest mouse. Bird species, depending upon the vegetation cover, may include the Western Meadowlark, Ring-Necked Pheasant, Mourning Dove, Red-Winged Blackbird, and raptors. Mallards and geese will utilize disturbed areas for cover if herbaceous species such as kochia or Russian thistle occur. Typical amphibians and grassland reptile species such as the plains spadefoot toad, Woodhouse's toad, Texas horned lizard, lesser earless lizard, prairie lizard, ornate box turtle, glossy snake, coachwhip, and western rattlesnake are likely to occur in disturbed areas, especially in areas of more sparse vegetation.

5.4.10. State Wildlife Areas

There are eight state wildlife areas located within or near the Build Alternatives, including Rocky Ford, Oxbow, John Martin Reservoir, Mike Higbee, Granada, Midwestern Farms (interim site), Sisson (interim site), and Holly (CDOW 2003b). Each state wildlife area is briefly described below, and the locations are shown in the relevant figures presented in Appendix J, Figures.

The Rocky Ford State Wildlife Area is located in Otero County near the city of Rocky Ford. It consists of just over 1,000 acres; however, less than 20 of those acres are within the Build Alternatives. It offers hunting for deer, rabbit, Pheasant, Bobwhite Quail, Mourning Dove, and waterfowl. Also, the Arkansas River provides fishing (CDOW 2009).

The Oxbow State Wildlife Area is located on US 50 between Bent's Old Fort National Historic Site and the Otero-Bent county line. It occupies approximately 400 acres and is located directly adjacent to, not within, the Build Alternatives. It offers hunting for deer, Pheasant, waterfowl, Turkey, Bobwhite Quail, and Mourning Dove (CDOW 2009). Other recreation activities include hiking, wildlife observation, and photography.

The John Martin Reservoir State Wildlife Area is in Bent County between Las Animas and Lamar two miles south of Hasty. It is approximately 19,400 acres; however, only around 1,000 of these acres are within the Build Alternatives. Recreation activities include boating, sailing, water skiing, camping, hiking, wildlife observation, and photography. Visitors also enjoy hunting and fishing (CDOW 2009).

The Mike Higbee State Wildlife Area is located on US 50 in Prowers County west of Lamar. It occupies almost 900 acres, and over 800 of those acres are within the Build Alternatives. It offers hunting for deer, rabbit, squirrel, Pheasant, Bobwhite Quail, Scaled Quail, Mourning Dove, and waterfowl (CDOW 2009). Warm water fishing for sunfish and bullheads also is available on the property's pond (CDOW 2007a).

The Granada State Wildlife Area is located just east of Granada in Prowers County along the Arkansas River. It occupies approximately 5,500 acres, and just over 3,400 of those acres are within the Build Alternatives. Recreational activities include hunting for small game, waterfowl, and deer (CDOW 2009). Warm water fishing in the Arkansas River also is available (CDOW 2007a).

The Midwestern Farms State Wildlife Area is located between Granada and Holly in Prowers County along the Arkansas River. It occupies less than 100 acres directly adjacent (to the north) to the Granada State Wildlife Area. Of those acres, approximately half are within the Build Alternatives. This is a newly established state wildlife area operating under a short-term lease agreement between the CPW (the managing agency) and the landowner. Like the other state wildlife areas in the Build Alternatives, it is used primarily for hunting activities (Black 2009).

Sisson State Wildlife Area also is located between Granada and Holly in Prowers County along the Arkansas River. It occupies approximately 2,000 acres directly adjacent on the east to the Granada State Wildlife Area. Of those acres, approximately 100 are within the Build Alternatives. Like the Midwestern Farms State Wildlife Area, this is also a newly established state wildlife area operating under a short-term lease agreement between the CPW (the managing agency) and the landowner and is primarily used for hunting activities (Black 2009).

The Holly State Wildlife Area is located in Prowers County just northwest of the town of Holly. It consists of roughly 250 acres, and all of them are located within the Build Alternatives. It provides hunting opportunities for rabbit, Pheasant, Mourning Dove, and waterfowl (CDOW 2009).

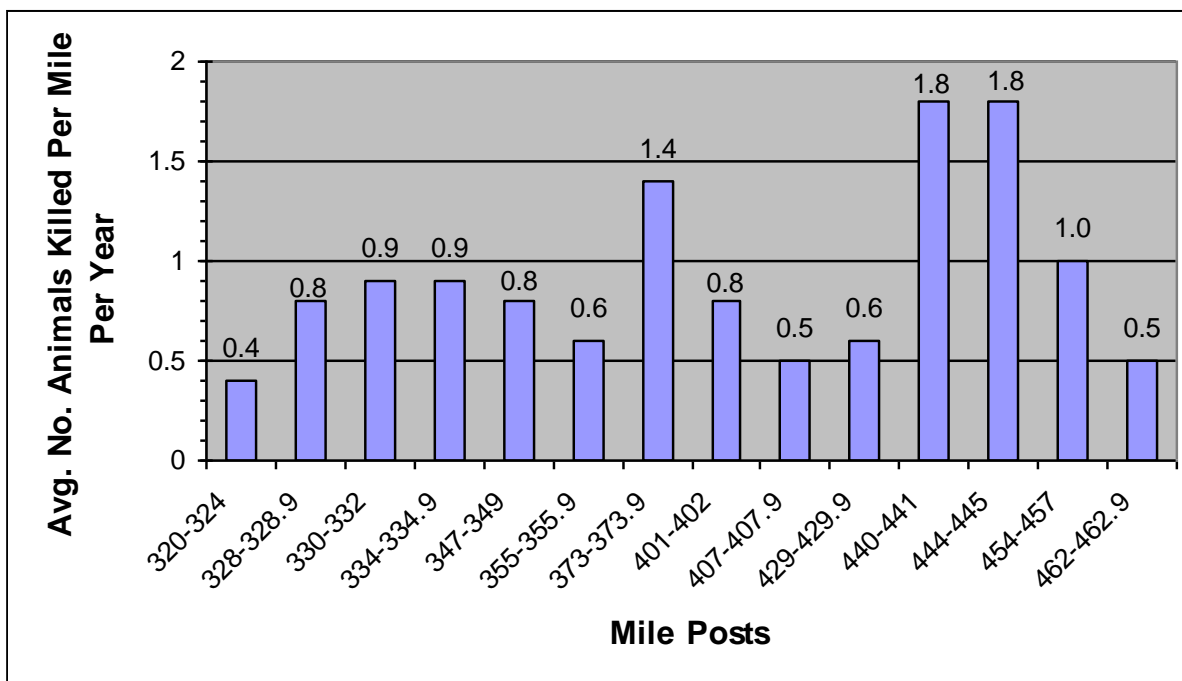
5.5. Wildlife Crossings

Wildlife occurrence and use patterns in the Build Alternatives are controlled primarily by vegetation, cover, and proximity to surface water. In general, areas with higher numbers of vehicle/animal collisions occur along drainages, streams, or riparian corridors. Data show that more than 400 animals (primarily deer) were reported killed or injured by vehicles driving on US 50 in the Build Alternatives from 1993 to 2006.

For the purposes of this report, the data were sorted to identify key animal crossings by mileposts during the past 10 years (1996 to 2006). This analysis identified the average number of roadkill per mile as defined by specific mileposts. These apparent relative concentrated wildlife mortality zones are listed below, and the average number of animals killed is shown in Figure 5-5.

- Milepost 330–332: an average of 0.9 animals killed per mile per year
- Milepost 334–334.9: an average of 0.9 animals killed per mile per year
- Milepost 373–373.9: an average of 1.4 animals killed per mile per year
- Milepost 440–441: an average of 1.8 animals killed per mile per year
- Milepost 444–445: an average of 1.8 animals killed per mile per year
- Milepost 454–457: an average of 1.0 animals killed per mile per year

Although evidence of animal movement under bridges, near railroads, through large culverts, or other cross-highway infrastructure has not been specifically noted, it is likely that local wildlife and domestic animals are voluntarily utilizing existing structures for safe passage across the highway.



Available data likely underrepresents the total number of animal-vehicle collisions in the project area.
 Source: CDOT 2007

Figure 5-5. Areas Along US 50 with the Highest Number of Animal Collisions Documented (1996 to 2006)

This analysis identified known wildlife crossings, as determined CPW, for the Build Alternatives. Information about these crossings is listed in Table 5-4 and shown on Figure J-13 through Figure J-16, located in Appendix J, Figures.

Wildlife crossing areas have been assigned a moderate (0.5 or less mortalities per mile per year), high (0.6 to 0.9 mortalities per mile per year), and very high (1.0 or more mortalities per mile per year) relative priority. High- and very high-priority areas are typically found in areas where US 50 crosses the Arkansas River, Huerfano River, Timpas Creek, where the Arkansas River or a State Wildlife Area borders the highway (e.g., north of the Mike Higbee State Wildlife Area), and at the intersection of the Arkansas River and the Granada State Wildlife Area. In most locations, high- and very high-priority areas consist of riparian woodland or shrubland habitat.

Table 5-4. Wildlife Crossings on US 50 in the Build Alternatives

Milepost(s) ^a	Description	Relative Priority ^b
320–324	Near the Pueblo Memorial Airport	Moderate
329	Between Pueblo and Fowler where US 50 crosses Chico Creek	High
330–332	Between Pueblo and Fowler where US 50 crosses the Arkansas River	High
334–336	Between Pueblo and Fowler where US 50 crosses the Huerfano River	High
347–349	Just west of Fowler where US 50 is adjacent to the Arkansas River and crosses the Oxford Farmer's Ditch	High
355	Between Fowler and Manzanola where US 50 crosses the Apishapa River	High
373–374	Just west of Swink where US 50 crosses Timpas Creek	Very high
401–402	Just east of Las Animas and northwest of the John Martin Reservoir and Ft. Lyon State Wildlife Areas	High
408	East of Las Animas near the John Martin Reservoir	Moderate
429–430	Just west of Lamar where US 50 is adjacent to the Vista Del Rio (irrigation) Ditch	High
440–442	Between Lamar and Granada where US 50 is directly adjacent to the Arkansas River, Lamar Canal, and Mike Higbee State Wildlife Area	Very high
442–444	Between Lamar and Granada where US 50 is directly adjacent to several drainages	High
444–445	Between Lamar and Granada where US 50 crosses the Manvel (irrigation) Canal	Very high
445–446	Between Lamar and Granada where US 50 is directly adjacent to the Manvel (irrigation) Canal	High
454–458	Between Granada and Holly where US 50 is directly adjacent to the X-Y (irrigation) Canal and Granada (irrigation) Ditch and crosses the Granada State Wildlife Area	Very high
462–463	Just west of Holly	Moderate

^aRounded to the nearest milepost

^bModerate = 0.5 or fewer animal mortalities per mile per year; high = 0.6 to 0.9 animal mortalities per mile per year; very high = 1.0 or more animal mortalities per mile per year

Sources: Black et al. 2007, Black 2009, CDOW 2003b, CDOW 2007a, CDOW 2009, McLean 2006

5.6. Wildlife Migration Routes

The project area occurs along a principal route of the central flyway, as previously described in Section 5.4, Terrestrial Wildlife. The central flyway is a key migration route for many bird species between breeding grounds in the north and wintering areas in the south.

5.7. Aquatic Resources

Major aquatic resources in the Build Alternatives include the Arkansas River, which parallels the project corridor, and the Huerfano River, which crosses the Build Alternatives. A more complete list of the aquatic resources in the Build Alternatives can be found in the Wetland and Riparian Technical Memorandum prepared as part of this US 50 Tier 1 EIS.

The majority of the streams within the project corridor support warm water fisheries. Warm water fisheries are defined as having a “summer water temperature of over 24 degrees Celsius” (Endicott 2007). However,

western portions of the Arkansas River and lower reaches of the Huerfano River are considered transitional between cold water and warm water fisheries (Nesler et al. 1999). Streams in this zone include the Purgatoire River, the Huerfano River, the St. Charles River, portions of the Arkansas River, and Fountain Creek (Nesler et al. 1999). Small plains streams that occur above elevations that are irrigated depend on rainfall, flood events, and springs to maintain fish populations. These creeks include Big Sandy Creek, Horse Creek, Timpas Creek, Buffalo Creek, and Cheyenne Creek (Nesler et al. 1999).

Generally, prairie streams have broad floodplains, low current velocities, and high turbidity. The floodplains typically are cultivated almost to the streambanks, with narrow bands of woody species along the active channels. Common or abundant fish species documented in the Build Alternatives are listed in Appendix H, Common or Abundant Fish Species Documented in the Project Area. These data were provided by the CPW and include sampled streams within or near the project corridor. The data are included in a comprehensive list of all species sampled from 1979 to 2005. Fishes typically found in streams were primarily warm water fishes and include palmetto bass (*Morone chrysops*), pumpkinseed (*Lepomis gibbosus*), river shiner (*Notropis blennius*), smallmouth bass (*Micropterus dolomieu*), channel catfish (*Ictalurus punctatus*), fathead minnow (*Pimephales promelas*), goldfish (*Carassius auratus*), and green sunfish (*Lepomis cyanellus*) (CDOW 2005).

Cold water transition species in the streams include flathead chub (*Platygobio gracilis*), longnose dace (*Rhinichthys osculus*), and white sucker (*Catostomus commersoni*). Native warm water transition species in the streams include the Arkansas darter (*Etheostoma cragini*) and the southern redbelly dace (*Phoxinus erythrogaster*). More common warm water fish species adapted to larger rivers include smallmouth bass, river shiner, pumpkinseed, fathead minnow, yellow perch (*Perca flavescens*), walleye (*Stizostedion vitreum*), palmetto bass, creek chub, black crappie (*Pomoxis nigromaculatus*), and common carp (*Cyprinus carpio*) (CDOW 2005). Trout (cold water)—primarily brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*)—are present in the larger streams, the Arkansas River, Granada Creek, Purgatoire River, Huerfano River, St. Charles River, and Apishapa River (CDOW 2005), though their specific occurrence in the Build Alternatives is likely to be incidental or rare. Information on special-status fish species is provided below and in Appendix G, Special-Status Species Potentially Occurring in the Project Area.

The Arkansas darter is listed as threatened in Colorado and is a candidate for protection under the Endangered Species Act. Several actions would greatly enhance the Arkansas darter's habitat, abundance, and distribution, including protection of riparian buffer corridors from overgrazing by livestock; protection of springs, pool refugia, and ground water levels from depletion; removal of introduced fish predators; and elimination of water pollution along occupied streams (CDOW 2007b, NDIS 2007). The Arkansas darter occurs in the Arkansas River and many of its tributaries, including Markham Arroyo (a.k.a. West May Valley Drainage Ditch), Buffalo Creek, Deadman Ditch, Cheyenne Creek, Horse Creek, Big Sandy Creek, the Buffalo Valley Ditch canal, Buffalo Creek, and Vista Del Rio ditch (adjacent to US 50) west of Lamar (Ramsay 2007). Most of these waterways are north of the Arkansas River and in the eastern end of the Build Alternatives (east of the John Martin Reservoir). The darter also occurs in Fountain Creek at the west end of the Build Alternative (CDOW 2006).

The flathead chub is a species of special concern that occurs in the Build Alternatives. These fish occur in the mainstem of the Arkansas River, as well as in many of the tributaries (Ramsay 2007). This species did not occur in the 2005 sampling data for the 16 streams listed in Appendix H, Common or Abundant Fish Species Documented in the Project Area. The flathead chub is unique to the Arkansas River Basin. Historic collection data (1875–1981) in Colorado shows this species to be well-distributed throughout the mainstem of the Arkansas River, with spot locations in Fountain and Timpas Creeks, and the St. Charles, Apishapa, and Purgatoire Rivers (Nesler et al. 1999). In more recent studies, the distribution of the chub was more limited and seems to have shifted to use of tributaries rather than the mainstems of several of the rivers. These recent studies (1993–1996) show the chub was collected in the Upper Arkansas River, Lake Meredith, and John Martin Reservoir reaches, and in the tributaries of Fountain Creek, and the Huerfano, Apishapa, and Purgatoire Rivers. This species is sparse below the John Martin Reservoir (Nesler et al. 1999).

The southern redbelly dace occurs at the western end of the project area. This native fish is limited in number and distribution and the potential threats to its habitat warrant the current state listing as endangered. This species prefers small, cool, clear streams or off-channel ponds with abundant vegetation and riparian shade. This habitat occurs infrequently in the Arkansas River basin in Colorado and limits the potential for recovery. For conservation purposes, the current range of this species is considered to be exclusively in the Upper Arkansas drainage and the Chico Creek drainage (Nesler et al. 1999).

The suckermouth minnow was designated as an endangered species in Colorado in 1998. Inventory results by Nesler et al. (1999) show this species to be one of the most uncommon of all native fish species collected in the Upper Arkansas, and other studies show decline in abundance. The suckermouth minnow occurs in the Arkansas River and its tributaries primarily below the John Martin Reservoir and is found near Rocky Ford (CDOW 2006). The suckermouth minnow inhabits clear, shallow-water riffle areas with sand and gravel substrate and year-round flows. Management efforts should be directed at expanding the distribution of suckermouth minnow in the waters upstream of the the John Martin Reservoir (Nesler et al 1999).

5.8. Special-Status Species

Special-status species include state and federally listed threatened and endangered species, as well as state listed species of concern. Threatened or endangered species are those listed or proposed for listing by the USFWS as threatened or endangered. Under Section 7 of the Endangered Species Act, as amended, activities conducted, sponsored, or funded by federal agencies must be reviewed for their effects on species federally listed or proposed for listing as threatened or endangered. A record of federally listed species that could occur in the project area was provided by the USFWS (2006 and 2015) and is included in Appendix C, U.S. Fish and Wildlife Service Letter Pertaining to Federally Listed Species. Rare and sensitive plant and animal species other than those listed under the Endangered Species Act are designated by the Colorado DNR. The U.S. Forest Service, the Bureau of Land Management, and the CNHP also designate sensitive species. Appendix G, Special-Status Species Potentially Occurring in the Project Area, provides a record of all the federal and state listed special-status species that potentially occur in the project area. Additionally, a record of all critically imperiled species potentially found in the project area, as defined by the CNHP, is included in Appendix I, Species Considered to be Critically Imperiled by the Colorado Natural Heritage Program Potentially Occurring in the Project Area.

6. Effects

The following sections discuss the potential of the No-Build Alternative and the Build Alternatives to affect biological resources.

6.1. No-Build Alternative

Under the No-Build Alternative, only minor and isolated construction would occur. Routine maintenance and repairs would be made as necessary to keep US 50 in usable condition, including standard overlays and repairs of weather- or crash-related damage. Additionally, smaller scale improvements may be undertaken, such as short passing lanes and other minor safety improvements.

Routine maintenance activities will likely continue to affect biological resources along the highway. Some examples of these activities are spraying for noxious weeds and mowing the areas directly adjacent to the highway (i.e., the CDOT right of way). Also, animal-vehicle collisions will continue to occur on the highway.

6.2. Build Alternatives

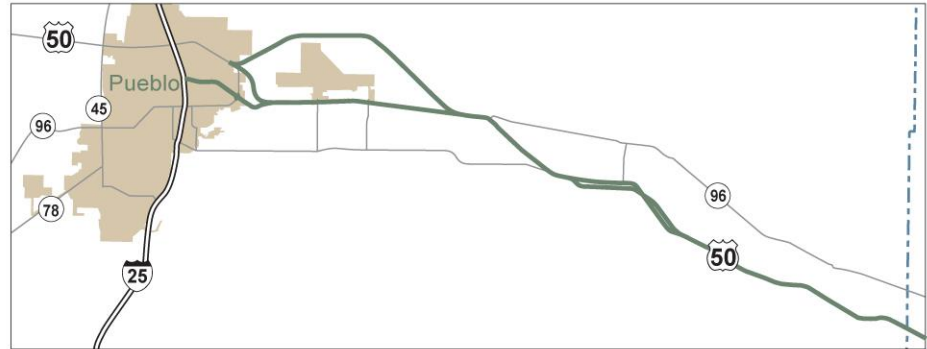
The Build Alternatives consist of constructing a four-lane expressway on or near the existing US 50 from I-25 in Pueblo, Colorado, to approximately one mile east of Holly, Colorado. There are a total of 30 Build Alternatives. In Pueblo, three Build Alternatives are proposed that either improve US 50 on its existing alignment and/or reroute it to the north to utilize SH 47. East of Pueblo, the remaining 27 Build Alternatives are divided into nine between-town alternatives and 18 around-town alternatives. The nine between-town alternatives improve US 50 on its current alignment, except near Fort Reynolds, where there is an alternative to realign the roadway to the south. The 18 around-town alternatives propose relocating US 50 from its current through-town route at Fowler, Manzanola, Rocky Ford, Swink, La Junta, Las Animas, Granada, and Holly. Figure 6-1 provides an overview of the Build Alternatives as proposed. Effects resulting from the Build Alternatives could occur as direct or indirect effects. These effects are discussed below.

Legend

-  Build Alternatives
-  Existing U.S. 50
-  City / Town
-  County



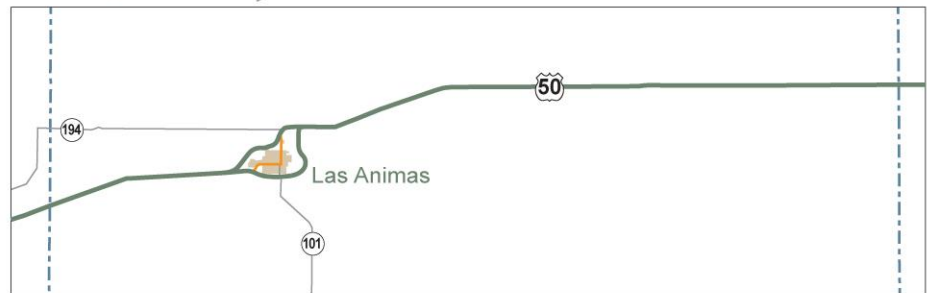
Pueblo County



Otero County



Bent County



Prowers County

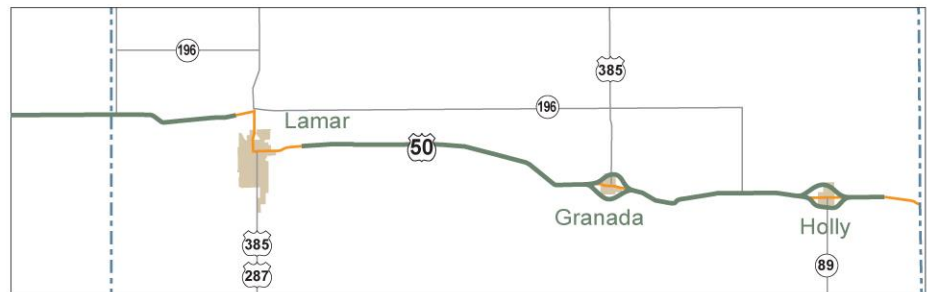


Figure 6-1. Build Alternatives Overview

6.2.1. Direct Effects

Direct effects are the result of the physical destruction or degradation of a resource. An example of a direct effect is the excavation and grading of grassland habitat during the construction of a road. Direct effects to biological resources by the Build Alternatives are discussed in terms of the overall effect of the Build Alternatives and effects by location.

Overall Effect of the Build Alternatives

Estimates of direct, permanent effects to land use/cover types (i.e., habitat) are provided in Table 6-1. These effects are important because they also would affect the species that are associated with these habitats.

Wildlife species' general habitat associations are described in Section 5.2, General Vegetation, of this report and are listed in Appendix F, Animals, Fish, and Plant Species Likely to Occur in the Project Area. Also, because the US 50 Tier 1 EIS only identifies a general location for the future US 50, not a specific alignment, the effects discussed by this analysis are estimates. Projected effects to biological resources will be refined during Tier 2 studies (when roadway alignments are identified).

Table 6-1. Summary of Direct, Permanent Effects to Land Use/Cover Types by Location (Acres)

Section	Build Alternatives(if more than one)	Land Use/ Cover Type (acres)					
		Agriculture	Grassland	Shrubland	Wetland/ Riparian	Other	Total
Section 1: Pueblo	Alternative 1: Pueblo Airport North	8	276	67	13	5	368
	Alternative 2: Pueblo Existing Alignment	45	64	5	60	137	310
	Alternative 3: Pueblo SH 47 Connection	45	88	20	48	90	291
Section 2: Pueblo to Fowler	Alternative 1: Fort Reynolds Existing Alignment	174	213	47	125	60	620
	Alternative 2: Fort Reynolds Realignment	221	190	54	112	39	616
Section 3: Fowler	Alternative 1: Fowler North	80	1	0	25	1	105
	Alternative 2: Fowler South	140	0	0	8	1	149
Section 4: Fowler to Manzanola	—	132	3	0	49	2	186
Section 5: Manzanola	Alternative 1: Manzanola North	64	0	0	5	9	78
	Alternative 2: Manzanola South	73	0	0	4	3	79
Section 6: Manzanola to Rocky Ford	—	156	1	1	1	4	164
Section 7: Rocky Ford	Alternative 1: Rocky Ford North	231	1	2	11	6	251
	Alternative 2: Rocky Ford South	207	16	7	12	6	248
Section 8: Rocky Ford to Swink	—	26	2	1	3	6	37
Section 9: Swink	Alternative 1: Swink North	58	0	0	6	9	72
	Alternative 2: Swink South	75	0	0	1	0	76

Section	Build Alternatives(if more than one)	Land Use/ Cover Type (acres)					
		Agriculture	Grassland	Shrubland	Wetland/ Riparian	Other	Total
Section 10: La Junta	Alternative 1: La Junta North	102	115	15	28	2	262
	Alternative 2: La Junta South	127	78	23	15	15	257
	Alternative 3: La Junta South	131	130	15	19	2	297
	Alternative 4: La Junta South	129	208	21	20	2	360
Section 11: La Junta to Las Animas	—	183	207	21	20	1	431
Section 12: Las Animas	Alternative 1: Las Animas North	59	0	2	40	4	105
	Alternative 2: Las Animas South	108	2	4	23	6	142
Section 13: Las Animas to Lamar	—	560	71	5	130	11	777
Section 14: Lamar to Granada	—	272	0	39	108	2	423
Section 15: Granada	Alternative 1: Granada North	59	2	1	5	0	67
	Alternative 2: Granada South	27	1	34	2	0	63
Section 16: Granada to Holly	—	155	13	33	55	4	259
Section 17: Holly	Alternative 1: Holly North	44	0	4	16	1	65
	Alternative 2: Holly South	43	0	3	20	0	66
Section 18: Holly Transition	—	73	12	3	22	1	110

Source: McLean 2006, SWReGAP 2006

Note: The sum of individual items may not equal totals due to rounding.

Maps showing these effects are located in Appendix J, Figures (the specific figure numbers for each location are provided in parentheses below).

- Pueblo (Figure J-17)
- Pueblo to Fowler (Figure J-18 and Figure J-19)
- Fowler (Figure J-20)
- Fowler to Manzanola (Figure J-21)
- Manzanola (Figure J-22)
- Manzanola to Rocky Ford (Figure J-23)
- Rocky Ford (Figure J-24)
- Rocky Ford to Swink (Figure J-25)
- La Junta (Figure J-26)
- La Junta to Las Animas (Figure J-27)
- Las Animas (Figure J-28)
- Las Animas to Lamar (Figure J-29 and Figure J-30)
- Lamar to Granada (Figure J-32)
- Granada (Figure J-34)

- Granada to Holly (Figure J-36)
- Holly (Figure J-38)
- Holly transition (Figure J-39)

Special-status species that could be affected by the Build Alternatives are listed below. This list includes all special-status species that could be affected, even those species that have not been observed in the Build Alternatives but may occur there due to existing habitat conditions.

- Birds—American Peregrine Falcon, Bald Eagle, Burrowing Owl, Ferruginous Hawk, Greater Sandhill Crane, Interior Least Tern, Lesser Prairie Chicken, Long-Billed Curlew, Mexican Spotted Owl, Mountain Plover, Piping Plover, Western Snowy Plover
- Mammals—Black-footed ferret, black-tailed prairie dog, Botta's pocket gopher, Canada lynx, swift fox, Townsend's big-eared bat
- Reptiles—common king snake, massasauga snake, Round-tailed horned lizard, Texas blind snake, Texas horned lizard, triploid checkered whiptail, yellow mud turtle
- Amphibians—Couch's spadefoot toad, Northern leopard frog, plains leopard frog
- Fishes—Arkansas darter, flathead chub, southern redbelly dace, suckermouth minnow

The entire project corridor is situated within the overall range of the swift fox. The fox is a resident of shortgrass prairie (i.e., grasslands), though it will utilize other habitat types interspersed with shortgrass prairie. Up to 20,900 acres of the swift fox's overall range could be affected by the Build Alternatives. How much of this range is ultimately affected (during Tier 2 studies) depends on what alternatives are chosen in Fowler, Swink, and La Junta. In addition, grassland effects would occur in the vicinity of towns or relatively close to the existing US 50. For these reasons, effects to the swift fox habitat by the Build Alternatives are expected to occur, but are expected to have a relatively minimal affect on the swift fox.

Direct effects to habitat that may occur also could affect migrating birds on the Central Flyway. This effect is anticipated to be relatively minimal because the Build Alternatives either follow the existing alignment of US 50 or is relatively close to developed areas. In general, alternatives that are closer to the Arkansas River would be expected to have a higher relative effect on migrating birds than alternatives that are farther from the river.

The Build Alternatives have the potential to positively and negatively affect the natural environment of the Lower Arkansas Valley due to its effect on noxious weeds. It could have positive effects by causing the removal of existing noxious weeds in the areas where the Build Alternatives would be constructed. However, Tier 2 construction activities could facilitate the delivery and spread of these harmful plants, as well. Construction activities create areas of bare ground and areas where the ground has been disturbed (i.e., where the native plant cover has been removed). These areas are perfect environments for noxious weeds. As their seeds are carried to these areas by wind or human activity, noxious weeds can easily establish themselves as the dominant plant species. Once established, they can outcompete native species (i.e., prevent them from taking root on those sites) or spread to nearby areas and degrade the native habitat found there.

Forteen species of noxious weeds were identified in the Build Alternatives. Since US 50 is the primary travel corridor through southeastern Colorado, it is likely that noxious weeds will use the activity on the highway (i.e., vehicles and humans) to spread to currently uncontaminated portions of the Build Alternatives in the future. During Tier 2 studies when specific roadway footprints are identified, a detailed analysis of existing noxious weeds along the highway should be obtained so that plans can be created to contain them as much as practical during Tier 2 studies (i.e., construction activities).

Effects to wildlife crossings are discussed below by location.

Effects by Location for the Build Alternatives

Biological resources could be affected differently by the Build Alternatives along its 150-mile length. Therefore, this section discusses effects by location (from west to east).

Section 1: Pueblo

There are three Build Alternatives within the Pueblo section of the project area. All three alternatives will affect the same eight Colorado listed special-status species: the black-tailed prairie dog and the species commonly associated with their colonies (i.e., Burrowing Owls, Ferruginous Hawks, and Mountain Plover), Botta's pocket gopher, swift fox, Townsend's big-eared bat, and plains leopard frog. No wildlife crossing impacts were identified in any of the three alternatives. Potential impacts to the specific habitats and noxious weeds found in each alternative are discussed below.

Alternative 1: Pueblo Airport North

Approximately 368 acres of habitat would be affected by the Build Alternative in this alternative. This acreage is comprised of 2 percent agricultural land, 75 percent grassland, 18 percent shrubland, 4 percent wetlands/riparian areas, and 1 percent other habitat types.

Eleven species of noxious weeds were identified within the current CDOT right of way for this alternative. The 11 species that have potential to occur in this section include Canada thistle, chicory, cutleaf teasel, field bindweed, Johnsongrass, musk thistle, puncturevine, prickly lettuce, Russian olive, salt cedar, and scotch thistle.

Alternative 2: Pueblo Existing Alignment

Approximately 310 acres of habitat would be affected by the Pueblo Existing Alignment Alternative. Habitat types affected include 14 percent agricultural land, 21 percent grassland, 2 percent shrubland, 19 percent wetlands/riparian areas, and 44 percent other habitat types. Effects are presented in Figure J-17, located in Appendix J, Figures.

Eleven species of noxious weeds were identified within the current CDOT right of way for this alternative. The 11 species that have potential to occur in this section include Canada thistle, chicory, cutleaf teasel, field bindweed, Johnsongrass, musk thistle, puncturevine, Russian knapweed, Russian olive, salt cedar, and scotch thistle.

The Build Alternative crosses several intermittent drainages in this area, but affects no standing water or other aquatic habitat. Approximately six acres of the Preble's meadow jumping mouse's overall range also would be affected.

Alternative 3: Pueblo SH 47 Connection

Approximately 291 acres of habitat would be affected by the Pueblo SH 47 Connection Alternative. Habitat types that have the potential to be affected include 15 percent agricultural land, 30 percent grassland, 7 percent shrubland, 17 percent wetlands/riparian areas, and 31 percent other habitat types.

Ten species of noxious weeds were identified within the current CDOT right of way for this alternative. The 10 species that have potential to occur in this area include Canada thistle, chicory, cutleaf teasel, field bindweed, Johnsongrass, musk thistle, puncturevine, Russian olive, salt cedar, and scotch thistle.

Section 2: Pueblo to Fowler

There are two alternatives within the Pueblo to Fowler section of the project area (see Figure J-18 in Appendix J, Figures). Both alternatives will have the potential to affect the same 17 special-status species, which include the Black-Tailed Prairie Dog and the species commonly associated with their colonies (i.e., Burrowing Owl, Ferruginous Hawk, and Mountain Plover), Botta's pocket gopher, swift fox, Townsend's big-eared bat, and plains leopard frog. In addition, potential impacts to three wildlife crossings were identified. These were three high-priority crossings found within both alternatives. These wildlife crossings are located between milepost 330 and milepost 332, milepost 334 and 336, and milepost 347 and milepost 349. Additionally, 11 species of noxious weeds were identified within the current CDOT right of way for both

alternatives, including Canada thistle, cutleaf teasel, field bindweed, Johnsongrass, musk thistle, perennial pepperweed, prickly lettuce, puncturevine, Russian knapweed, Russian olive, and salt cedar. Potential impacts to the specific habitats found in each alternative are discussed below.

Both alternatives cross the Arkansas and Huerfano rivers, Chico Creek, and several intermittent drainages. Also, just over one acre of standing water and other aquatic habitat would be affected. The southern redbelly dace (state endangered) and Arkansas darter (federal candidate species and state threatened) are known to occur in Chico Creek and potentially in nearby reaches of the Arkansas River. Though not documented in the Huerfano River, the southern redbelly dace also may occur there. The flathead chub has been documented in both the Arkansas and Huerfano rivers in the past, but is now found primarily in the tributaries to these rivers. For this reason, the alternative is not expected to affect it.

Alternative 1: Fort Reynolds Existing Alignment

Approximately 619 acres of habitat would be affected. This habitat is composed of 28 percent agricultural land, 34 percent grassland, 8 percent shrubland, 20 percent wetlands/riparian areas, and 10 percent other habitat types.

Alternative 2: Fort Reynolds Realignment

Approximately 616 acres of habitat would be affected. This habitat is composed of 36 percent agricultural land, 31 percent grassland, 9 percent shrubland, 18 percent wetlands/riparian areas, and 6 percent other habitat types.

Section 3: Fowler

There are two alternatives within the Fowler section (see Figure J-19 and Figure J-20 in Appendix J, Figures). Both alternatives have the potential to impact one wildlife crossing identified between milepost 347 and milepost 349. Seven species of noxious weeds were identified within the current CDOT right of way for both alternatives, including field bindweed, Johnsongrass, prickly lettuce, puncturevine, Russian knapweed, Russian olive, and salt cedar. Potential impacts to the specific habitats and special-status species found in each alternative are discussed below.

No black-tailed prairie dog colonies have been reported in either alternative. However, several other sensitive species may be affected. Though not specifically documented in the Build Alternative, based on the known distributions and preferred habitat types, adverse effects to the following sensitive species could occur in this area (all are state species of concern): plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew.

Alternative 1: Fowler North

The North Alternative comes close to the Arkansas River and would affect just under 105 acres of habitat, which is composed of 76 percent agricultural land, 1 percent grasslands, and 23 percent wetlands or riparian areas. This alternative also could affect up to seven special-status species, including the Greater Sandhill Crane, Long-Billed Curlew, swift fox, plains leopard frog, Bald Eagle, common king snake, and yellow mud turtle.

This alternative crosses perennial and intermittent drainages, as well as ditches and canals. No standing water bodies would be affected. Also, roughly three acres of Bald Eagle winter range and Great Blue Heron foraging area along the Arkansas River would be affected by the Fowler North Alternative.

Alternative 2: Fowler South

The South Alternative would affect approximately 149 acres of habitat, which is composed of 94 percent agricultural land, 5 percent wetlands/riparian areas, and less than 1 percent other types. It also could affect

up to four special-status species, including the Greater Sandhill Crane, Long-Billed Curlew, swift fox, and plains leopard frog.

The Fowler South Alternative would affect some waterways and drainages, the majority of which are classified as canals or ditches. In addition, no standing water or other aquatic habitat is expected to be affected. No Bald Eagle winter ranges or Great Blue Heron foraging areas would be affected either.

No effects are expected to the round-tailed horned lizard (*Phrynosomum modestum*), a state species of concern. In Colorado, the round-tailed horned lizard is known from one isolated population several kilometers south-southeast of Fowler.

Section 4: Fowler to Manzanola

Nearly 186 acres of habitat would be affected in the Fowler to Manzanola section (see Figure J-21 in Appendix J, Figures), which is comprised of 71 percent agricultural land, 2 percent grassland, 26 percent wetlands/riparian areas, and less than 1 percent other habitat types. This section of the Build Alternative also could affect up to seven special-status species, including the Greater Sandhill Crane, Long-Billed Curlew, swift fox, common king snake, yellow mud turtle, plains leopard frog, and southern redbelly dace. One high-priority wildlife crossing would be affected at milepost 355 in this alternative. Finally, seven species of noxious weeds were identified within the current CDOT right of way for both alternatives, including field bindweed, Johnsongrass, prickly lettuce, puncturevine, Russian knapweed, Russian olive, and salt cedar.

The Build Alternative in this area would cross the Apishapa River and several intermittent drainages, as well as ditches and canals, though no standing water or other aquatic habitat would be affected. The flathead chub (a species of special concern) has been documented in the Apishapa River in the past but more recently is found primarily in its tributaries. Therefore, no effect to this species is anticipated. Though currently undocumented, the southern redbelly dace also may occur in the Apishapa River (Ramsay 2007).

No black-tailed prairie dog colonies have been reported in this area. However, several other sensitive species may be affected. Though not specifically documented in the Build Alternative, based on the known distributions and preferred habitat types, adverse effects to the following sensitive species could occur in this area (all are state species of concern): plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, common king snake, and yellow mud turtle.

No effects are expected to the round-tailed horned lizard (*Phrynosomum modestum*), a state species of concern. In Colorado, the round-tailed horned lizard is known from one isolated population several kilometers south-southeast of Fowler.

A high-priority wildlife crossing at the Apishapa River occurs in this area. Because of this, wildlife mortality from vehicle collisions is expected to increase if left unmitigated.

Section 5: Manzanola

There are two alternatives in the Manzanola section of the project area. Neither alternative will affect any wildlife crossings. Both alternatives will have the potential to impact the same six special-status species, which include the Greater Sandhill Crane, Long-Billed Curlew, swift fox, common king snake, yellow mud turtle, and plains leopard frog. Potential impacts to the specific habitats and noxious weeds found in each alternative are discussed below.

Alternative 1: Manzanola North

There are 78 acres of habitat that could be affected in the Manzanola North Alternative, which consists of 83 percent agricultural land, 6 percent wetlands/riparian areas, and 11 percent other habitat types. These effects are presented in Figure J-22, located in Appendix J, Figures.

In addition, seven species of noxious weeds were identified within the current CDOT right of way for both alternatives, including field bindweed, Johnsongrass, prickly lettuce, puncturevine, Russian knapweed, Russian olive, and salt cedar.

Several intermittent canals and ditches would be affected in this area. However, no standing water or other aquatic habitat would be affected.

Alternative 2: Manzanola South

There are 80 acres of habitat that could be affected in the Manzanola South Alternative. These acres consist of 91 percent agricultural land, 5 percent wetlands/riparian areas, and 4 percent other habitat types. In addition, six species of noxious weeds were identified within the current CDOT right of way for both alternatives, so these have the potential to occur. These six species include field bindweed, Johnsongrass, prickly lettuce, puncturevine, Russian olive, and salt cedar.

Section 6: Manzanola to Rocky Ford

Approximately 164 acres of habitat would be affected in the Manzanola to Rocky Ford section, which is composed of 96 percent agricultural land, 1 percent grasslands, 1 percent wetlands/riparian areas, and 3 percent other habitat types. These effects are presented in Figure J-23, located in Appendix J, Figures.

Some limited effects to intermittent drainages are expected in this area, however, no standing water or other aquatic habitat would be affected.

No black-tailed prairie dog colonies have been reported in this area. However, several other sensitive species may be affected. Though not specifically documented in the Build Alternative, based on the known distributions and preferred habitat types, adverse effects to the following sensitive species could occur in this area (all are state species of concern): plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, common king snake, and yellow mud turtle.

No wildlife crossings are currently known to occur in this area.

Section 7: Rocky Ford

There are two alternatives within the Rocky Ford section of the project area. Neither alternatives will affect any wildlife crossings. However, both alternatives do have the potential to impact the same six special-status species, which include the Greater Sandhill Crane, Long-Billed Curlew, swift fox, common king snake, yellow mud turtle, and plains leopard frog. Potential impacts to the specific habitats and noxious weeds found in each alternative are discussed below.

Alternative 1: Rocky Ford North

The Rocky Ford North Alternative would directly affect approximately 251 acres of habitat, of which 92 percent is agricultural land, 1 percent is shrublands, 4 percent is wetlands/riparian areas, and 3 percent is other habitat types. These effects are presented in Figure J-24, located in Appendix J, Figures.

Six species of noxious weeds were identified within the current CDOT right of way for both alternatives, so these have the potential to occur. These six species include field bindweed, Johnsongrass, puncturevine, Russian knapweed, Russian olive, and salt cedar.

Intermittent canals and ditches would be affected in this area, however, no standing water or other aquatic habitat would be affected. The suckermouth minnow is known to occur in the Arkansas River in this area, although it is unlikely that the Build Alternative would cause adverse effect to it.

Alternative 2: Rocky Ford South

The Rocky Ford South Alternative could affect approximately 248 acres of habitat, of which 84 percent is agricultural land, 6 percent is grasslands, 3 percent is shrublands, 5 percent is wetlands/riparian areas, and 3 percent is other habitat types.

Seven species of noxious weeds were identified within the current CDOT right of way for both alternatives, including field bindweed, Johnsongrass, puncturevine, Russian knapweed, Russian olive, salt cedar, and scotch thistle.

Section 8: Rocky Ford to Swink

The Build Alternative between Rocky Ford and Swink would directly affect nearly 38 acres of habitat. The majority (69 percent) of this habitat is agricultural, with the remainder consisting of 4 percent grassland, 3 percent shrubland, 8 percent wetland/riparian resources, and 16 percent other habitat types. These effects are presented in Figure J-25, located in Appendix J, Figures.

The Build Alternative crosses Timpas Creek in this area, but it would not affect additional standing water or other aquatic habitat. The flathead chub is known to inhabit Timpas Creek in discrete segments or spot locations, but it is not expected to be affected. Though undocumented, there is potential for the southern redbelly dace to occur in Timpas Creek. Approximately four acres of Great Blue Heron foraging area also would be affected.

No black-tailed prairie dog colonies are known to occur within this area, but based on the known distributions and preferred habitat types, adverse effects to the following sensitive species could occur in this area (all are state species of concern): plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, common king snake, and yellow mud turtle.

Section 9: Swink

There are two alternatives within the Swink section of the project area. Neither alternative will affect any wildlife crossings, but both alternatives have the potential to impact the same six special-status species, which include the Greater Sandhill Crane, Long-Billed Curlew, swift fox, common king snake, yellow mud turtle, and plains leopard frog. In addition, six species of noxious weeds were identified within the current CDOT ROW for both alternatives, so these have the potential to occur. These species include field bindweed, Johnsongrass, puncturevine, Russian olive, salt cedar, and scotch thistle. Potential impacts to the specific habitats found in each alternative are discussed below.

Alternative 1: Swink North

Alternative 1 is roughly 2.4 miles long and would go north around the town. Under this alternative, approximately 73 acres of habitat, which is composed of 80 percent agricultural land, 9 percent wetlands/riparian areas, and 12 percent other habitat types. These effects are presented in Figure J-25, located in Appendix J, Figures.

Alternative 1 would affect intermittent streams, canals, and ditches, and would affect approximately 0.1 acre of standing water or other aquatic habitat. Roughly one acre of Great Blue Heron foraging area would be adversely affected in this area.

Alternative 2: Swink South

Alternative 2 would go south around the town. Under this alternative, roughly 76 acres of habitat could be impacted, which is comprised of 98 percent agricultural land and 2 percent wetlands/riparian areas. These effects are presented in Figure J-25, located in Appendix J, Figures.

No effects to standing water habitat are expected under the Swink south alternative, but some effect to Timpas Creek and some canals and ditches may occur. No effects to the flathead chub or southern redbelly dace are expected, but approximately four acres of Great Blue Heron foraging habitat would be affected.

Section 10: La Junta

There are four alternatives to consider in the La Junta Section of the project area. One alternative is to the north of La Junta, while the other three are to the south. None of the four alternatives will affect any wildlife crossings, but all have the potential to impact the same 15 special-status species, including the Greater Sandhill Crane, Long-Billed Curlew, black-tailed prairie dog, Burrowing Owl, Ferruginous Hawk, Mountain Plover, swift fox, Townsend's big-eared bat, common king snake, massasauga snake, Texas horned lizard, triploid checkered whiptail, yellow mud turtle, Couch's spadefoot toad, and plains leopard frog. Potential impacts to the specific habitats and noxious weeds found in each alternative are discussed below.

Alternative 1: La Junta North

The La Junta North Alternative could affect nearly 262 acres of habitat, which is composed of 39 percent agricultural land, 44 percent grassland, 6 percent shrubland, 11 percent wetlands/riparian areas, and 1 percent other habitat types.

Alternative 1 would affect intermittent streams, canals, and ditches, and would affect approximately 0.1 acre of standing water or other aquatic habitat. Six species of noxious weeds were identified within the current CDOT ROW for this alternative, so they have the potential to occur. These six species include field bindweed, Johnsongrass, puncturevine, Russian knapweed, salt cedar, and scotch thistle.

Alternative 2: La Junta South

Alternative 2 would go south around the city. Total direct effect to land use/cover types would be approximately 257 acres of habitat composed of 49 percent agricultural land, 30 percent grassland, 9 percent shrubland, 6 percent wetlands/riparian areas, and 6 percent other habitat types. These effects are presented in Figure J-26, located in Appendix J, Figures.

For this alternative, five species of noxious weeds were identified within the current CDOT right of way, including field bindweed, Johnsongrass, puncturevine, salt cedar, and scotch thistle.

Alternative 2 affects streams, canals, and ditches, although these affects are the fewest of the four La Junta alternatives. Approximately 0.1 acre of effect would occur to standing water or other aquatic habitat.

Alternative 2 would decrease the overall range of the Texas horned lizard and massasauga snake by approximately 90 acres each. These effects are both less than Alternative 3.

Alternative 3: La Junta South

Alternative 3 also would go south around the city. However, this alternative is located farther south than Alternative 2: La Junta South 1. Direct effects to land use/cover types under Alternative 3: Alternative 2 would be approximately 297 acres of habitat that is composed of 44 percent agricultural land, 44 percent grassland, 5 percent shrubland, 6 percent wetlands/riparian areas, and 1 percent other habitat types. These effects are presented in Figure J-26, located in Appendix J, Figures.

The same five species of noxious weeds that were identified in the Alternative 2 also are present in Alternative 3.

Effects to streams, canals, and ditches under Alternative 3 would be greater than Alternative 1. In addition, approximately 0.6 acre of effect would occur to standing water or other aquatic habitat, which would be less than Alternative 1 or 2.

Based on the 2000 black-tailed prairie dog mapping, roughly 20 acres of effect would occur to their colonies under this alternative. However, it is likely that the spatial configuration, burrow density, and other attributes have changed substantially since that time. This alternative presents the most effects from the four La Junta alternatives. Due to the likely occurrence of black-tailed prairie dogs in this area, associated sensitive species also may occur and could be adversely affected.

Under this alternative, an estimated decrease of the massasauga snake's overall range by approximately 140 acres and a decrease of roughly 120 acres of the Texas horned lizard's overall range would occur. This is more than Alternative 2.

Alternative 4: La Junta South

Alternative 4 also would go south around the city. However, this alternative is located farther south than both Alternative 2 and Alternative 3. Alternative 4 would affect nearly 360 acres of habitat, which is made up of 36 percent agricultural land, 58 percent grassland, 3 percent shrubland, and 3 percent wetlands/riparian areas.

The same five species of noxious weeds that were identified in the La Junta South 1 Alternative also are present in Alternative 4.

Effects to non-wetland flowing bodies of water are highest as a result of Alternative 4 compared to the other La Junta sections. Alternative 4 also results in more direct effects to standing water or other aquatic habitat with 1.2 acres potentially affected.

Section 11: La Junta to Las Animas

The Build Alternative could affect 431 acres of habitat in this section of the corridor, which is composed of 43 percent agricultural land, 48 percent grassland, 5 percent shrubland, and 4 percent wetlands/riparian areas. These impacts are presented in Figure J-27, located in Appendix J, Figures.

Seven species of noxious weeds were identified within the current CDOT right of way, including field bindweed, Johnsongrass, puncturevine, Russian knapweed, Russian olive, salt cedar, and scotch thistle.

The Build Alternative in this area would affect numerous intermittent drainages and canals and ditches. No standing water or other aquatic habitat would be affected by this section.

Black-tailed prairie dog mapping completed in 2000 suggests that the Build Alternative in this area could affect approximately 20 acres of black-tailed prairie dog colonies. However, it is likely the spatial configuration, burrow density, and other attributes have changed substantially since that time. Due to the likely occurrence of black-tailed prairie dogs in this area, associated sensitive species also may occur and be adversely affected.

Based on available mapping, the massasauga snake's overall range would decrease by approximately 330 acres due to the Build Alternative in this area. Adverse effects to the following sensitive species also could occur in this area (all are state species of concern): Couch's spadefoot toad, plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, Townsend's big eared bat, common king snake, Texas horned lizard, triploid checkered whiptail, and yellow mud turtle.

No wildlife crossings are currently known to occur in this area.

Section 12: Las Animas

Two alternatives have been identified within the Las Animas section of the project area. Neither alternative will affect any wildlife crossings, but both alternatives have the potential to impact the same 13 special-status species, including the Bald Eagle, Greater Sandhill Crane, Long-Billed Curlew, Western Snowy Plover, swift fox, Townsend's big-eared bat, common king snake, Texas horned lizard, yellow mud turtle, Couch's

spadefoot toad, plains leopard frog, Arkansas darter, and flathead chub. Potential impacts to the specific habitats and noxious weeds found in each alternative are discussed below.

Alternative 1: Las Animas North

Alternative 1 could directly affect roughly 105 acres of habitat, of which 56 percent is agricultural land, 2 percent is shrubland, 38 percent is wetlands/riparian areas, and 4 percent is other habitat types. These effects are presented in Figure J-28, located in Appendix J, Figures.

Four species of noxious weeds were identified within the current CDOT right of way for this alternative, so these will have the potential to occur. These four species include field bindweed, Johnsongrass, Russian olive, and salt cedar.

The Build Alternative in this area would affect the Arkansas River and several intermittent streams, canals, and ditches. It also would affect approximately 1.2 acres of standing water and other aquatic habitat. Due to the crossing of the Arkansas River, special-status fish species, such as the Arkansas darter and flathead chub, would be adversely affected. In addition, the downstream proximity of the Interior Least Tern (federally endangered) and Piping Plover (federally threatened) nesting habitat found on the shores of the nearby John Martin Reservoir should be examined in more detail during Tier 2 studies for possible effects. The Build Alternative in this area also would affect nearly 80 acres of Bald Eagle winter range and five acres of Great Blue Heron foraging habitat.

Alternative 2: Las Animas South

Alternative 2 would affect approximately 142 acres, of which 76 percent is agricultural land, 1 percent is grasslands, 3 percent is shrubland, 16 percent is wetlands/riparian areas, and 4 percent is other habitat types.

Five species of noxious weeds were identified within the current CDOT ROW for this alternative, including field bindweed, Johnsongrass, Russian knapweed, Russian olive, and salt cedar.

Section 13: Las Animas to Lamar

The Build Alternative in this section would affect approximately 777 acres of habitat. This acreage is composed of 72 percent agricultural land, 9 percent grassland, 1 percent shrubland, 17 percent wetlands/riparian areas, and 1 percent other habitat types. These effects are presented in Figure J-29 and Figure J-30, located in Appendix J, Figures.

Eight species of noxious weeds were identified within the current CDOT right of way and, therefore, have the potential to occur. These species include field bindweed, hoary cress, Johnsongrass, prickly lettuce, puncturevine, Russian knapweed, Russian olive, and salt cedar.

A substantial number of perennial and intermittent streams, canals, and ditches would be traversed by the Build Alternative in this area. Effects to standing water and other aquatic habitat would be relatively low (approximately 1.4 acres), considering its length. The Build Alternative also would cross the John Martin Reservoir State Wildlife Area. However, US 50 already crosses this reservoir at its existing location, therefore, effects to habitat within the state wildlife area are expected to be minimal.

Several sensitive species in this area would be affected and are listed below.

- Less than one acre of the Least Tern (endangered) and the Piping Plover (threatened) production and foraging habitat would be affected. However, since this area is located at the northern edge of mapped habitat for these species, the effect is likely to be negligible.
- Roughly 30 acres of the half-mile buffer surrounding a Bald Eagle winter roost site east of Hasty would also be affected. Additionally, six acres of Bald Eagle winter concentration habitat and approximately

150 acres of Bald Eagle winter range would be affected. These effects are presented in Figure J-31, located in Appendix J, Figures.

- Approximately 20 acres of Great Blue Heron foraging habitat would be affected.
- The overall range of the massasauga snake and Texas horned lizard would be reduced by approximately 130 acres and 460 acres, respectively.
- Approximately three acres of American White Pelican overall range and foraging area would be affected.
- Other sensitive species that could be affected in this area include the following (all are state species of concern): Couch's spadefoot toad, plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, Western Snowy Plover, common king snake, and yellow mud turtle.

Using the 2000 black-tailed prairie dog mapping that is available, effects to black-tailed prairie dog habitat in this area is estimated to be approximately two acres. Because black-tailed prairie dog colonies would be affected, sensitive species generally found in the same area—such as the Burrowing Owl, Ferruginous Hawk, and Mountain Plover—also could occur and be adversely affected.

Two wildlife crossings are known to occur within this area. The western-most crossing occurs near Las Animas and has a high-priority rating. The second crossing occurs at Gageby Creek and has a rating of moderate priority. Because of these crossings, the Build Alternative in this area would likely increase animal-vehicle collisions and wildlife mortality if left unmitigated.

Section 14: Lamar to Granada

The Build Alternative would affect approximately 422 acres of habitat. This acreage consists of 64 percent agricultural land, 9 percent shrubland, 26 percent wetlands/riparian areas and 1 percent other habitat types. These effects are presented in Figure J-32, located in Appendix J, Figures.

Six species of noxious weeds were identified within the current CDOT right of way and, therefore, have the potential to occur. These include field bindweed, Johnsongrass, prickly lettuce, puncturevine, Russian olive, and salt cedar.

No standing water or other aquatic habitat would be affected in this area, but several perennial and intermittent drainages, canals, and ditches would be affected. Effects to the Arkansas darter and the suckermouth minnow, which may inhabit the Arkansas River in this area, are not expected. The Mike Higbee State Wildlife Area is located adjacent to US 50 and would be affected if the Build Alternative is constructed. Based on black-tailed prairie dog colony mapping completed in 2000, no effects to this species are anticipated.

Effects to sand sage habitat (i.e., shrublands) could affect the Lesser Prairie Chicken (federally threatened species), although specific use of shrub habitat is not documented within this area. Several sensitive species in this area would be affected and are listed below.

- Roughly 30 acres of the half-mile buffer surrounding a Bald Eagle nest would be affected. These effects are presented in Figure J-33, located in Appendix J, Figures.
- Approximately 50 acres of the overall range of the massasauga snake and Texas horned lizard would be affected.
- Approximately two acres of Great Blue Heron foraging habitat would be affected.
- Black Rails are known to inhabit cattail marshes adjacent to US 50 at the Mike Higbee State Wildlife Area and would be affected.
- Other sensitive species that could be affected in this area include (all are state species of concern): Couch's spadefoot toad, plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, common king snake, and yellow mud turtle.

Two wildlife crossings exist in this area near the Mike Higbee State Wildlife Area. One is a very-high priority crossing and the other is a high-priority crossing. Wildlife mortality at these locations is already problematic, and increases in traffic volumes will exacerbate this problem if left unmitigated.

Section 15: Granada

Two alternatives exist within the Granada section of the project area for the Build Alternative. Both alternatives will have the potential to impact the same 10 special-status species, which include the Greater Sandhill Crane, Lesser Prairie Chicken, Long-Billed Curlew, swift fox, common king snake, massasauga snake, Texas horned lizard, yellow mud turtle, Couch's spadefoot toad, and plains leopard frog. Both alternatives also have the potential to affect one very-high priority wildlife crossing located between milepost 454 and milepost 458. In addition, six species of noxious weeds were identified within the current CDOT right of way for both alternatives, including field bindweed, Johnsongrass, prickly lettuce, puncturevine, Russian olive, and salt cedar. Potential impacts to the specific habitats found in each alternative are discussed below.

Alternative 1: Granada North

Alternative 1 would affect approximately 67 acres of habitat, which is composed of 88 percent agricultural land, 3 percent grassland, 1 percent shrubland, 7 percent wetlands/riparian areas, and 1 percent other habitat types.

Alternative 2: Granada South

Alternative 2 would affect roughly 63 acres of habitat, which is composed of 42 percent agricultural land, 2 percent grassland, 53 percent shrubland, and 3 percent wetlands/riparian areas. These effects are presented in Figure J-34, located in Appendix J, Figures.

No standing water or other aquatic habitat would be affected in this area, but several intermittent canals and ditches would be affected. Based on 2000 mapping of black-tailed prairie dog colonies, no effects to this species are anticipated in this area.

Effects to sand sage habitat (i.e., shrublands) also would affect the Lesser Prairie Chicken (federally threatened species). Roughly 50 acres of Lesser Prairie Chicken production area and 130 acres of their overall range would be affected by the Build Alternative at Granada and between Granada and Holly (combined). These effects are presented in Figure J-35 and Figure J-37, located in Appendix J, Figures.

Approximately 30 acres of the overall range of the massasauga snake and Texas horned lizard would be affected in this area. Other sensitive species that are undocumented in the Build Alternative, but could be affected in this area, include the following (all are state species of concern): Couch's spadefoot toad, plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, common king snake, and yellow mud turtle

Section 16: Granada to Holly

The Build Alternative between Granada and Holly is more than 8.6 miles long and would follow the existing US 50 alignment. It would directly affect roughly 259 acres of habitat. This habitat is composed of 60 percent agricultural land, 5 percent grassland, 13 percent shrubland, 21 percent wetlands/riparian areas, and 1 percent other habitat types. These effects are presented in Figure J-36, located in Appendix J, Figures.

Six species of noxious weeds were identified within the current CDOT ROW, including field bindweed, hoary cress, Johnsongrass, puncturevine, Russian olive, and salt cedar.

The Granada State Wildlife Area is located on both sides (north and south) of the Build Alternative in this area, and, therefore, would be affected. Effects to waterways—primarily intermittent canals and ditches—would be larger than in any other segment of the Build Alternative. Additionally, less than one acre of standing water and other aquatic habitat would be affected. The Build Alternative crosses the Arkansas River in this area, and the Arkansas darter and suckermouth minnows are known to exist in the river at this location. The Arkansas darter also is known to exist in a canal located adjacent to US 50 in this area; therefore, it could be affected within the canal, as well.

Several sensitive species in this area would be affected and are listed below.

- Approximately 50 acres of Lesser Prairie Chicken production area and 130 acres of their overall range would be affected by the Build Alternative at Granada and between Granada and Holly (combined). These effects are presented in Figure J-35 and Figure J-37, located in Appendix J, Figures.
- Five acres of Bald Eagle winter range and Great Blue Heron foraging area also would be affected.
- Less than one acre of the overall range of the massasauga snake and Texas horned lizard would be affected.
- Other sensitive species that are currently undocumented in the Build Alternative, but could be affected in this area, include (all are state species of concern): Couch's spadefoot toad, plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, common king snake, and yellow mud turtle.

Two wildlife crossings occur in this area. One is a very-high priority crossing, and one is a moderate-priority crossing. Though current traffic volumes are relatively low on US 50 in this area, they already pose a barrier to wildlife attempting to cross the highway. The projected increases in traffic volumes will only exacerbate this issue if mitigation is not implemented.

Section 17: Holly

There are two alternatives within the Holly section of the project area for the Build Alternative. Both alternatives will have the potential to impact the same nine special-status species, which include the Bald Eagle, Greater Sandhill Crane, Long-Billed Curlew, swift fox, common king snake, yellow mud turtle, Couch's spadefoot toad, plains leopard frog, and the Arkansas darter. Both alternatives also have the potential to affect one moderate-priority wildlife crossing located between milepost 462 and milepost 463. In addition, six species of noxious weeds were identified within the current CDOT ROW for both alternatives, and, therefore, these have the potential to occur. These include field bindweed, hoary cress, Johnsongrass, puncturevine, prickly lettuce, and salt cedar. Potential impacts to the specific habitats found in each alternative are discussed below.

Alternative 1: Holly North

The Holly North Alternative would affect nearly 65 acres of habitat, of which 67 percent is agricultural land, 7 percent is shrubland, 25 percent is wetlands/riparian areas, and 1 percent represents other habitat types.

Alternative 2: Holly South

The Holly South Alternative impacts nearly 66 acres of habitat, of which 66 percent is agricultural land, 4 percent is shrubland, and 30 percent is wetlands/riparian areas. These effects are presented in Figure J-38, located in Appendix J, Figures.

In this area, a minimal amount of effect is projected for the intermittent ditches, and approximately 0.2 acre of effect to standing water or other aquatic habitat are projected. No effects to black-tailed prairie dog colonies are anticipated in this area. However, the Arkansas darter is known to inhabit Wild Horse Creek. The Build Alternative crosses this creek in this area. The Holly State Wildlife Area follows Wild Horse Creek and could also be affected. A minimal (less than one acre) amount of Bald Eagle winter range and Great Blue Heron foraging habitat also would be affected.

Section 18: Holly Transition

In this location, the Build Alternative would affect approximately 110 acres of habitat. This acreage is composed of 66 percent agricultural land, 10 percent grassland, 3 percent shrubland, 20 percent wetlands/riparian areas, and 1 percent other habitat types. These effects are presented in Figure J-39, located in Appendix J, Figures.

Five species of noxious weeds were identified within the current CDOT ROW, so these have the potential to occur. These include field bindweed, hoary cress, Johnsongrass, puncturevine, and salt cedar.

Approximately 2.8 acres of standing water or other aquatic habitat are anticipated to be affected in this area. Effects to intermittent waterways would also occur. The Arkansas darter is known to occur in Cheyenne Creek near the Kansas border, and it could occur in other waterways in this area. Therefore, it could be affected.

Based on available black-tailed prairie dog colony mapping, four acres of these colonies would be affected. Consequently, sensitive species associated with these colonies also could occur within the area and be adversely affected. Approximately eight acres of Great Blue Heron foraging habitat would be affected. Sensitive species (all are state species of concern) that are undocumented in the Build Alternative but could be affected include: Couch's spadefoot toad, plains leopard frog, Greater Sandhill Crane, Long-Billed Curlew, common king snake, and yellow mud turtle.

No wildlife crossings are currently known to occur in this area.

6.2.2. Indirect Effects

Indirect effects occur away from the project site in time, space, or both. An example of an indirect effect is road sand that is applied to a roadway in winter and that may be carried in snowmelt runoff into a nearby stream where the excess sediment fills aquatic habitat. Another example of an indirect effect is the introduction and establishment of noxious weeds in newly disturbed soils. The noxious weeds become established and begin to out-compete native plant species, which then leads to reduced forage availability for livestock and various wildlife species. This can result in avoidance or reduction in use by wildlife species.

At this Tier 1 level of analysis, indirect effects to biological resources by the Build Alternatives cannot be determined. This is because such an evaluation depends on the specific location of the roadway footprint (i.e., alignment), and that will not be determined until Tier 2 studies. Potential indirect effects to biological resources include the following:

- Habitat fragmentation and wildlife mortality—Habitat fragmentation can be defined as the separation of previously contiguous blocks of habitat into one or more disconnected pieces (Waller and Servheen 1999). It can occur in the physical sense of dividing up the landscape (i.e., by a road), or through an increase in the level of activity (i.e., increase in traffic volumes), both of which prevent or at least hinder wildlife movement. Either form can result in impediments to wildlife dispersal and corresponding genetic exchange among populations. Several factors contribute to existing habitat fragmentation issues in the Build Alternatives, including US 50, the railroad, agricultural activities, and residential development.
- Increased noise levels—Increased noise levels (i.e., from traffic on US 50) could cause resident animal species in adjacent habitats to relocate. This effect generally lasts until resident wildlife leave or become habituated to the changes. In general, traffic levels on US 50 are anticipated to increase through 2040; therefore, noise levels from that traffic would increase as well. Additionally, this type of indirect effect would be more pronounced in areas where the new around-town routes are constructed, because traffic noise generally does not exist there today. It is unclear at this time if increases in noise levels would affect migrating birds.
- Introduction and spread of noxious weeds—Seeds and plant parts of noxious weeds and other invasive plant species can be carried into Build Alternatives on vehicles or construction equipment, existing weed seeds can be spread during construction, or the wind can deliver weed seeds to newly disturbed soils. These different ways for weed seeds to be spread in construction areas facilitate both the establishment and spread of noxious weeds in an area. Once established, they can spread into nearby undisturbed areas and, without intervention, will slowly degrade habitat quality for various wildlife species, resulting in a shift in plant and animal species composition found in a particular area. The most common noxious weed species identified in the Build Alternatives are field bindweed and salt cedar.

7. Mitigation Strategies

The US 50 Tier 1 EIS has developed a Natural Resources Mitigation Strategies Plan. This plan is intended to guide mitigation activities for natural resource impacts that occur during Tier 2 studies, primarily impacts to wildlife and their habitat. The Natural Resources Mitigation Strategies Plan has been included as an appendix to the US 50 Tier 1 EIS. All applicable laws and regulations will be followed, and mitigation measures would be applied as needed to offset identified impacts during Tier 2 studies.

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Appendices

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Appendix A. Resource Methodology Overview for Biological Resources

This resource methodology overview is included with this technical memorandum for reference only. The lead agencies for the US 50 Tier 1 EIS (CDOT and FHWA) drafted resource methodology overviews to identify and document which resource evaluation activities would be completed during the Tier 1 EIS, and which would be completed during Tier 2 studies. These overviews were intended to be guidelines to ensure that the Tier 1 EIS remained a broad-based analysis, while clarifying (to the public and resource agencies) when particular data and decisions would be addressed in the tiered process. These overviews were approved by the lead agencies, and they were agreed upon by the resource agencies during the project’s scoping process. They were subsequently used by the project’s resource specialists as guidelines to ensure that their activities were relevant to the Tier 1 (i.e., corridor location) decision.

Table A-1. Resource Methodology Overview for Biological Resources

Methodology Overview	Biological Resources	
	Tier 1	Tier 2
Relevant Data/ Information Sources	<ul style="list-style-type: none"> • Lists of special-status species and lands obtained from USFWS and CPW • Habitat land cover mapping from the Natural Diversity Information Source (NDIS) • Colorado Natural Heritage Program (CNHP) data • Existing biological assessments and reports for projects in the region and study area (USFWS and CPW will be contacted for these studies) • Conversations with local CPW and USFWS biologists familiar with the study area to determine protected species involvement and large mammal linkages • Coordination with Southern Rockies Ecosystem Project, local and state birding groups, and USFWS (USFWS coordination includes how the Shortgrass Prairie Initiative would or would not apply) and NGOs, as appropriate • CDOT wildlife/vehicle collision data for study area • CDOT Noxious Weeds Database • Other appropriate data sources 	<p>Review and update Tier 1 data search and collect additional data required to complete the appropriate Tier 2 analysis.</p>

Methodology Overview	Biological Resources	
	Tier 1	Tier 2
Collection and/or Analysis Methodology	<ul style="list-style-type: none"> Vegetation will be mapped for the study area using the GIS overlay methodology outlined for the other resources. This vegetation mapping will be used to identify vegetation communities occurring in the study area. These communities determine the diversity of wildlife species occurring in the study area, including special-status species. Based on the vegetation communities present in the study area, the federal and state lists of species of special concern will be reviewed for the likely presence of these species in the study area. Existing data and sources will be used to identify broad wildlife movement corridors. A windshield survey will be conducted within the study area to verify the accuracy of the habitat and land cover mapping data. Factors that could cause a potential for jeopardy will be identified for plant and wildlife species. 	<ul style="list-style-type: none"> Update Tier 1 analysis sufficient for standard NEPA documentation. When required, conduct presence/absence surveys. Depending on the finding in Tier 1, if it is determined that the project may impact federally threatened or endangered species, the USFWS may require that a biological assessment be prepared for the project.
Project Area	One to four miles wide surrounding the existing US 50 facility beginning at I-25 in Pueblo to the Colorado-Kansas state line	Tier 2 specific sections of independent utility corridor boundaries
Impacts	Impacts on vegetation and wildlife habitat and protected species will be determined through a GIS overlay process.	<ul style="list-style-type: none"> Determine impacts to wildlife and special-status species (if present). Initiate formal Section 7 Consultation for any federally protected species.
Mitigation Options	Potential mitigation may include: <ul style="list-style-type: none"> Banking for multiple resource benefits, including wetland, riparian, water quality, and habitat, ensuring that these sites address resource agency goals and issues Tier 2 or pre-construction strategies to avoid potential jeopardy calls If identified as occurring in the study area, surveys (when required by USFWS or CPW) for specific species will be identified for Tier 2 or pre-construction 	<ul style="list-style-type: none"> Implement mitigation commitments outlined in the Biological Opinion. Implement mitigation commitments for large mammal crossings and/or migratory birds.

Methodology Overview	Biological Resources	
	Tier 1	Tier 2
Deliverables	<p>Biological Resource Technical Memorandum for vegetation and wildlife will include a list of protected species potentially occurring in the study area and habitat requirements for each species, mapping of habitat, general roadway corridor strategies for habitat preservation, and corridor permeability. The Memorandum will form the basis for a need to prepare a Biological Assessment in Tier 2 for any federally protected species that may be affected by a proposed action.</p>	<p>Update Tier 1 reports for specific sections of independent utility as needed, including Biological Evaluation and Assessment Report with steps to comply with identified strategies as appropriate for Tier 2 sections of independent utility level of NEPA documentation.</p>
Regulatory Guidance/ Requirements	<ul style="list-style-type: none"> • Endangered Species Act (16 USC 1531-1543) • Interagency Cooperation—Endangered Species Act (50 CFR 40) • Colorado Noxious Weed Act (CRS 35-5-101) • Integrated Noxious Weed Management Plan, CDOT 2000 • Migratory Bird Treaty Act (16 USC 703-711) • Bald and Golden Eagle Protection Acts (16 USC 668-668d) • Fish and Wildlife Coordination Act (16 USC 661-666c) • Surface Transportation and Uniform Relocation Assistance Act of 1987, Section 130 (Wildflowers) (23 USC 319(b)) (PL 100-17) • Executive Order 13112, Invasive Species • Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds • CDOT Black-Tailed Prairie Dog Policy • CDOT Shortgrass Prairie Initiative • MAP-21 	

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Appendix B. Abbreviations and Acronyms

CCC	Colorado Climate Center
CDOA	Colorado Department of Agriculture
CDOT	Colorado Department of Transportation
CDOW	Colorado Division of Wildlife
CEQ	Council on Environmental Quality
CFC	Central Flyway Council
CFR	Code of Federal Regulations
CPW	Colorado Parks and Wildlife
CR	County Road
CWCB	Colorado Water Conservation Board
DNR	Department of Natural Resources
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
GIS	Geographic information system
I-25	Interstate 25
MAP-21	Moving Ahead for Progress in the 21st Century Act of 2012
NDIS	National Diversity Information Source
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
NSE	Nature Serve Explorer
SECWCD	Southeastern Colorado Water Conservancy District
SH	State Highway
SWReGAP	Southwest Regional Gap Analysis Project
US 50 Tier 1 EIS	U.S. Highway 50 Tier 1 Environmental Impact Statement
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
WRCC	Western Regional Climate Center

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Appendix C. U.S. Fish and Wildlife Service Letter Pertaining to Federally Listed Species



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Colorado Field Office
P.O. Box 25486, DFC (65412)
Denver, Colorado 80225-0486



IN REPLY REFER TO:
ES/CO: T&E/Species List
TAILS: 65412-2007-SL-0075

NOV 22 2006

Michael Perez
Colorado Department of Transportation
905 Erie Avenue
Pueblo, Colorado 81002

Dear Mr. Perez:

Based on the authority conferred to the U.S. Fish and Wildlife Service (Service) by the Fish and Wildlife Act of 1956 (916 U.S.C. 742(a)-754); Fish and Wildlife Coordination Act (FWCA - 16 U.S.C. 661-667(c)); National Environmental Policy Act of 1969 (NEPA - 42 U.S.C. 4321-4347); Department of Transportation Act (49 U.S.C. 1653(f)), and; Endangered Species Act of 1973, as amended (ESA - 50 CFR §402.14), as well as multiple Executive Orders, policies and guidelines, and interrelated statutes to ensure the conservation and enhancement of fish and wildlife resources (e.g., Migratory Bird Treaty Act (MBTA - 16 U.S.C. 703), and Bald and Golden Eagle Protection Act (BGEPA - 16 U.S.C. 668)), the Service reviewed your November 6, 2006, request for information on the Service's trust resources in the vicinity of the proposed **US50 Corridor East Tier 1 Environmental Impact Statement**. The proposed highway improvements would occur from Pueblo east to the Kansas state line.

Threatened and Endangered Species

Following is a list of Federal endangered, threatened, proposed and candidate species for Bent, Otero, Prowers, and Pueblo 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: Bald Eagle (*Haliaeetus leucocephalus*), Endangered
Piping Plover, (*Charadrius melodus*), Threatened
Least Tern (*Sterna antillarum*), Endangered
Mexican Spotted Owl (*Strix occidentalis lucida*), Threatened
- Mammals: Black-footed Ferret (*Mustela nigripes*), Endangered

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.

Birds: Lesser Prairie-chicken (*Tyrannuchus pallidicinctus*)

Fishes: Arkansas Darter (*Etheostoma cragini*)

Migratory Birds

Under the MBTA construction activities in grassland, wetland, stream, and woodland habitats, and those that occur on bridges (e.g., which may affect swallow nests on bridge girders) that would otherwise result in the take of migratory birds, eggs, young, and/or active nests should be avoided. Although the provisions of MBTA are applicable year-round, most migratory bird nesting activity in eastern Colorado occurs during the period of April 1 to August 15. However, some migratory birds are known to nest outside of the aforementioned primary nesting season period. For example, raptors can be expected to nest in woodland habitats during February 1 through July 15. If the proposed construction project is planned to occur during the primary nesting season or at any other time which may result in the take of nesting migratory birds, the Service recommends that the project proponent (or construction contractor) arrange to have a qualified biologist conduct a field survey of the affected habitats and structures to determine the absence or presence of nesting migratory birds. Surveys should be conducted during the nesting season. In some cases, such as on bridges or other similar structures, nesting can be prevented until construction is complete. It is further recommended that the results of field surveys for nesting birds, along with information regarding the qualifications of the biologist(s) performing the surveys, be thoroughly documented and that such documentation be maintained on file by the project proponent (and/or construction contractor) for potential review by the Service (if requested) until such time as construction on the proposed project has been completed. The Service's Colorado Field Office should be contacted immediately for further guidance if a field survey identifies the existence of one or more active bird nests that cannot be avoided by the planned construction activities. Adherence to these guidelines will help avoid the unnecessary take of migratory birds and the possible need for law enforcement action.

Mr. Michael Perez, US50 Pueblo to Kansas, species list

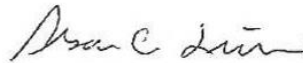
Page 3

Wetlands

FWCA provides the basic authority for the Service's involvement in evaluating impacts to fish and wildlife "whenever the waters of any stream or other body of water are proposed or authorized to be impounded, diverted, the channel deepened, or the stream or other body of water otherwise controlled or modified **for any purpose whatever**...by any department or agency of the United States, or by any public or private agency under Federal permit or license," including water crossings and wetland impacts, whether or not those wetlands are under the jurisdiction of the U.S. Army Corps of Engineers [16 U.S.C. 661(1), emphasis added]. It requires that fish and wildlife resources "receive equal consideration...to other project features...through the effectual and harmonious planning, development, maintenance, and coordination of wildlife conservation and rehabilitation," and requires Federal agencies to consult with the Service during the planning process to help "prevent the loss of or damage to such resources as well as providing for the development and improvement thereof" (16 U.S.C. 661 *et seq*). Full consideration is to be given to Service recommendations.

If the Service can be of further assistance, please contact Alison Deans Michael of my staff at 303 236-4758.

Sincerely,



Susan C. Linner
Colorado Field Supervisor

pc: CDOT (Jeff Peterson)
Michael

Ref Alison\H:\My Documents\CDOT 2005\Region 2\US 50 - Pueblo to Kansas\Species list, etc., request\US50 Pueblo to Kansas
spplist.doc

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Appendix D. Accuracy Assessment of Southwest Regional Gap Analysis Project and Colorado Division of Wildlife Riparian Vegetation Mapping Along the US 50 Corridor

D.1. Introduction

Vegetation mapping data were field-checked for accuracy along the US 50 corridor from Pueblo to the Kansas state line during the week of October 23, 2006. Points, not polygons (i.e., areas), along the corridor were checked for accuracy. The data checked for accuracy included the SWReGAP data and the CDOW, which is now Colorado Parks and Wildlife (CPW), riparian mapping data. Sites were evaluated for their accuracy in identifying the type of vegetation that actually occurs on the ground. The extent and the configuration of the polygons were not verified.

The corridor was driven from the state line and sites checked from east to west. The corridor was driven at approximately 55 miles per hour, making frequent stops. An in-depth analysis of each site was not conducted. Sites were verified simply by looking at the site in the field and comparing it to the mapped polygon at a specific location. A simple “yes” or “no” was noted to identify whether the mapped vegetation type matched what was observed on the ground.

D.2. Results

A total of 448 points were checked, including 346 points of the SWReGAP data and 102 points of the CPW riparian data. Overall, the SWReGAP data had an accuracy rating of 77.2 percent (Table D-1 and Figure D-1), while the CPW data had an accuracy rating of 76.5 percent (Table D-2 and Figure D-2). The SWReGAP data was collected from 1999 to 2001. The CPW data was derived from aerial photographs taken in the late 1980s.

Table D-1. Accuracy Assessment of Southwest Regional Gap Analysis Project Data Along the US 50 Corridor from Pueblo to the Kansas State Line

Type	Mapped Versus Actual		Total Checked	Percent Correct
	Match	No Match		
Agriculture	88	6	94	93.6
Developed, medium to high intensity	24	6	30	80.0
Developed, open space—low intensity	22	2	24	91.7
Intermountain basins semi-desert shrub-steppe	4	2	6	66.7
Invasive SW riparian woodland/shrubland	47	35	82	57.3
Open water	3	—	3	100.0
Recent mining	1	—	1	100.0
Western Great Plains floodplain herbaceous wetland	23	11	34	67.6
Western Great Plains riparian woodland/shrubland	20	5	25	80.0
Western Great Plains sandhill shrubland	12	8	20	60.0
Western Great Plains shortgrass prairie	23	4	27	85.2
TOTAL	267	79	346	77.2

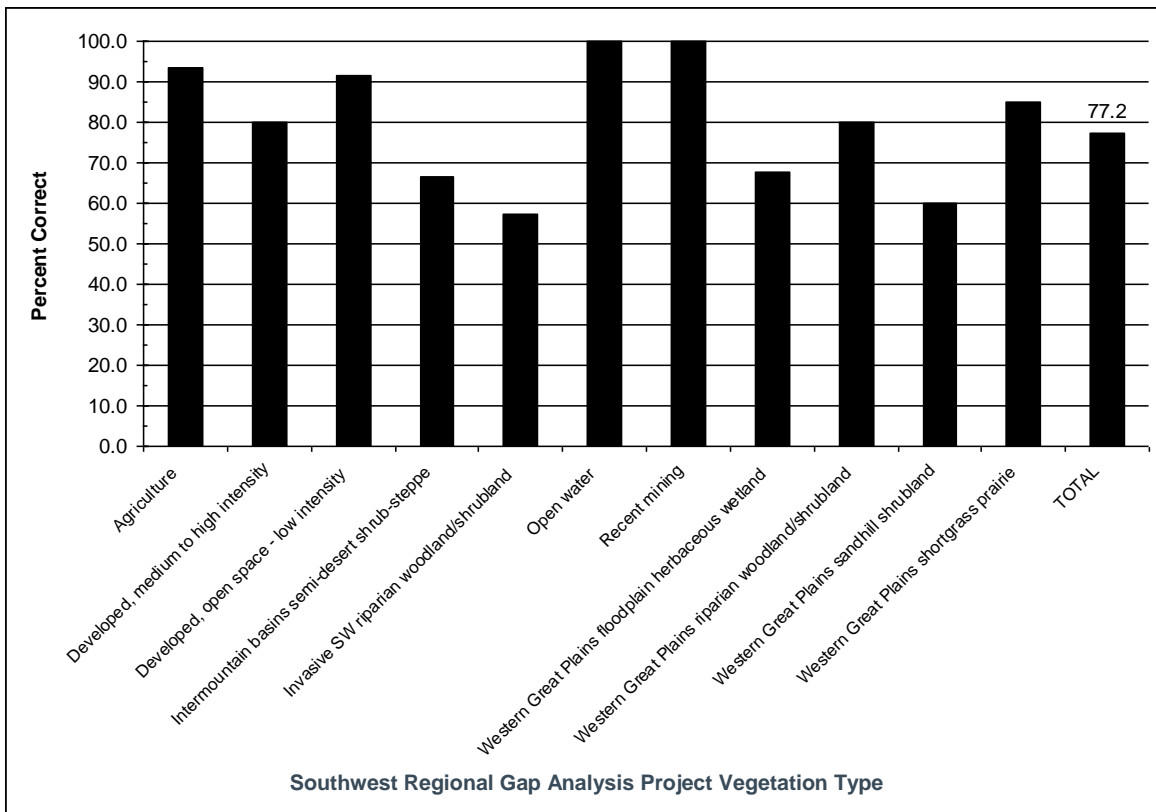


Figure D-1. Summary of Accuracy Assessment for Southwest Regional Gap Analysis Project Data Along the US 50 Corridor from Pueblo to the Kansas State Line

Table D-2. Accuracy Assessment of Colorado Division of Wildlife Data Along the US 50 Corridor from Pueblo to the Kansas State Line

Type	Mapped Versus Actual		Total Checked	Percent Correct
	Match	No Match		
Open water—riverine	3		3	100.0
Open water—standing	4	1	5	80.0
Riparian deciduous tree—cottonwood	32		32	100.0
Riparian herbaceous—sedges/rushes/mesic grasses	20	12	32	62.5
Riparian herbaceous—cattails/sedges/rushes	2	5	7	28.6
Riparian shrub—general	9		9	100.0
Riparian shrub—tamarisk	8	2	10	80.0
Riparian shrub—willow		4	4	0.0
TOTAL	78	24	102	76.5

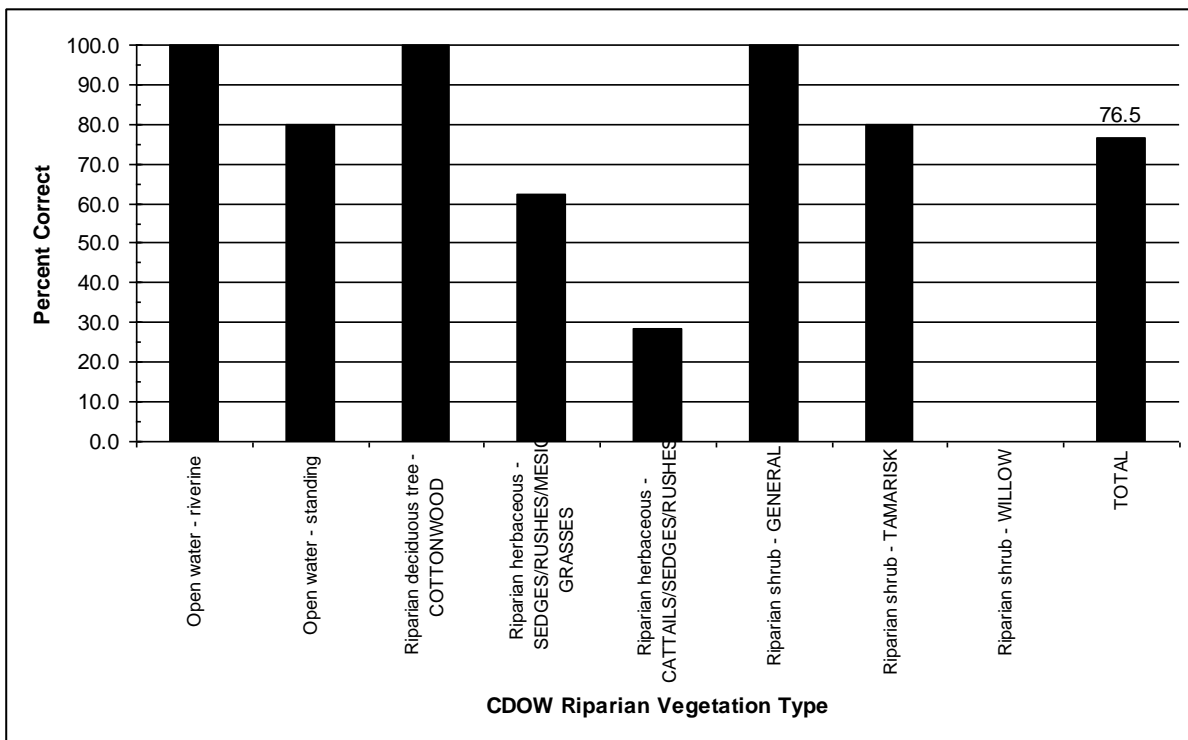


Figure D-2. Summary of Accuracy Assessment for Colorado Division of Wildlife Data Along the US 50 Corridor from Pueblo to the Kansas State Line

D.3 Observations and Possible Explanations for Discrepancies

- Land conversion, especially around towns
- Tamarisk control—some tamarisk-infested areas may have been eradicated since the mapping effort was completed
- Invasive wetland shrubs and trees (as identified by the SWReGAP) consist primarily of tamarisk and Chinese elm—some Russian olive exists, but is a minor component
- Area around Montebello Road in Pueblo is changing rapidly
- Tamarisk invasion of emergent and willow areas
- Irrigated areas may give false positives for SWReGAP wetland polygons
- SWReGAP data seemed to have a problem distinguishing between shortgrass prairie and shrub-steppe areas
- SWReGAP data seemed to have a problem with smaller polygons
- SWReGAP data did well with large polygons
- Urban residential areas and feedlots were placed in the developed, open space-low intensity category—main criterion appears to be percent impervious cover—data might be skewed due to tree cover in urban and residential settings
- CPW data did well with cottonwood-dominated areas
- Fallow agricultural lands and overgrazed prairie often become dominated by kochia, Russian thistle, or both
- In the case of CPW wetland and riparian areas checked, in most cases the wetland area existed, but the vegetation class differed from what was mapped
- Small SWReGAP wetland polygons frequently appear to be incorrect—consider imposing a size limit on the SWReGAP polygons used in the analysis

Appendix E. CDOT Noxious Weed List (2013)

All populations of List A species in Colorado are designated by the commissioner for eradication. List A species include:

LIST A SPECIES	
Common Name	Scientific Name
African rue	<i>Peganum harmala</i>
Camelthorn	<i>Alhagi pseudalhagi</i>
Common crupina	<i>Crupina vulgaris</i>
Cypress spurge	<i>Euphorbia cyparissias</i>
Dyer's woad	<i>Isatis tinctoria</i>
Elongated mustard	<i>Brassica elongata</i>
Giant reed	<i>Arundo donax</i>
Giant salvinia	<i>Salvinia molesta</i>
Hydrilla	<i>Hydrilla verticillata</i>
Japanese knotweed	<i>Polygonum cuspidatum</i>
Giant knotweed	<i>Polygonum sachalinense</i>
Bohemian knotweed	<i>Polygonum x bohemicum</i>
Meadow knapweed	<i>Centaurea pratensis</i>
Mediterranean sage	<i>Salvia aethiopis</i>
Medusahead	<i>Taeniatherum caput-medusae</i>
Myrtle spurge	<i>Euphorbia myrsinites</i>
Orange hawkweed	<i>Hieracium aurantiacum</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Rush skeletonweed	<i>Chondrilla juncea</i>
Squarrose knapweed	<i>Centaurea virgata</i>
Tansy ragwort	<i>Senecio jacobaea</i>
Yellow starthistle	<i>Centaurea solstitialis</i>

List B noxious weed species are species for which the commissioner—in consultation with the state noxious weed advisory committee, local governments, and other interested parties—develops and implements state noxious weed management plans designed to stop the continued spread of these species. Until a plan for a particular species is developed and implemented by rule, all persons are recommended to manage that species. List B species include:

LIST B SPECIES	
Common Name	Scientific Name
Absinth wormwood	<i>Artemisia absinthium</i>
Black henbane	<i>Hyoscyamus niger</i>
Bouncingbet	<i>Saponaria officinalis</i>
Bull thistle	<i>Cirsium vulgare</i>
Canada thistle	<i>Cirsium arvense</i>
Chinese clematis	<i>Clematis orientalis</i>
Common tansy	<i>Tanacetum vulgare</i>
Common teasel	<i>Dipsacus fullonum</i>
Corn chamomile	<i>Anthemis arvensis</i>
Cutleaf teasel	<i>Dipsacus laciniatus</i>
Dalmatian toadflax, broad-leaved	<i>Linaria dalmatica</i>
Dalmatian toadflax, narrow-leaved	<i>Linaria genistifolia</i>
Dame's rocket	<i>Hesperis matronalis</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Hoary cress	<i>Cardaria draba</i>
Houndstongue	<i>Cynoglossum officinale</i>
Jointed goatgrass	<i>Aegilops cylindrica</i>
Leafy spurge	<i>Euphorbia esula</i>
Mayweed chamomile	<i>Anthemis cotula</i>
Moth mullein	<i>Verbascum blattaria</i>
Musk thistle	<i>Carduus nutans</i>
Oxeye daisy	<i>Chrysanthemum leucanthemum</i>
Perennial pepperweed	<i>Lepidium latifolium</i>
Plumeless thistle	<i>Carduus acanthoides</i>
Quackgrass	<i>Elytrigia repens</i>
Russian knapweed	<i>Acroptilon repens</i>
Russian-olive	<i>Elaeagnus angustifolia</i>
Salt cedar	<i>Tamarix chinensis, T. parviflora, and T. ramosissima</i>
Scentless chamomile	<i>Matricaria perforata</i>
Scotch thistle	<i>Onopordum tauricum</i>
Spotted knapweed	<i>Centaurea maculosa</i>
Spurred anoda	<i>Anoda cristata</i>
Sulfur cinquefoil	<i>Potentilla recta</i>
Venice mallow	<i>Hibiscus trionum</i>
Wild caraway	<i>Carum carvi</i>
Yellow nutsedge	<i>Cyperus esculentus</i>
Yellow toadflax	<i>Linaria vulgaris</i>

List C noxious weed species are species for which the commissioner—in consultation with the state noxious weed advisory committee, local governments, and other interested parties—will develop and implement state noxious weed management plans designed to support the efforts of local governing bodies to facilitate more effective integrated weed management on private and public lands. The goal of such plans will not be to stop the continued spread of these species, but to provide additional education, research, and biological control resources to jurisdictions that choose to require management of List C species. List C species include:

LIST C SPECIES	
Common Name	Scientific Name
Bulbous bluegrass	<i>Poa bulbosa</i>
Chicory	<i>Cichorium intybus</i>
Common burdock	<i>Arctium minus</i>
Common mullein	<i>Verbascum thapsus</i>
Common St. Johnswort	<i>Hypericum perforatum</i>
Downy brome	<i>Bromus tectorum</i>
Field bindweed	<i>Convolvulus arvensis</i>
Halogeton	<i>Halogeton glomeratus</i>
Johnsongrass	<i>Sorghum halepense</i>
Perennial sowthistle	<i>Sonchus arvensis</i>
Poison hemlock	<i>Conium maculatum</i>
Puncturevine	<i>Tribulus terrestris</i>
Redstem filaree	<i>Erodium cicutarium</i>
Velvetleaf	<i>Abutilon theophrasti</i>
Wild proso millet	<i>Panicum miliaceum</i>

Watch List species have been determined to pose a potential threat to the agricultural productivity and environmental values of the lands of the state. The Watch List is intended to serve advisory and educational purposes only. The Watch List will encourage the identification and reporting of species to the Commissioner to facilitate the collection of information to assist the Commission in determining which species should be designated as noxious weeds. The Watch List includes:

WATCH LIST SPECIES	
Common Name	Scientific Name
Asian mustard	<i>Brassica tournefortii</i>
Baby's breath	<i>Gypsophila paniculata</i>
Bathurst burr, Spiney cocklebur	<i>Xanthium spinosum</i>
Common bugloss	<i>Anchusa officinalis</i>
Common reed	<i>Phragmites australis</i>
Flowering rush	<i>Butomus umbellatus</i>
Garlic mustard	<i>Alliaria petiolata</i>
Hairy willow-herb	<i>Epilobium hirsutum</i>
Himalayan blackberry	<i>Rubus armeniacus</i>
Japanese blood grass/cogongrass	<i>Imperata cylindrica</i>
Meadow hawkweed	<i>Hieracium caespitosum</i>
Onionweed	<i>Asphodelus fistulosus</i>
Pampas grass	<i>Cortideria jubata</i>
Scotch broom	<i>Cytisus scoparius</i>
Sericea lespedeza	<i>Lespedeza cuneata</i>
Swainsonpea	<i>Sphaerophysa salsula</i>
Syrian beancaper	<i>Zygophyllum fabago</i>
Water hyacinth	<i>Eichhornia crassipes</i>
Water lettuce	<i>Pistia stratiotes</i>
White bryony	<i>Bryonia alba</i>
Woolly distaff thistle	<i>Carthamus lanatus</i>
Yellow flag iris	<i>Iris pseudacorus</i>

Appendix F. Animals, Fish, and Plant Species Likely to Occur in the Project Area

This section describes the animal, fish, and plant species likely to occur on a regular basis in the project area throughout the course of a year (Table F-1). The species list is not intended to be comprehensive, but to reflect the majority of species that occur in the project area throughout an average year. For example, some species may only occur during spring or fall migrations and others only during the winter. Species that are relatively rare, or that may occur as casual visitors or irregularly, were not included.

The habitats that are listed for each species are considered to be the most likely habitat types to occur within the project area, but are not a comprehensive list of all the habitat types these species may use throughout the course of their life cycles. Please note that references to open water habitat are meant to include the mudflats and beaches that commonly surround open water areas.

Table F-1. Animals, Fish, and Plant Species Likely to Occur in the Project Area

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
AMPHIBIANS											
Bullfrog	<i>Rana catesbeiana</i>					X	X				
Couch's spadefoot toad	<i>Scaphiopus couchii</i>		X								
Great Plains toad	<i>Bufo cognatus</i>	X		X							
New Mexico spadefoot toad	<i>Spea multiplicata</i>		X	X							
Northern leopard frog	<i>Rana pipiens</i>					X	X				
Plains leopard frog	<i>Rana blairi</i>					X	X				
Plains spadefoot toad	<i>Spea bombifrons</i>	X	X	X		X					X
Red-spotted toad	<i>Bufo punctatus</i>				X	X					
Tiger salamander	<i>Ambystoma tigrinum</i>					X					
Western chorus frog	<i>Pseudacris triseriata</i>					X	X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Woodhouse's toad	<i>Bufo woodhousii</i>	X	X	X							X
BIRDS											
American Avocet	<i>Recurvirostra americana</i>					X	X				
American Bittern	<i>Botaurus lentiginosus</i>					X	X				
American Coot	<i>Fulica americana</i>					X	X				
American Crow	<i>Corvus brachyrhynchos</i>	X		X		X			X	X	
American Dipper	<i>Cinclus mexicanus</i>					X				X	
American Goldfinch	<i>Carduelis tristis</i>	X				X			X		
American Kestrel	<i>Falco sparverius</i>	X	X			X			X		
American Pipit	<i>Anthus rubescens</i>					X	X				
American Redstart	<i>Setophaga ruticilla</i>					X			X		
American Robin	<i>Turdus migratorius</i>				X	X			X	X	
American Tree Sparrow	<i>Spizella arborea</i>			X							
American White Pelican	<i>Pelecanus erythrorhynchos</i>						X				
American Wigeon	<i>Anas americana</i>	X				X	X		X		
Baird's Sandpiper	<i>Calidris bairdii</i>						X				
Bald Eagle	<i>Haliaeetus leucocephalus</i>		X			X	X				
Bank Swallow	<i>Riparia riparia</i>	X				X					
Barn Swallow	<i>Hirundo rustica</i>	X				X		X		X	
Bewick's Wren	<i>Thryomanes bewickii</i>			X	X	X					
Black Rail	<i>Laterallus jamaicensis</i>					X					
Black Tern	<i>Chlidonias niger</i>					X	X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Black-Bellied Plover	<i>Pluvialis squatarola</i>					X	X				
Black-Billed Magpie	<i>Pica pica</i>	X			X	X			X	X	
Black-Capped Chickadee	<i>Poecile atricapillus</i>					X			X	X	
Black-Crowned Night-Heron	<i>Nycticorax nycticorax</i>					X	X				
Black-Headed Grosbeak	<i>Pheucticus melanocephalus</i>				X	X					
Black-Necked Stilt	<i>Himantopus mexicanus</i>						X				
Black-Throated Sparrow	<i>Amphispiza bilineata</i>			X	X						
Blue Grosbeak	<i>Guiraca caerulea</i>	X		X		X					
Blue Jay	<i>Cyanocitta cristata</i>					X			X		
Blue-Gray Gnatcatcher	<i>Polioptila caerulea</i>				X	X					
Blue-Winged Teal	<i>Anas discors</i>	X				X	X				
Bobolink	<i>Dolichonyx oryzivorus</i>	X	X								
Bonaparte's Gull	<i>Larus philadelphia</i>						X				
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	X	X			X			X		
Brewer's Sparrow	<i>Spizella breweri</i>			X							
Broad-Tailed Hummingbird	<i>Selasphorus platycercus</i>					X					
Brown Thrasher	<i>Toxostoma rufum</i>					X				X	
Brown-Headed Cowbird	<i>Molothrus ater</i>	X	X	X		X					
Bufflehead	<i>Bucephala albeola</i>					X	X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Bullock's Oriole	<i>Icterus bullockii</i>					X			X		
Burrowing Owl	<i>Athene cunicularia</i>		X								
California Gull	<i>Larus californicus</i>	X					X				
Canada Goose	<i>Branta canadensis</i>	X				X	X		X	X	X
Canyon Towhee	<i>Pipilo fuscus</i>			X	X						
Canyon Wren	<i>Catherpes mexicanus</i>							X			
Cassin's Kingbird	<i>Tyrannus vociferans</i>				X						
Cassin's Sparrow	<i>Aimophila cassinii</i>		X	X							
Cedar Waxwing	<i>Bombycilla cedrorum</i>	X			X	X			X		
Chestnut-Collared Longspur	<i>Calcarius ornatus</i>	X	X								
Chihuahuan Raven	<i>Corvus cryptoleucus</i>		X	X							
Chimney Swift	<i>Chaetura pelagica</i>								X	X	
Chipping Sparrow	<i>Spizella passerina</i>			X	X	X					
Cinnamon Teal	<i>Anas cyanoptera</i>	X				X	X				
Clark's Grebe	<i>Aechmophorus clarkii</i>					X	X				
Clay-Colored Sparrow	<i>Spizella pallida</i>			X		X			X		X
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	X					X	X		X	
Common Goldeneye	<i>Bucephala clangula</i>					X	X				
Common Grackle	<i>Quiscalus quiscula</i>	X				X			X		
Common Loon	<i>Gavia immer</i>						X				
Common Merganser	<i>Mergus merganser</i>					X	X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Common Nighthawk	<i>Chordeiles minor</i>	X	X	X	X	X			X		
Common Raven	<i>Corvus corax</i>							X			
Common Snipe	<i>Gallinago gallinago</i>					X					
Common Yellowthroat	<i>Geothlypis trichas</i>					X					
Cooper's Hawk	<i>Accipiter cooperii</i>				X	X					
Curve-Billed Thrasher	<i>Toxostoma curvirostre</i>				X	X					
Dark-Eyed Junco	<i>Junco hyemalis</i>				X	X			X		
Dickcissel	<i>Spiza americana</i>	X	X			X					
Double-Crested Cormorant	<i>Phalacrocorax auritus</i>						X				
Downy Woodpecker	<i>Picoides pubescens</i>					X			X	X	
Eared Grebe	<i>Podiceps nigricollis</i>					X	X				
Eastern Kingbird	<i>Tyrannus tyrannus</i>	X				X					
Eastern Screech-Owl	<i>Otus asio</i>					X				X	
European Starling	<i>Sturnus vulgaris</i>	X				X			X	X	
Evening Grosbeak	<i>Coccothraustes vespertinus</i>								X		
Ferruginous Hawk	<i>Buteo regalis</i>		X	X				X			
Field Sparrow	<i>Spizella pusilla</i>	X				X					
Forster's Tern	<i>Sterna forsteri</i>						X				
Franklin's Gull	<i>Larus pipixcan</i>	X					X				
Gadwall	<i>Anas strepera</i>	X	X			X	X				
Golden Eagle	<i>Aquila chrysaetos</i>		X	X	X			X			

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Golden-Crowned Kinglet	<i>Regulus satrapa</i>				X	X				X	
Grasshopper Sparrow	<i>Ammodramus savannarum</i>		X	X							
Gray-Crowned Rosy Finch	<i>Leucosticte tephrocotis</i>			X					X	X	
Great Blue Heron	<i>Ardea herodias</i>					X	X				
Great Horned Owl	<i>Bubo virginianus</i>	X				X			X		
Greater Sandhill Crane	<i>Grus canadensis tabida</i>	X				X	X				
Great-Tailed Grackle	<i>Quiscalus mexicanus</i>					X					
Green-Tailed Towhee	<i>Pipilo chlorurus</i>			X	X	X					
Green-Winged Teal	<i>Anas crecca</i>					X	X				
Harris' Sparrow	<i>Zonotrichia querula</i>	X		X					X		
Hermit Thrush	<i>Catharus guttatus</i>				X	X					
Herring Gull	<i>Larus argentatus</i>						X				
Horned Grebe	<i>Podiceps auritus</i>						X				
Horned Lark	<i>Eremophila alpestris</i>	X	X	X							
House Finch	<i>Carpodacus mexicanus</i>				X				X		
House Sparrow	<i>Passer domesticus</i>	X							X	X	
House Wren	<i>Troglodytes aedon</i>					X					
Killdeer	<i>Charadrius vociferus</i>	X				X	X			X	
Lapland Longspur	<i>Calcarius lapponicus</i>	X	X								
Lark Bunting	<i>Calamospiza melanocorys</i>		X	X							

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Lark Sparrow	<i>Chondestes grammacus</i>	X	X	X	X	X					
Lazuli Bunting	<i>Passerina amoena</i>			X	X	X					
Least Sandpiper	<i>Calidris minutilla</i>					X	X				
Lesser Goldfinch	<i>Carduelis psaltria</i>	X				X			X		
Lesser Prairie Chicken	<i>Tympanuchus pallidicinctus</i>		X	X							
Lesser Sandhill Crane	<i>Grus canadensis</i>	X				X	X				
Lesser Scaup	<i>Aythya affinis</i>					X	X				
Lesser Yellowlegs	<i>Tringa flavipes</i>					X	X				
Lewis' Woodpecker	<i>Melanerpes lewis</i>	X				X				X	
Lincoln's Sparrow	<i>Melospiza lincolni</i>					X					
Loggerhead Shrike	<i>Lanius ludovicianus</i>	X	X	X						X	
Long-Billed Curlew	<i>Numenius americanus</i>	X	X								
Long-Billed Dowitcher	<i>Limnodromus scolopaceus</i>						X				
Mallard	<i>Anas platyrhynchos</i>	X				X	X		X	X	X
Marbled Godwit	<i>Limosa fedoa</i>						X				
Marsh Wren	<i>Cistothorus palustris</i>					X					
McCown's Longspur	<i>Calcarius mccownii</i>	X	X								
Mississippi Kite	<i>Ictinia mississippiensis</i>					X				X	
Mountain Bluebird	<i>Sialia currucoides</i>	X	X	X	X					X	
Mountain Plover	<i>Charadrius montanus</i>		X								

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Mourning Dove	<i>Zenaida macroura</i>	X		X		X			X		X
Northern Bobwhite	<i>Colinus virginianus</i>	X	X			X					
Northern Flicker	<i>Colaptes auratus</i>					X			X	X	
Northern Harrier	<i>Circus cyaneus</i>	X	X			X					
Northern Mockingbird	<i>Mimus polyglottos</i>	X		X	X	X					
Northern Pintail	<i>Anas acuta</i>	X				X	X				
Northern Rough-Winged Swallow	<i>Stelgidopteryx serripennis</i>					X					
Northern Shoveler	<i>Anas clypeata</i>	X	X			X	X				
Orange-Crowned Warbler	<i>Vermivora celata</i>			X		X			X		
Orchard Oriole	<i>Icterus spurius</i>					X					
Pectoral Sandpiper	<i>Calidris melanotos</i>					X	X				
Pied-Billed Grebe	<i>Podilymbus podiceps</i>						X				
Pine Siskin	<i>Carduelis pinus</i>			X		X			X		
Pinyon Jay	<i>Gymnorhinus cyanocephalus</i>				X						
Piping Plover	<i>Charadrius melodus</i>						X				
Red-Bellied Woodpecker	<i>Melanerpes carolinus</i>					X					
Red-Breasted Nuthatch	<i>Sitta canadensis</i>				X	X				X	
Red-Eyed Vireo	<i>Vireo olivaceus</i>					X			X		
Redhead	<i>Aythya americana</i>					X	X				
Red-Headed Woodpecker	<i>Melanerpes erythrocephalus</i>					X					

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Red-Necked Phalarope	<i>Phalaropus lobatus</i>						X				
Red-Tailed Hawk	<i>Buteo jamaicensis</i>	X	X			X					
Red-Winged Blackbird	<i>Agelaius phoeniceus</i>	X				X					X
Ring-Billed Gull	<i>Larus delawarensis</i>	X					X				
Ring-Necked Duck	<i>Aythya collaris</i>					X	X				
Ring-Necked Pheasant	<i>Phasianus colchicus</i>	X								X	X
Rock Dove	<i>Columba livia</i>							X	X	X	
Rock Wren	<i>Salpinctes obsoletus</i>							X			
Ross' Goose	<i>Chen rossii</i>	X				X	X				
Rough-Legged Hawk	<i>Buteo lagopus</i>	X	X	X							
Ruby-Crowned Kinglet	<i>Regulus calendula</i>				X	X			X		
Ruddy Duck	<i>Oxyura jamaicensis</i>					X	X				
Sage Thrasher	<i>Oreoscoptes montanus</i>			X							
Savannah Sparrow	<i>Passerculus sandwichensis</i>	X	X			X					
Say's Phoebe	<i>Sayornis saya</i>	X	X	X						X	
Scaled Quail	<i>Callipepla squamata</i>	X	X	X							
Semipalmated Sandpiper	<i>Calidris pusilla</i>					X	X				
Sharp-Shinned Hawk	<i>Accipiter striatus</i>				X	X					
Snow Goose	<i>Chen caerulescens</i>	X				X	X				
Snowy Egret	<i>Egretta thula</i>					X	X				
Snowy Plover	<i>Charadrius alexandrinus</i>						X				
Solitary Sandpiper	<i>Tringa solitaria</i>						X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Song Sparrow	<i>Melospiza melodia</i>					X					
Sora	<i>Porzana carolina</i>					X					
Southwestern Willow Flycatcher	<i>Empidonax traillii extimus</i>					X					
Spotted Sandpiper	<i>Actitis macularia</i>					X	X				
Spotted Towhee	<i>Pipilo maculatus</i>				X	X					
Steller's Jay	<i>Cyanocitta stelleri</i>				X						
Stilt Sandpiper	<i>Calidris himantopus</i>						X				
Swainson's Hawk	<i>Buteo swainsoni</i>	X	X	X		X					
Swainson's Thrush	<i>Catharus ustulatus</i>					X					
Townsend's Solitaire	<i>Myadestes townsendi</i>				X						
Tree Swallow	<i>Tachycineta bicolor</i>					X					
Turkey Vulture	<i>Cathartes aura</i>	X	X	X				X			
Vesper Sparrow	<i>Poocetes gramineus</i>		X	X	X						
Violet-Green Swallow	<i>Tachycineta thalassina</i>					X		X			
Virginia Rail	<i>Rallus limicola</i>					X					
Virginia's Warbler	<i>Vermivora virginiae</i>			X	X	X					
Warbling Vireo	<i>Vireo gilvus</i>					X			X		
Western Grebe	<i>Aechmophorus occidentalis</i>					X	X				
Western Kingbird	<i>Tyrannus verticalis</i>	X			X	X				X	
Western Meadowlark	<i>Sturnella neglecta</i>	X	X	X							X
Western Sandpiper	<i>Calidris mauri</i>						X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Western Screech-Owl	<i>Otus kennicottii</i>					X					
Western Scrub Jay	<i>Aphelocoma californica</i>				X						
Western Tanager	<i>Piranga ludoviciana</i>				X				X		
Western Wood-Pewee	<i>Contopus sordidulus</i>					X					
White-Breasted Nuthatch	<i>Sitta carolinensis</i>				X	X					
White-Crowned Sparrow	<i>Zonotrichia leucophrys</i>					X					
White-Faced Ibis	<i>Plegadis chihi</i>					X	X				
White-Rumped Sandpiper	<i>Calidris fuscicollis</i>						X				
White-Throated Sparrow	<i>Zonotrichia albicollis</i>					X			X		
White-Throated Swift	<i>Aeronautes saxatalis</i>							X			
Wild Turkey	<i>Meleagris gallopavo</i>	X			X	X					
Willet	<i>Catoptrophorus semipalmatus</i>					X	X				
Wilson's Phalarope	<i>Phalaropus tricolor</i>					X	X				
Wood Duck	<i>Aix sponsa</i>					X	X				
Yellow Warbler	<i>Dendroica petechia</i>					X			X	X	
Yellow-Headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	X				X					
Yellow-Rumped Warbler	<i>Dendroica coronata</i>					X			X		
MAMMALS											
American badger	<i>Taxidea taxus</i>		X	X							
American beaver	<i>Castor canadensis</i>					X	X				
American elk	<i>Cervus elaphus</i>			X							

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Big brown bat	<i>Eptesicus fuscus</i>								X	X	
Black-tailed jackrabbit	<i>Lepus californicus</i>		X								
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>		X								
Bobcat	<i>Lynx rufus</i>				X			X			
Botta's pocket gopher	<i>Thomomys bottae</i>	X	X	X	X						
Brush mouse	<i>Peromyscus boylii</i>				X	X					
Common muskrat	<i>Ondatra zibethicus</i>					X	X				
Common porcupine	<i>Erethizon dorsatum</i>				X						
Coyote	<i>Canis latrans</i>	X	X	X				X			
Deer mouse	<i>Peromyscus maniculatus</i>	X	X	X							X
Desert cottontail	<i>Sylvilagus audubonii</i>	X	X	X							
Desert shrew	<i>Notiosorex crawfordi</i>			X							
Eastern cottontail	<i>Sylvilagus floridanus</i>		X	X							
Eastern woodrat	<i>Neotoma floridana</i>			X		X					
Fox squirrel	<i>Sciurus niger</i>					X			X		
Hispid cotton rat	<i>Sigmodon hispidus</i>	X	X								
Hispid pocket mouse	<i>Chaetodipus hispidus</i>		X								
Hoary bat	<i>Lasiurus cinereus</i>				X	X					
House mouse	<i>Mus musculus</i>	X							X	X	
Least chipmunk	<i>Tamias minimus</i>				X			X			
Little brown myotis	<i>Myotis lucifugus</i>				X	X				X	

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Mexican woodrat	<i>Neotoma mexicana</i>				X			X			
Mountain cottontail	<i>Sylvilagus nuttallii</i>		X	X	X	X					
Mountain lion	<i>Felis concolor</i>							X			
Mule deer	<i>Odocoileus hemionus</i>		X	X	X	X					
Northern grasshopper mouse	<i>Onychomys leucogaster</i>		X	X							X
Ord's kangaroo rat	<i>Dipodomys ordii</i>		X	X	X						
Pallid bat	<i>Antrozous pallidus</i>			X	X			X			
Pinyon mouse	<i>Peromyscus truei</i>				X			X			
Plains harvest mouse	<i>Reithrodontomys montanus</i>		X								
Plains pocket gopher	<i>Geomys bursarius</i>	X	X			X					
Plains pocket mouse	<i>Perognathus flavescens</i>		X	X							X
Prairie vole	<i>Microtus ochrogaster</i>		X	X							X
Pronghorn	<i>Antilocapra americana</i>		X	X							
Raccoon	<i>Procyon lotor</i>	X				X	X		X	X	
Red fox	<i>Vulpes vulpes</i>	X		X		X	X				
Rock squirrel	<i>Spermophilus variegatus</i>							X			
Silky pocket mouse	<i>Perognathus flavus</i>		X		X						
Silver-haired bat	<i>Lasiorycteris noctivagans</i>							X		X	X
Southern Plains Woodrat	<i>Neotoma micropus</i>		X					X			
Striped skunk	<i>Mephitis mephitis</i>	X			X			X	X	X	
Swift fox	<i>Vulpes velox</i>		X								

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Thirteen-lined ground squirrel	<i>Spermophilus tridecemlineatus</i>	X	X	X							
Virginia opossum	<i>Didelphis virginiana</i>		X			X					
Western harvest mouse	<i>Reithrodontomys megalotis</i>		X	X		X					X
Western pipistrelle	<i>Pipistrellus hesperus</i>			X				X			
Western small-footed myotis	<i>Myotis ciliolabrum</i>							X		X	X
Western spotted skunk	<i>Spilogale gracilis</i>			X	X						
White-footed mouse	<i>Peromyscus leucopus</i>				X	X		X			
White-tailed deer	<i>Odocoileus virginianus</i>	X	X	X		X		X		X	
White-throated woodrat	<i>Neotoma albigula</i>				X						
Yellow-faced pocket gopher	<i>Cratogeomys castanops</i>	X	X	X							
Yuma myotis	<i>Myotis yumanensis</i>				X	X					
REPTILES											
Coachwhip	<i>Masticophis flagellum</i>		X		X	X		X			X
Collared lizard	<i>Crotaphytus collaris</i>			X	X			X			
Fence lizard	<i>Sceloporus undulatus</i>			X	X			X			
Glossy snake	<i>Arizona elegans</i>		X								X
Gopher snake	<i>Pituophis catenifer</i>			X							
Great Plains skink	<i>Eumeces obsoletus</i>					X		X			
Ground snake	<i>Sonora semiannulata</i>		X					X			
Lesser earless lizard	<i>Holbrookia maculata</i>		X	X							X
Lined snake	<i>Tropidoclonion lineatum</i>		X			X			X		

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Massasauga snake	<i>Sistrurus catenatus</i>		X	X							
Milk snake	<i>Lampropeltis triangulum</i>		X	X	X						
Northern water snake	<i>Nerodia sipedon</i>					X	X				
Ornate box turtle	<i>Terrapene ornata</i>		X	X							X
Painted turtle	<i>Chrysemys picta</i>					X					
Plains black-headed snake	<i>Tantilla nigriceps</i>		X	X				X			
Plains garter snake	<i>Thamnophis radix</i>		X			X				X	
Racer	<i>Coluber constrictor</i>		X	X		X					
Rat snake	<i>Elaphe guttata</i>		X	X		X					
Six-lined racerunner	<i>Cnemidophorus sexlineatus</i>			X							
Snapping turtle	<i>Chelydra serpentina</i>					X					
Spiny softshell	<i>Apalone spinifera</i>					X	X				
Texas horned lizard	<i>Phrynosoma cornutum</i>		X								X
Triploid checkered whiptail	<i>Cnemidophorus neotesselatus</i>		X	X							
Western hognose snake	<i>Heterodon nasicus</i>		X	X		X					
Western rattlesnake	<i>Crotalus viridis</i>		X	X	X						X
Western terrestrial garter snake	<i>Thamnophis elegans</i>					X					
FISH											
Arkansas darter	<i>Etheostoma cragini</i>						X				
Black bullhead	<i>Ameiurus melas</i>						X				
Blue catfish	<i>Ictalurus furcatus</i>						X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Black crappie	<i>Pomoxis nigromaculatus</i>						X				
Bluegill	<i>Lepomis macrochirus</i>						X				
Channel catfish	<i>Ictalurus punctatus</i>						X				
Common carp	<i>Cyrinus carpio</i>						X				
Fathead minnow	<i>Pimephales promelas</i>						X				
Flathead catfish	<i>Pylodictis olivaris</i>						X				
Flathead chub	<i>Platygobio gracilis</i>						X				
Freshwater drum	<i>Aplodinotus grunniens</i>						X				
Gizzard shad	<i>Dorosoma cepedianum</i>						X				
Grass carp	<i>Ctenopharyngodon idella</i>						X				
Green sunfish	<i>Lepomis cyanellus</i>						X				
Largemouth bass	<i>Micropterus salmoides</i>						X				
Longnose dace	<i>Rhinichthys osculus</i>						X				
Longnose sucker	<i>Catostomus catostomus</i>						X				
Orange-spotted sunfish	<i>Lepomis humilis</i>						X				
Plains killfish	<i>Fundulus zebrinus</i>						X				
Plains minnow	<i>Hybognathus placitus</i>						X				
Pumpkinseed	<i>Lepomis gibbosus</i>						X				
Red shiner	<i>Cyrinella lutrensis</i>						X				
River carpsucker	<i>Carpodes carpio</i>						X				

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Sand shiner	<i>Notropis stramineus</i>						X				
Sauger	<i>Sander canadensis</i>						X				
Smallmouth bass	<i>Micropterus dolomieu</i>						X				
Stoneroller	<i>Campostoma anomalum</i>						X				
Suckermouth minnow	<i>Phenacobius mirabilis</i>						X				
Walleye	<i>Sander vitreus, formerly Stizostedion vitreum</i>						X				
Western mosquitofish	<i>Gambusia affinis</i>						X				
White sucker	<i>Catostomus commersoni</i>						X				
Yellow bullhead	<i>Ameiurus natalis</i>						X				
Yellow perch	<i>Perca flavescens</i>						X				
PLANTS											
Herbaceous Species											
Alkali sacaton	<i>Sporobolus airoides</i>		X	X							
Big bluestem	<i>Andropogon gerardii</i>		X								
Blue grama	<i>Bouteloua gracilis</i>		X	X				X			
Buffalograss	<i>Buchloe dactyloides</i>		X								
Bulbous bluegrass	<i>Poa bulbosa</i>										X
Cheatgrass	<i>Bromus tectorum</i>										X
Common Mediterranean grass	<i>Sporobolus cryptandrus</i>										X
Crested wheatgrass	<i>Agropyron cristatum</i>										X

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Galleta	<i>Pleuraphis jamesii</i>		X	X							
Green needlegrass	<i>Nessella viridula</i>		X								
Hairy grama	<i>Bouteloua hirsute</i>		X	X							
Halegeton	<i>Halegeton glomeratum</i>										X
Indian ricegrass	<i>Achnatherum hymenoides</i>		X								
Intermediate wheatgrass	<i>Thinopyron intermedium</i>										X
Kentucky bluegrass	<i>Poa pratensis</i>										X
Kochia	<i>Kochia scoparia</i>										X
Lehmann lovegrass	<i>Eragrostis lehmannianna</i>										X
Little bluestem	<i>Schizachyrium scoparium</i>		X	X							
Mountain muhly	<i>Muhlenbergia montana</i>		X								
Needle and thread	<i>Hesperostipa comata</i>		X	X							
Prairie Junegrass	<i>Koeleria cristata</i>		X								
Prairie sandreed	<i>Calamovifla gigantean</i>		X	X				X			
Russian thistle	<i>Salsola spp.</i>										X
Sand bluestem	<i>Andropogon hallii</i>		X	X							
Sand dropseed	<i>Sporobolus cryptandrus</i>		X	X							
Sandberg bluegrass	<i>Poa secunda</i>		X	X							
Scentless chamomile	<i>Matricaria perforate</i>										
Side oats grama	<i>Bouteloua curtipendula</i>		X	X				X			
Smooth brome	<i>Bromus inermis</i>										X

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Soft chess	<i>Sporobolus airoides</i>										X
Thickspike wheatgrass	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>		X	X							
Three-awn	<i>Aristida purpurea</i>		X								
Western wheatgrass	<i>Agropyron smithii</i>		X	X							
Wild oats	<i>Avena fatua</i>	X									X
Noxious Weeds											
Bull thistle	<i>Cirsium vulgare</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Canada thistle	<i>Cirsium arvense</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Common teasel	<i>Dipsacus fullonum</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Dalmatian toadflax	<i>Linaria dalmatica</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
	<i>Linaria genistifolia</i>										
Diffuse knapweed	<i>Centaurea diffusa</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Downy brome	<i>Bromus tectorum</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Field bindweed	<i>Convolvulus arvensis</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Hoary cress	<i>Cardaria draba</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Houndstongue	<i>Cynoglossum officinale</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Johnsongrass	<i>Sorghum halepense</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Jointed goatgrass	<i>Aegilops cylindrica</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Musk thistle	<i>Carduus nutans</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Myrtle spurge	<i>Euphorbia myrsinites</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Oyeye daisy	<i>Chrysanthemum leucanthemum</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									

Common Name	Scientific Name	Primary Habitat Types									
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed
Perennial pepperweed	<i>Lepidium latifolium</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Poison hemlock	<i>Conium maculatum</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Puncturevine	<i>Tribulus terrestris</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Purple loosestrife	<i>Lythrum salicaria</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Russian knapweed	<i>Centaurea repens</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Russian olive	<i>Eleagnus angustifolia</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Salt cedar	<i>Tamarix sp.</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Scotch thistle	<i>Onopordum acanthium</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
	<i>Onopordum tauricum</i>										
Spotted knapweed	<i>Centaurea maculosa</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Yellow starthistle	<i>Centaurea solstitialis</i>	Noxious species documented in the project area—can occur in many different cover types (see Table 5-3 and Appendix E)									
Shrubs											
Big sagebrush	<i>Artemisia tridentata</i>			X				X			
Broom snakeweed	<i>Gutierrezia sarothrae</i>			X							
Chickasaw plum	<i>Prunus angustifolia</i>			X							
Four-winged saltbush	<i>Atriplex canescens</i>			X							
Fringed sagebrush	<i>Artemisia frigida</i>			X							
Green rabbitbrush	<i>Chrysothamnus viscidiflorus</i>			X							
Horsebrush	<i>Tetradymia spp.</i>			X							
Mesquite	<i>Prosopis glandulosa</i>			X							
Nevada ephedra	<i>Ephedra nevadensis</i>			X							

Common Name	Scientific Name	Primary Habitat Types										
		Agriculture	Grassland	Shrubland	Woodlands	Wetlands/ Riparian	Open Water	Rock Outcrops	Urban	Rural	Disturbed	
Pale wolfberry	<i>Lycium pallida</i>			X								
Sand sagebrush	<i>Artemisia filifolia</i>			X								
Saltbush	<i>Atriplex sp.</i>			X								
Shadescale	<i>Atriplex confertifolia</i>			X								
Skunkbrush sumac	<i>Rhus trilobata</i>			X				X				
Soapweed yucca	<i>Yucca glauca</i>		X	X								
Spiny hopsage	<i>Atriplex spinosa</i>			X								
Wild buckwheat	<i>Eriogonum spp.</i>			X								
Winterfat	<i>Krascheninnikovi a lanata</i>			X								
Wyoming big sagebrush	<i>Artemisia tridentata spp. wyomingensis</i>			X				X				
Trees												
Rocky Mountain juniper	<i>Juniperus scopulorum</i>				X							
Pinyon pine	<i>Pinus edulis</i>				X							

sp. = species

ssp. = subspecies

Sources: NDIS 2007 (animal species), SWReGap 2007 (plant species), CDOT 2006 (plant species), Andrews and Righter 1992 (habitat), Hammerson 1999 (habitat), NDIS 2007 (habitat), NSE 2007 (habitat), CDOW 1999 (fish), CDOW 2005 (J. Ramsay unpublished fish data).

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Appendix G. Special-Status Species Potentially Occurring in the Project Area

Table G-1. Special-Status Species Potentially Occurring in the Project Area

Common Name	Scientific Name	Listing Status ^a	CNHP Status ^b	Suitable Habitat	Main Food Items	Potential to Occur ^c	Additional Comments About Species in the Project Area
AMPHIBIANS							
Couch's spadefoot toad	<i>Scaphiopus cauchii</i>	SC	G5S1	Grasslands—Shortgrass prairie from 3,800–4,500 feet elevation. Known to occur in Otero County.	Termites, beetles, small arthropods	High	
Northern leopard frog	<i>Rana pipiens</i>	SC	G5S3	Wetland/riparian areas—Wet meadows; banks of marshes, ponds, lakes, reservoirs, streams, and ditches. Occurs throughout Colorado, excluding most of the southeastern and east-central portions of the state. Elevation range extends from below 3,500 feet in northeastern Colorado to above 11,000 feet in southern Colorado.	Invertebrates	Moderate to High	Found in the eastern end of the project area
Plains leopard frog	<i>Rana blairi</i>	SC	G5S3	Wetland/riparian areas—Margins of streams, ponds, reservoirs, creek pools, and irrigation ditches	Small invertebrates, vertebrates	High	Occur in the project area
BIRDS							
American Peregrine Falcon	<i>Falco peregrines</i>	SC	G4T4	Breeding habitat is often on cliffs and almost always near open water.	Smaller birds, bats, and large flying insects	Low	Has not been documented in the project area
Bald Eagle	<i>Haliaeetus leucocephalus</i>	ST (removed from the federal list of threatened species in July 2007)	G5S1B/S3N	Wetland/riparian areas, open water, grasslands—Large trees or cliffs near water with abundant fish prey. In winter, they may also occur locally in semi-deserts and grasslands, especially near prairie dog towns. Bald Eagle nest occurs in Prowers County between Lamar and Granada on the edge of an agricultural and woodland, shrubland habitat	Primarily fish, waterfowl; carrion, squirrels, prairie dogs and rabbits	High	Active nests northeast of Avondale between the river and the railroad, and between Lamar and Granada. Roost site northwest of the John Martin Reservoir adjacent to US 50
Burrowing Owl	<i>Athene cunicularia</i>	ST	G4S4B	Grasslands, prairie dog colonies	Rodents, small birds, eggs, nestlings, reptiles and insects	High	Occurs in prairie mid-March to September
Ferruginous Hawk	<i>Buteo regalis</i>	SC	G4S3B/S4N	Grasslands, semi-desert shrublands, winter resident around prairie dog towns	Prairie dogs and ground squirrels	High	Key issues loss of nesting habitat, reduction of prey
Greater Sandhill Crane	<i>Grus canadensis tabida</i>	SC	G5T4S2B/S4N	Wetland/riparian areas, open water—Mudflats around reservoirs, moist meadows, agricultural areas. Breeds in grassy parkland and shrubby wetlands	Insects, crustaceans, berries, grains	High	Cranes migrate through the project area
Interior Least Tern	<i>Sterna antillarum athalassos</i>	FE, SE	G4S1B	Wetland/riparian areas, open water—Breed and nest along reservoirs on bare sandy shoreline, migrants reservoirs, lakes, rivers	Small fish	High	Nesting occurs along the shorelines of John Martin Reservoir. The project crosses a small portion of John Martin Reservoir State Wildlife Area, but will not cross the reservoir itself, therefore nesting habitat for this species will not be impacted.
Lesser Prairie Chicken	<i>Typanuchus pullidicinctus</i>	FT	G3S2	Shrublands—Sand sage habitat	Grasshoppers, insects, seeds, leaves, grain	High	Small pockets of birds found on private ranches south of Holly

Common Name	Scientific Name	Listing Status ^a	CNHP Status ^b	Suitable Habitat	Main Food Items	Potential to Occur ^c	Additional Comments About Species in the Project Area
Long-billed Curlew	<i>Numenius americanus</i>	SC	G5S2B	Grasslands—Shortgrass prairie, grain fields: nests near water	Crustaceans, worms	High	Documented in Pueblo, Otero, Bent, and Prowers counties
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	FT	G3T3S1B/SUN	Woodlands, rock outcrops—Nests in canyons and dense, mature forests with multi-layered structure, elevation ranges from 4,100 to 9,000 feet	Small mammals (rodents, voles, pocket gophers)	Low	Adequate breeding habitat does not exist in the project area
Mountain Plover	<i>Charadrius montanus</i>	SC	G2S2B	Grasslands—Prairie dog colonies. Common to abundant fall migrant to lower Arkansas valley—Bent County	Insects	High	Occur in the area, near prairie dog towns
Piping Plover	<i>Charadrius melodus</i>	FT, ST	G3S1B	Wetland/riparian areas, open water—Mudflats open shorelines or reservoirs and lakes	Marine worms, fly larvae, beetles, crustaceans, mollusks	Moderate	Nesting occurs along the shorelines of John Martin Reservoir. The project crosses a small portion of John Martin Reservoir State Wildlife Area, but will not cross the reservoir itself, therefore nesting habitat for this species will not be impacted.
Western Snowy Plover	<i>Charadrius alexandrinus</i>	SC	G4T3S1B	Wetland/riparian areas, open water—Alkali flats around reservoirs, mudflats and sandy shorelines	Small invertebrates, crustaceans, mollusks	Moderate	Snowy Plovers have been documented in Otero, Bent, and Prowers counties. Known to occur at John Martin Reservoir
FISH							
Arkansas darter	<i>Etheostoma cragini</i>	FC, ST	G3G4S2	Found on in tributaries of the Arkansas River where waters are clear, low currents, sandy bottoms, abundant rooted aquatic vegetation. Isolated populations in Big Sandy Creek	Small aquatic invertebrates	High	See Section 5.3, Aquatic Resources. Has been documented in the Project Area in several streams/rivers
Greenback cutthroat trout	<i>Oncorhynchus clarki stomias</i>	FT	ST	High mountain lakes and headwaters of streams. Spawns in cool, clear, slow-flowing streams with gravel bottoms.	Small aquatic invertebrates	Low	None
Flathead chub	<i>Hybopsis gracilis</i>	SC	G3S5	Moderate to fast flowing currents in main channels of turbid small to large rivers. Occurs in shallow to deep water over mud, rock, or sand substrate	Invertebrates	High	See Section 5.3, Aquatic Resources. Needs flood flows to spawn successfully. Occurs primarily in tributaries to the Arkansas River and upstream of John Martin Reservoir
Plains minnow	<i>Hybognathus placitius</i>	SE	Not tracked	Main channel areas of streams with some current and sandy bottoms	Aquatic plants	High	Occurs within the Arkansas River primarily from area west of Rocky Ford to John Martin Reservoir
Southern redbelly dace	<i>Phoxinus erythrogaster</i>	SE	G5S1	Inhabits cool, clear streams or off-channel ponds with abundant algal growth, deep silts and abundant riparian vegetation for shade. Upper Arkansas River drainage near Pueblo and the Chico Creek drainage	Algae, detritus, small aquatic invertebrates (chironomids)	Moderate to high	See Section 5.3, Aquatic Resources. Occurs at the west end of the project area
Suckermouth minnow	<i>Phenacobius mirabilis</i>	SE	Not tracked	Riffles of warm prairie streams of all sizes with low to moderate currents. Occurs in the Arkansas River and its tributaries primarily below the John Martin Reservoir as well as near Rocky Ford	Aquatic larvae, detritus, roots	Low	See Section 5.3, Aquatic Resources
MAMMALS							
Black-footed ferret	<i>Mustela nigripes</i>	FE	G1S1	Grasslands—In association with prairie dog colonies	Prairie dogs	Low	No known population exists in the project area

Common Name	Scientific Name	Listing Status ^a	CNHP Status ^b	Suitable Habitat	Main Food Items	Potential to Occur ^c	Additional Comments About Species in the Project Area
Black-tailed prairie dog	<i>Cynomys ludovicianus</i>	SC	G4S3	Grasslands—Shortgrass prairie	Grass and forbs	High	Associated species—see Figure J-9 through Figure J-12, located in Appendix J
Botta's pocket gopher	<i>Thomomys bottae</i>	SC	G5T1S1	Agricultural lands, grasslands, roadsides and semidesert shrubland. Known to occur in Pueblo County	Roots, tubers and succulent stems of grasses and forbs	Moderate to high	None
Canada lynx	<i>Lynx canadensis</i>	FT	SE	High alpine, coniferous forests, with the presence of snowshoe hare (their primary prey).	Snowshoe Hare and other small mammals and birds.	Low	None
Swift fox	<i>Vulpes velox</i>	SC	G3S3	Grasslands—Shortgrass prairie	Mammals, birds, invertebrates, vegetation	High	Populations stable within southeast Colorado
Townsend's big-eared bat	<i>Plecotus townsendii</i>	SC	G4T4S2	Shrublands—Semi-desert shrublands. Known to occur in Pueblo and Otero counties	Nocturnal flying insects	Moderate to high	None
REPTILES							
Common king snake	<i>Lampropeltis getula</i>	SC	G5S1	Agricultural lands—Irrigated fields on the floodplain of the Arkansas River	Rodents, birds, bird eggs, lizards, snakes and amphibians	High	Known from Otero and Bent counties
Massasauga snake	<i>Sistrurus catenatus</i>	SC	G3G4S2	Shrublands—Sand sage habitat	Lizards, small mammals, centipedes	High	Likely in sand sage habitat. Known in Otero, Bent, and Prowers counties and the northeast corner of Pueblo County
Round-tailed horned lizard	<i>Phrynosoma modestum</i>	SC	G5S1	Dry grassland and shrubland habitats, especially on lowland slopes and along the margins of arroyos on gravelly to rocky soils.	Primarily ants, other arthropods	Low	Known in Colorado from one disjunct population located a few kilometers south-southeast of Fowler.
Texas blind snake	<i>Leptotyphlops dulcis</i>	SC	Not tracked	Rock outcrops, woodlands—Elevation from 4,300 to 5,000 feet, damp loose soil among and under rocks.	Ants and termites	Moderate	Undocumented in the project area, but considered likely to occur in Otero and Bent counties
Texas horned lizard	<i>Phrynosoma cornutum</i>	SC	G4G5S3	Grasslands—Plains grasslands in bare sandy, gravelly or loamy soils	Ants and small arthropods	High	Known to occur primarily south of the Arkansas River in Otero, Bent and Prowers counties. Also occurs in southeast corner of Pueblo County
Triploid checkered whiptail	<i>Cnemidophorus neotesselatus</i>	SC	Not tracked	Rock outcrops—Hillsides, arroyos and canyons along the Arkansas river valley, canyon-grassland transition along the Huerfano River and the Purgatoire River and tributaries	Invertebrates	High	
Yellow mud turtle	<i>Kinosternon flavescens</i>	SC	G5S1	Wetland/riparian areas—Permanent and intermittent streams, ponds, rain pools, irrigation ditches, wet fields, and surrounding grasslands and particularly, sandhills	Vertebrates, invertebrates, algae, aquatic plant species	High	Known in Bent and Prowers counties

^aListing status: FT = federally listed as threatened; FE = federally listed as endangered; FC = federal candidate for listing; ST = listed as threatened by the state of Colorado; SE = listed as endangered by the state of Colorado; SC = species of concern in Colorado

^bCNHP status: G = Global Rank; S = State Rank; T = Intraspecific taxon; B = Breeding; GU or SU = not rankable; 5 = secure; 1 = critically imperiled

^cPotential to occur in the project area is based on habitat requirements versus available habitat and documented occurrences in the project vicinity

Sources: NDIS 2007, CDOW 2005, Hammerson 1999, Burt and Grossenheider 1976, Andrews and Righter 1992, Tomelleri 2007

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Table G-2. CDOT Shortgrass Prairie Initiative Species that are not Federally or State Listed and that Could Potentially Occur in the Project Area

Common Name	Scientific Name
Primary List	
Arkansas River feverfew	<i>Bolophyta tetraeuris</i>
Arkansas Valley evening primrose	<i>Oenothera harringtonii</i>
Cassin's Sparrow	<i>Aimophila cassinii</i>
Golden blazing star	<i>Nuttallia chrysantha</i>
Lark Bunting	<i>Calamospiza melanocorys</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
McCown's Longspur	<i>Calcarius mccownii</i>
Pueblo goldenweed	<i>Oenopsis puebloensis</i>
Round-leaf four-o'clock	<i>Oxybaphus rotundifolius</i>
Western box turtle	<i>Terrapene ornata</i>
Secondary List	
Regal fritillary	<i>Speyeria idalia</i>
On-Site Mitigation Species List	
Giant floater	<i>Anodonta grandis</i>

Several species discussed by CDOT's Shortgrass Prairie Initiative do not currently have a federal or state listing status. However, these species could be listed in the future due to population declines, loss of habitat, or both. The species discussed by the initiative that could potentially occur in the project area have been identified (Table G-2). Though their future status is unknown, it is prudent to mention them in this memorandum so that current and future readers are aware of them. According to the initiative, mitigation for populations and habitat for species found on the primary list are specifically targeted for off-site mitigation (i.e., land protection). Populations and habitat for species found on the secondary list will be considered in selecting among potential mitigation sites.

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Appendix H. Common or Abundant Fish Species Documented in the Project Area

Table H-1. Common or Abundant Fish Species Documents in the Project Area

River or stream	County	Number of Species	Most Common Species (listed in order of abundance)	State Sensitive Fish Species
Arkansas River	All	29	Smallmouth bass river shiner, pumpkinseed, fathead minnow, yellow perch, walleye, southern redbelly dace, brown trout, palmetto bass, and creek chub	Arkansas darter, flathead chub, Southern redbelly dace, suckermouth minnow
Chico Creek	Pueblo	10	Palmetto bass, pumpkinseed, river shiner, smallmouth bass, walleye, and longnose dace	Southern redbelly dace (documented)
Huerfano River	Pueblo	9	Pumpkinseed, smallmouth bass, brown trout, fathead minnow, goldfish, and yellow perch	Southern redbelly dace (potential occurrence)
St. Charles River	Pueblo	15	Palmetto bass, fathead minnow, brown trout, goldfish, yellow perch, pumpkinseed, river shiner, and western mosquitofish	Southern redbelly dace (potential occurrence)
Apishapa River	Otero	8	Fathead minnow, brown trout, river shiner, goldfish, and yellow perch	Southern redbelly dace (potential occurrence)
Crooked Arroyo	Otero	10	Fathead minnow, smallmouth bass, southern redbelly dace, and river shiner	Southern redbelly dace (potential occurrence)
Horse Creek	Otero	16	Pumpkinseed, smallmouth bass, river shiner, goldfish, palmetto bass, and southern redbelly dace	Southern redbelly dace
Timpas Creek	Otero	9	Goldfish, river shiner, southern redbelly dace, fathead minnow, and smallmouth bass	Southern redbelly dace (potential occurrence)
Graveyard Creek	Bent	1	Goldfish	None sampled
Limestone Creek	Bent	0	None sampled	None sampled
Prowers Arroyo	Bent	3	Pumpkinseed, black crappie, and goldfish	None sampled
Purgatorie River	Bent	14	Fathead minnow, river shiner, smallmouth bass, goldfish, brown trout, and creek chub	Southern redbelly dace
Big Sandy Creek	Bent, Prowers	13	Pumpkinseed, smallmouth bass, Arkansas darter, goldfish, palmetto bass, river shiner, and creek chub	Arkansas darter, southern redbelly dace

River or stream	County	Number of Species	Most Common Species (listed in order of abundance)	State Sensitive Fish Species
Buffalo Creek	Prowers	12	Palmetto bass, small mouth bass, pumpkinseed, goldfish, walleye, and northern redbelly dace	None sampled
Cheyenne Creek	Prowers	3	Pumpkinseed, smallmouth bass, and river shiner	None sampled
Granada Creek	Prowers	1	Rainbow trout	None sampled

Appendix I. Species Considered to be Critically Imperiled by the Colorado Natural Heritage Program Potentially Occurring in the Project Area

Table I-1. Critically Imperiled Species Potentially Occurring in the Project Area

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	Colorado Status
AMPHIBIANS					
Couch's spadefoot toad	<i>Scaphiopus couchii</i>	G5	S1		SC
Green toad	<i>Bufo debilis</i>	G5	S2		
BIRDS					
Chestnut-Collared Longspur	<i>Calcarius ornatus</i>	G5	S1B		
Western Snowy Plover	<i>Charadrius alexandrinus nivosus</i>	G4T3	S1B	LT	
Piping Plover	<i>Charadrius melodus</i>	G3	S1B	LE, LT	ST
Least Tern	<i>Sterna antillarum</i>	G4	S1B	LE	SE
Bald Eagle	<i>Haliaeetus leucocephalus</i>	G5	S1B,S3N	LT	ST
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	G3T3	S1B,SUN	LT	ST
Rufous-Crowned Sparrow	<i>Aimophila ruficeps</i>	G5	S2		
Lesser Prairie Chicken	<i>Tympanuchus pallidicinctus</i>	G3	S2	LT	ST
Mountain Plover	<i>Charadrius montanus</i>	G2	S2B		SC
Long-Billed Curlew	<i>Numenius americanus</i>	G5	S2B		SC
Ovenbird	<i>Seiurus aurocapillus</i>	G5	S2B		
Gray Vireo	<i>Vireo vicinior</i>	G4	S2B		
FISH					
Southern redbelly dace	<i>Phoxinus erythrogaster</i>	G5	S1		SE
Arkansas darter	<i>Etheostoma cragini</i>	G3G4	S2	C	ST
INVERTEBRATES					
Giant floater	<i>Anodonta grandis</i>	G5	S2		
Dusted skipper	<i>Atrytonopsis hianna</i>	G4G5	S2		

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	Colorado Status
Colorado clue	<i>Euphilotes rita coloradensis</i>	G3G4T2T3	S2		
Rhesus skipper	<i>Polites rhesus</i>	G4	S2S3		
MAMMALS					
Black-footed ferret	<i>Mustela nigripes</i>	G1	S1	LE, XN	SE
Townsend's big-eared bat ssp.	<i>Plecotus townsendii pallescens</i>	G4T4	S2		SC
Eastern spotted skunk	<i>Spilogale putorius</i>	G5	S2		
REPTILES					
Yellow mud turtle	<i>Kinosternon flavescens</i>	G5	S1		SC
Common kingsnake	<i>Lampropeltis getula</i>	G5	S1		SC
Roundtail horned lizard	<i>Phrynosoma modestum</i>	G5	S1		SC
Triploid Colorado checkered whiptail	<i>Aspidoscelis neotesselata</i>	G2G3	S2		SC
Massasauga snake	<i>Sistrurus catenatus</i>	G3G4	S2	C	SC
PLANTS					
Lavender hyssop	<i>Agastache foeniculum</i>	G4G5	S1		
Ebony spleenwort	<i>Asplenium platyneuron</i>	G5	S1		
Silver beard grass	<i>Bothriochloa laguroides</i> ssp. ^a <i>torreyana</i> <i>Herbaceous Vegetation</i>	G2Q	S1		
Peck sedge	<i>Carex peckii</i>	G4G5	S1		
Sandhill goosefoot	<i>Chenopodium cycloides</i>	G3G4	S1		
Lace hedgehog cactus	<i>Echinocereus reichenbachii</i> var. <i>perbellus</i>	G5T4?	S1		
Dwarf milkweed	<i>Asclepias uncialis</i> ssp. <i>uncialis</i>	G3G4T2T3	S2		
Cheilanthes eatonii	<i>Eaton's lip fern</i>	G5?	S2		
American yellow lady's-slipper	<i>Cypripedium calceolus</i> ssp. ^a <i>parviflorum</i>	G5	S2		
Colorado gumweed	<i>Grindelia inornata</i>	G2	S2		
Rocky Mountain bladderpod	<i>Lesquerella calcicola</i>	G2	S2		
Golden blazing star	<i>Nuttallia chrysantha</i>	G2	S2		
Arkansas Valley evening primrose	<i>Oenothera harringtonii</i>	G2	S2		
Pueblo goldenweed	<i>Oonopsis puebloensis</i>	G2	S2		
Round-leaf four-o'clock	<i>Oxybaphus rotundifolius</i>	G2	S2		
Altai chickweed	<i>Stellaria irrigua</i>	G4?	S2		
Prairie violet	<i>Viola pedatifida</i>	G5	S2		

Common Name	Scientific Name	Global Rank	State Rank	Federal Status	Colorado Status
New Mexico cliff fern	<i>Woodsia neomexicana</i>	G4?	S2		
VEGETATION COMMUNITIES					
Narrowleaf cottonwood/western wheatgrass	<i>Populus angustifolia/Pascopyrum smithii forest</i>	G1Q	S1		
Plains cottonwood/sand dropseed	<i>Populus deltoides/sporobolus cryptandrus</i>	G1G2Q	S1S2		
Northern sandhill prairie	<i>Artemisia filifolia/Andropogon hallii shrubland</i>	G3?	S2		
Clustered sedge wetland	<i>Carex praegracilis herbaceous vegetation</i>	G3G4	S2		
Plains cottonwood/western wheatgrass-vine mesquite	<i>Populus deltoides/pascopyrum smithii-panicum obtusum</i>	G2	S2		
Plains cottonwood/alkali sacaton	<i>Populus deltoides/sporobolus airoides</i>	G3	S2		
Shrubland	<i>Rhus trilobata - Philadelphus microphyllus shrubland</i>	GU	S2		
Saline bottomland shrublands	<i>Sarcobatus vermiculatus/Sporobolus airoides sparse vegetation</i>	G3?	S2		
Alkali sacaton-vine mesquite	<i>Sporobolus airoides/Panicum obtusum herbaceous vegetation</i>	G2	S2		
Mixed foothill shrublands	<i>Cercocarpus montanus-rhus trilobata/ andropogon gerardii</i>	G2G3	S2S3		
Great Plains marsh	<i>Schoenoplectus acutus—typha latifolia— (Schoenoplectus tabernaemontani) sandhills herbaceous vegetation</i>	G4	S2S3		
Coyote willow/bulrush	<i>Salix exigua/schoenoplectus pungens</i>	GU	S2S4		

ssp. = subspecies

I.1. Natural Heritage Program Classification Scheme

The classification scheme that the Natural Heritage Network uses to track rare species and natural communities is a standardized ranking system that allows the Natural Heritage Network members and cooperators to target the most at-risk species and ecosystems for inventory, protection, research, and management. Species and ecosystems are ranked on the Global (G), National (N), and Subnational/state/province (S) levels. The basic ranks used to classify species and ecosystems are:

- 1 = Critically Imperiled (Example: G1 = Globally Ranked Critically Imperiled)
- 2 = Imperiled (Example: N2 = Nationally Ranked Imperiled)
- 3 = Vulnerable to Extirpation (Example: S3 = State Ranked Vulnerable to Extirpation)
- 4 = Apparently Secure
- 5 = Demonstrably Widespread, Abundant, and Secure

There are numerous additional ranks and associated criteria used by the Natural Heritage Network, including: Accepted Global (G), National (N), and Subnational/state/province (S) Ranks (Table I-2).

Table I-2. Ranks and Associated Criteria Used by the Natural Heritage Network

Rank	Definition
GX NX SX	Presumed Extirpated or Extinct—Element is believed to be extirpated from the nation or subnation, or globally extinct. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
GH NH SH	Possibly Extirpated or Extinct (Historical)—Element occurred historically, and there is some expectation that it may be rediscovered. Its presence may not have been verified in the past 20 years. An element would become GH, NH, or SH without such a 20-year delay if the only known occurrences were destroyed or if it had been extensively and unsuccessfully looked for. Upon verification of an extant occurrence, NH or SH-ranked elements would typically receive a G1, N1, or S1 rank. These ranks should be reserved for elements for which some effort has been made to relocate occurrences, rather than simply using this rank for all elements not known from verified extant occurrences.
G1 N1 S1	Critically Imperiled—Critically imperiled because of extreme rarity or because of some factor(s) making it especially vulnerable to extirpation or extinction. Typically 5 or fewer occurrences or less than 1,000 remaining individuals.
G2 N2 S2	Imperiled—Imperiled because of rarity or because of some factor(s) making it very vulnerable to extirpation or extinction. Typically 6 to 20 occurrences or between 1,000 and 3,000 remaining individuals.
G3 N3 S3	Vulnerable—Vulnerable either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation or extinction. Typically 21 to 100 occurrences or between 3,000 and 10,000 remaining individuals.
G4 N4 S4	Apparently Secure—Uncommon but not rare, and usually widespread. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals.
G5 N5 S5	Secure—Common, widespread, and abundant. Perpetually secure under present conditions. Typically with considerably more than 100 occurrences and more than 10,000 individuals.
G? N? S?	Unranked—Rank not yet assessed.
GU NU S	Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

Rank	Definition
G#G# N#N# S#S#	Range Rank—A numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status of the element. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).
HYB	Hybrid—Element not ranked because it represents an interspecific hybrid, not a species.
NE SE	Exotic—An exotic established in the nation or subnation; may be native in nearby regions (e.g., house finch or catalpa in the eastern United States).
NE1 SE1	Exotic Numeric—An exotic established in the nation or subnation that has been assigned a numeric rank to indicate its status, as defined for N1 or S1 through N5 or S5.
NA SA	Accidental—Accidental or casual in the nation or subnation, in other words, infrequent and outside usual range. Includes species (usually birds or butterflies) recorded once or only a few times at a location. A few of these species may have bred on the one or two occasions they were recorded. Examples include European strays or western birds on the East Coast and vice-versa.
NZ SZ	Zero Occurrences—Present but lacking practical conservation concern in the nation or subnation because there are no definable occurrences, although the taxon is native and appears regularly in the nation or subnation. An NZ or SZ rank will generally be used for long distance migrants whose occurrences during their migrations have little or no conservation value for the migrant, as they are typically too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped, and protected. In other words, the migrant regularly passes through the nation or state, but enduring, mappable “Element Occurrences” cannot be defined. Typically, the NZ or SZ rank applies to a non-breeding population in the nation or subnation (i.e., birds on migration). An NZ or SZ rank may in a few instances also apply to a breeding population, for example, certain Lepidoptera, which regularly die out every year with no significant return migration. Although the NZ or SZ ranks typically apply to migrants, it should be used discriminately. NZ or SZ only apply when the migrants occur in an irregular, transitory, and dispersed manner.
NP SP	Potential—Potential that element occurs in the nation or subnation, but no extant or historic occurrences are accepted.
NR SR	Reported—Element reported in the nation or subnation, but without a basis for either accepting or rejecting the report, or the report not yet reviewed locally. Some of these are very recent discoveries for which the program hasn't yet received firsthand information; others are old, obscure reports.
NSYN SSYN	Synonym—Element reported as occurring in the nation or subnation, but the national or state data center does not recognize the taxon; therefore, the element is not assigned a national or subnational rank.
*	N or S rank that has been assigned and is under review. Contact the individual subnational Natural Heritage Program for the assigned rank.
Not Provided	Species known to occur in this nation or subnation. Contact the individual subnational Natural Heritage Program for assigned rank.

Table I-3. Natural Heritage Network Subrank Qualifiers

Subrank	Definition
B	Breeding—Basic rank refers to the breeding population of the element in the nation or subnation (e.g., S2B = Subnational Imperiled—Breeding Population).
N	Nonbreeding Basic—This rank refers to non-breeding population of the element in the nation or subnation (e.g., S3N = Subnational Vulnerable—Non-Breeding Population).
?	Inexact or Uncertain—Denotes inexact or uncertain numeric rank (e.g., SE? = Uncertain Subnational Exotic Rank).
C	Captive or Cultivated—Present populations are only found in captivity or cultivation, or as a reintroduced population not yet established (e.g., G1C = globally critically imperiled in captive or cultivated populations only).
T	Infraspecific Taxon (trinomial)—The status of the subspecies or varieties (taxa) are indicated by a "T-rank" following the species' global rank (e.g., G2T1 = globally imperiled species with subspecies or variety in question critically imperiled).

Appendix J. Figures (J-1 through J-39)

This appendix contains the following figures (in the order listed):

- Figure J-1. Land Use/Land Cover—Pueblo County
- Figure J-2. Land Use/Land Cover—Otero County
- Figure J-3. Land Use/Land Cover—Bent County
- Figure J-4. Land Use/Land Cover—Prowers County
- Figure J-5. Noxious Vegetation—Pueblo County
- Figure J-6. Noxious Vegetation—Otero County
- Figure J-7. Noxious Vegetation—Bent County
- Figure J-8. Noxious Vegetation—Prowers County
- Figure J-9. Black-tailed Prairie Dog Activities—Pueblo County
- Figure J-10. Black-tailed Prairie Dog Activities—Otero County
- Figure J-11. Black-tailed Prairie Dog Activities—Bent County
- Figure J-12. Black-tailed Prairie Dog Activities—Prowers County
- Figure J-13. Wildlife Crossings Relative Priority—Pueblo County
- Figure J-14. Wildlife Crossings Relative Priority—Otero County
- Figure J-15. Wildlife Crossings Relative Priority—Bent County
- Figure J-16. Wildlife Crossings Relative Priority—Prowers County
- Figure J-17. Land Use and Land Cover Effects—Pueblo
- Figure J-18. Land Use and Land Cover Impacts—Pueblo to Fowler (west)
- Figure J-19. Land Use and Land Cover Impacts—Pueblo to Fowler (east)
- Figure J-20. Land Use and Land Cover Impacts—Fowler North Alternative and Fowler South Alternative
- Figure J-21. Land Use and Land Cover Impacts—Fowler to Manzanola
- Figure J-22. Land Use and Land Cover Impacts—Manzanola
- Figure J-23. Land Use and Land Cover Impacts—Manzanola to Rocky Ford
- Figure J-24. Land Use and Land Cover Impacts—Rocky Ford
- Figure J-25. Land Use and Land Cover Impacts—Rocky Ford to Swink, Swink North Alternative and Swink South Alternative
- Figure J-26. Land Use and Land Cover Impacts—La Junta South 1 Alternative and La Junta South 2 Alternative
- Figure J-27. Land Use and Land Cover Impacts—La Junta to Las Animas
- Figure J-28. Land Use and Land Cover Impacts—Las Animas
- Figure J-29. Land Use and Land Cover Impacts—Las Animas to Lamar (west)
- Figure J-30. Land Use and Land Cover Impacts—Las Animas to Lamar (east)
- Figure J-31. Bald Eagle Habitat Impacts—Las Animas to Lamar (east)
- Figure J-32. Land Use and Land Cover Impacts—Lamar to Granada
- Figure J-33. Bald Eagle Habitat Impacts—Lamar to Granada
- Figure J-34. Land Use and Land Cover Impacts—Granada
- Figure J-35. Lesser Prairie Chicken Habitat Impacts—Granada
- Figure J-36. Land Use and Land Cover Impacts—Granada to Holly
- Figure J-37. Lesser Prairie Chicken Habitat Impacts—Granada to Holly
- Figure J-38. Land Use and Land Cover Impacts—Holly
- Figure J-39. Land Use and Land Cover Impacts—Holly Transition

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Figure J-1. Land Use/Land Cover—Pueblo County

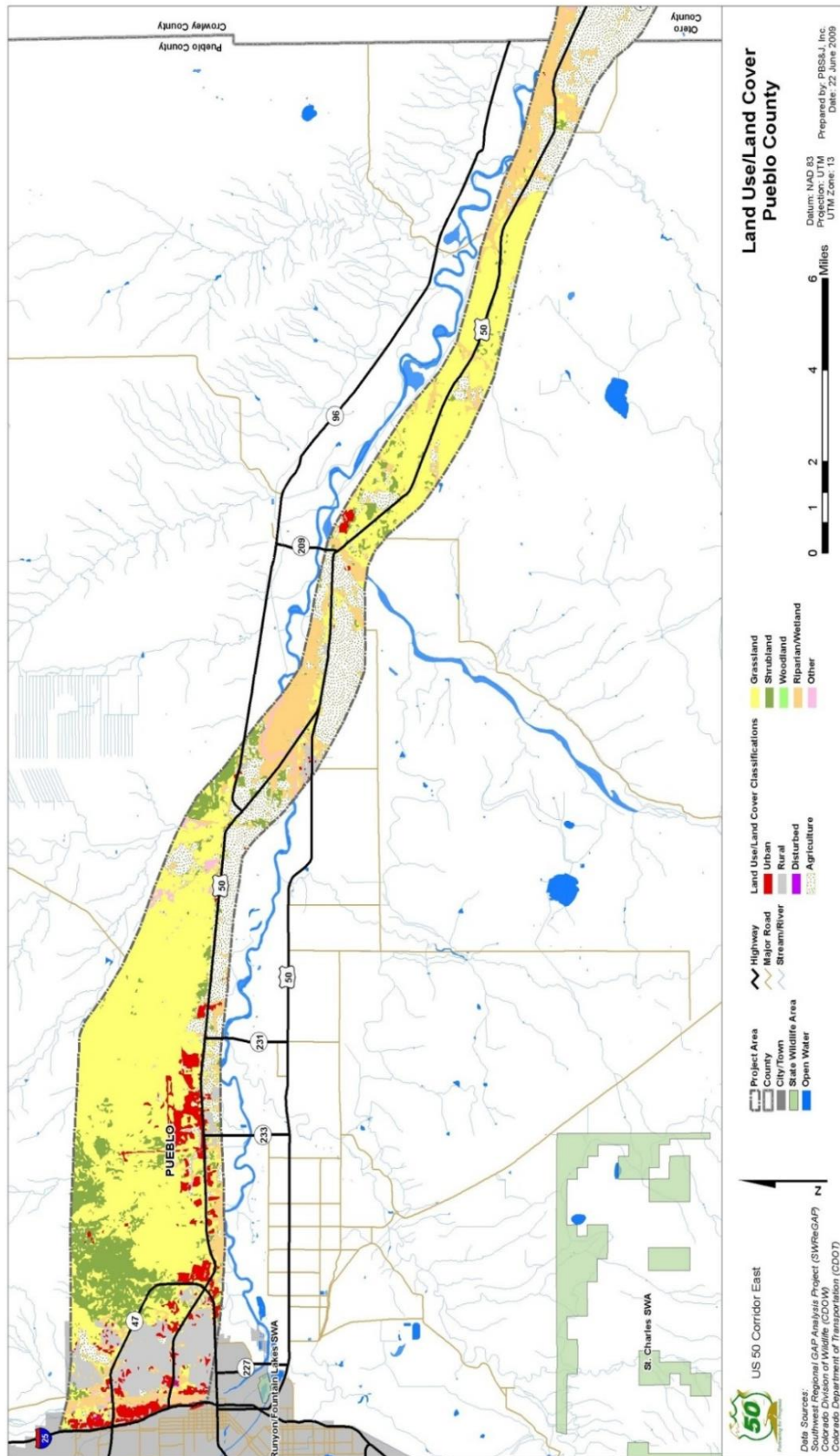


Figure J-2. Land Use/Land Cover—Otero County

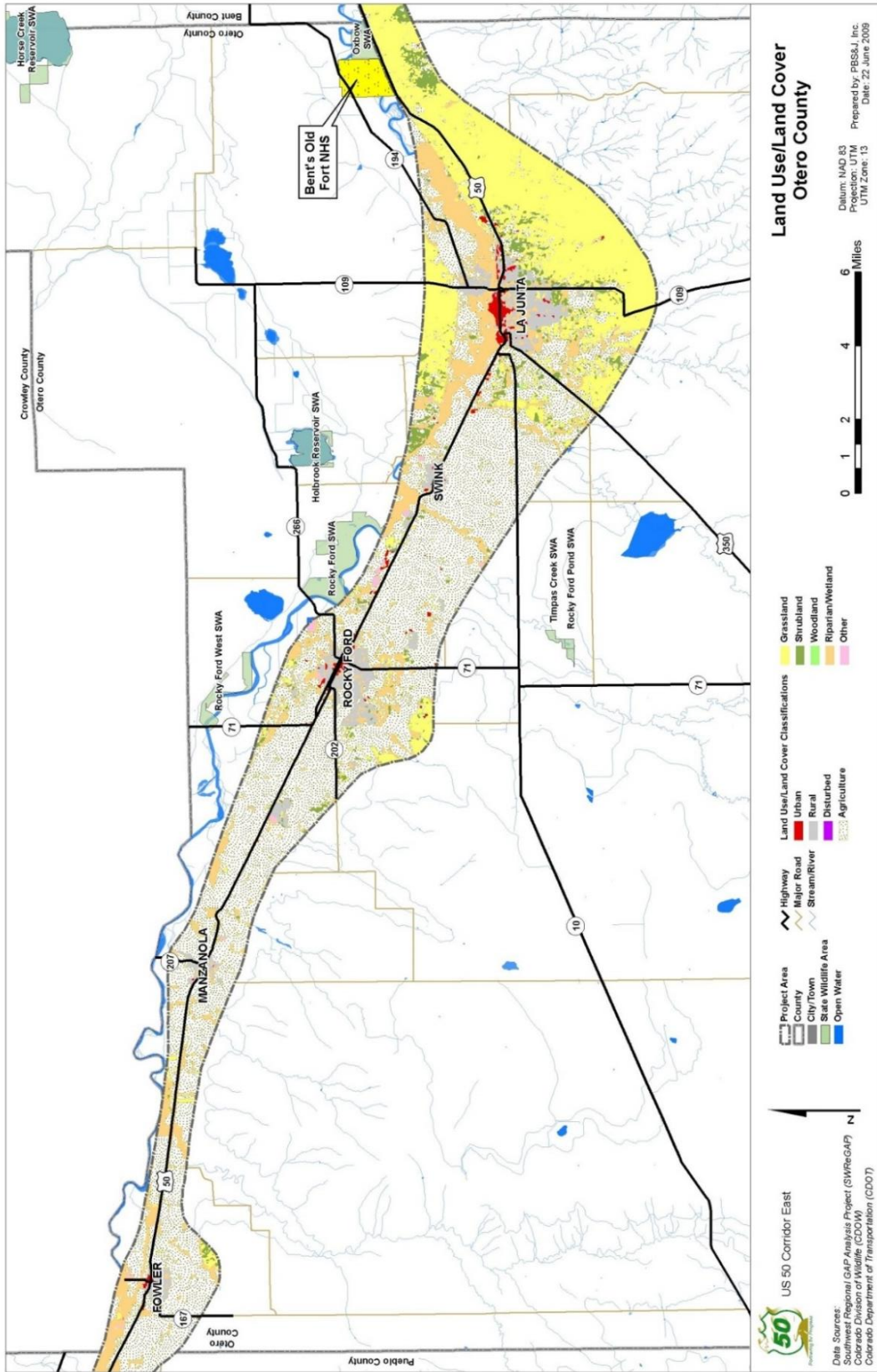


Figure J-3. Land Use/Land Cover—Bent County

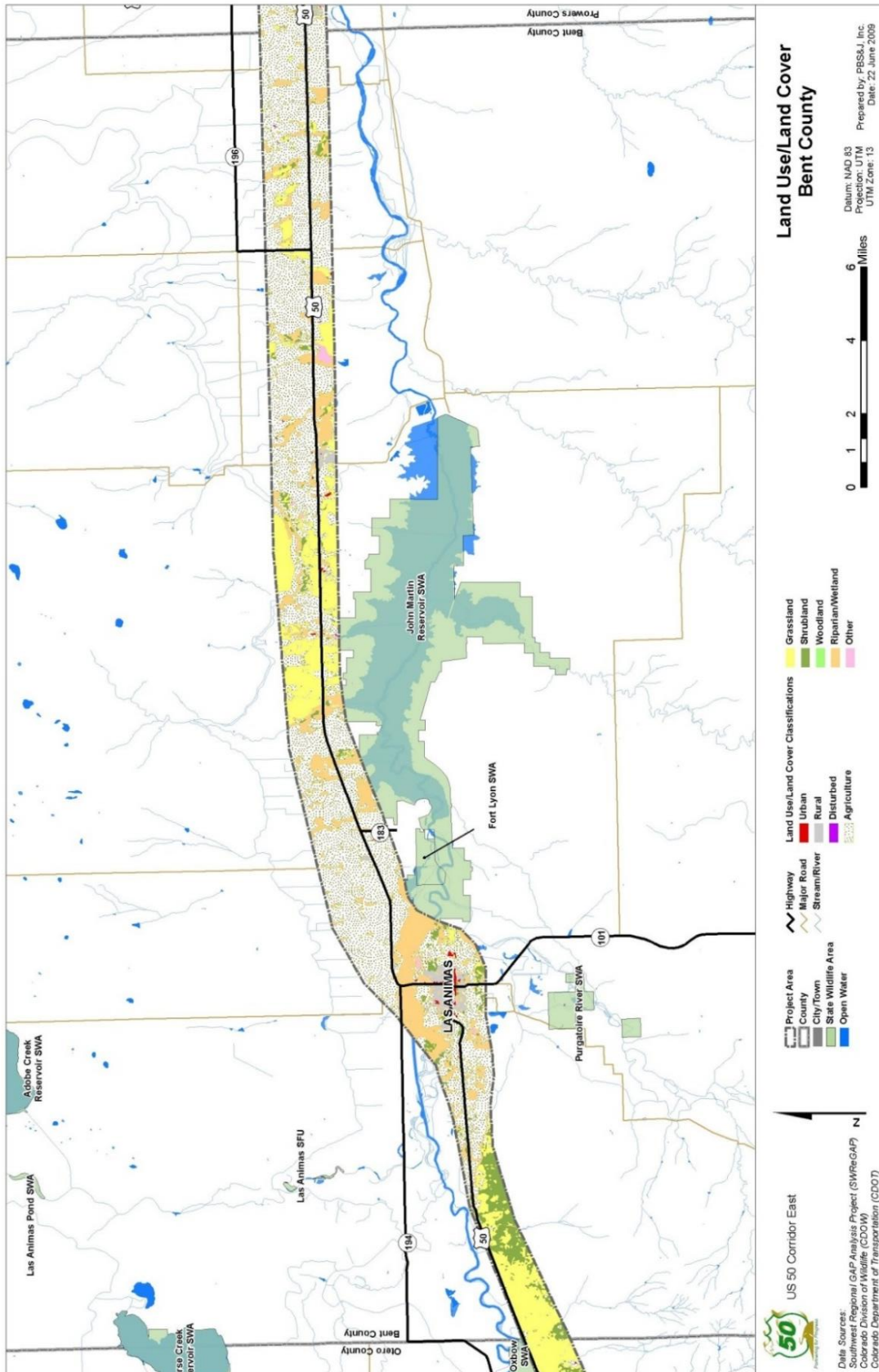


Figure J-4. Land Use/Land Cover—Prowers County

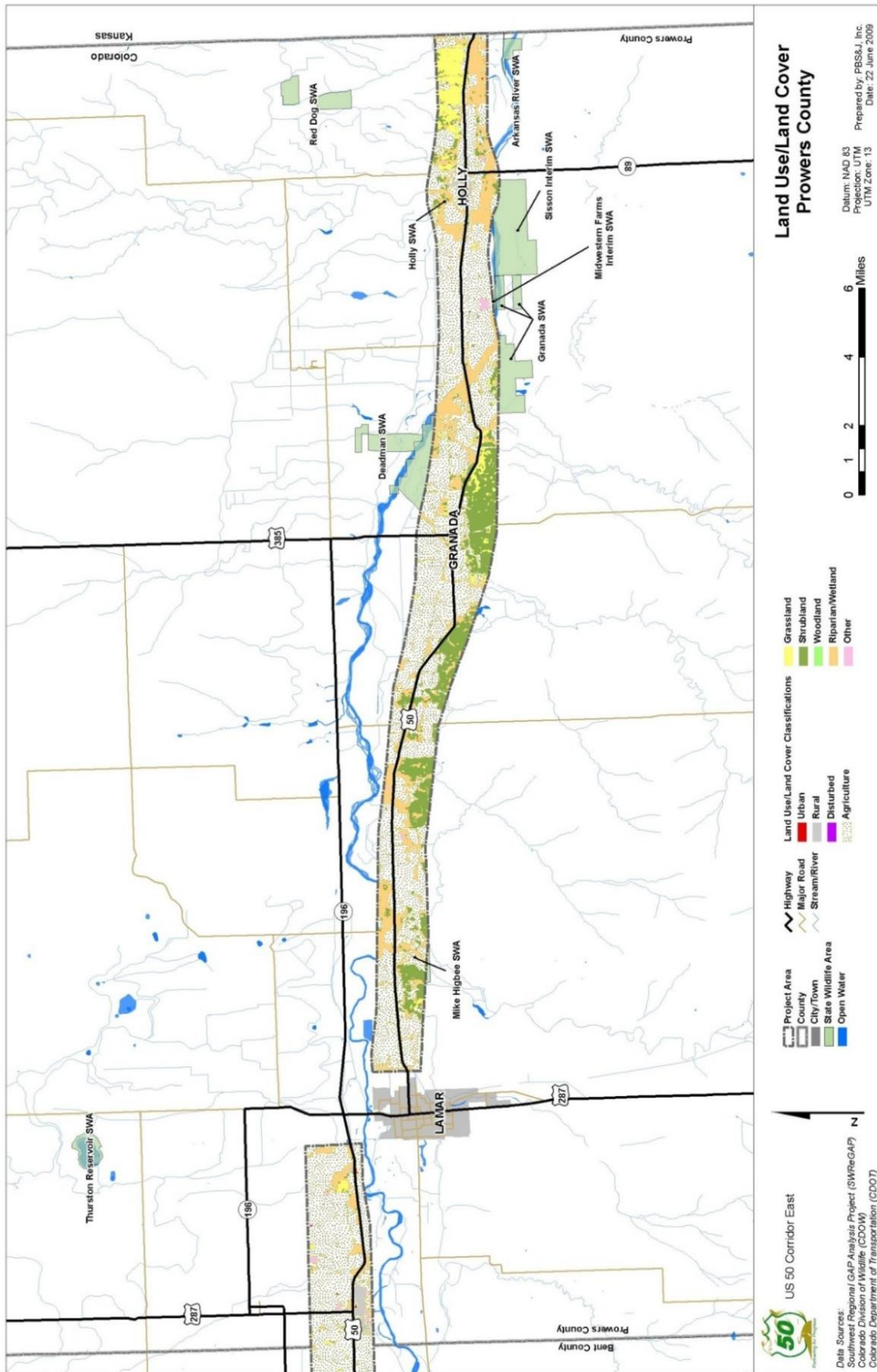


Figure J-5. Noxious Vegetation—Pueblo County

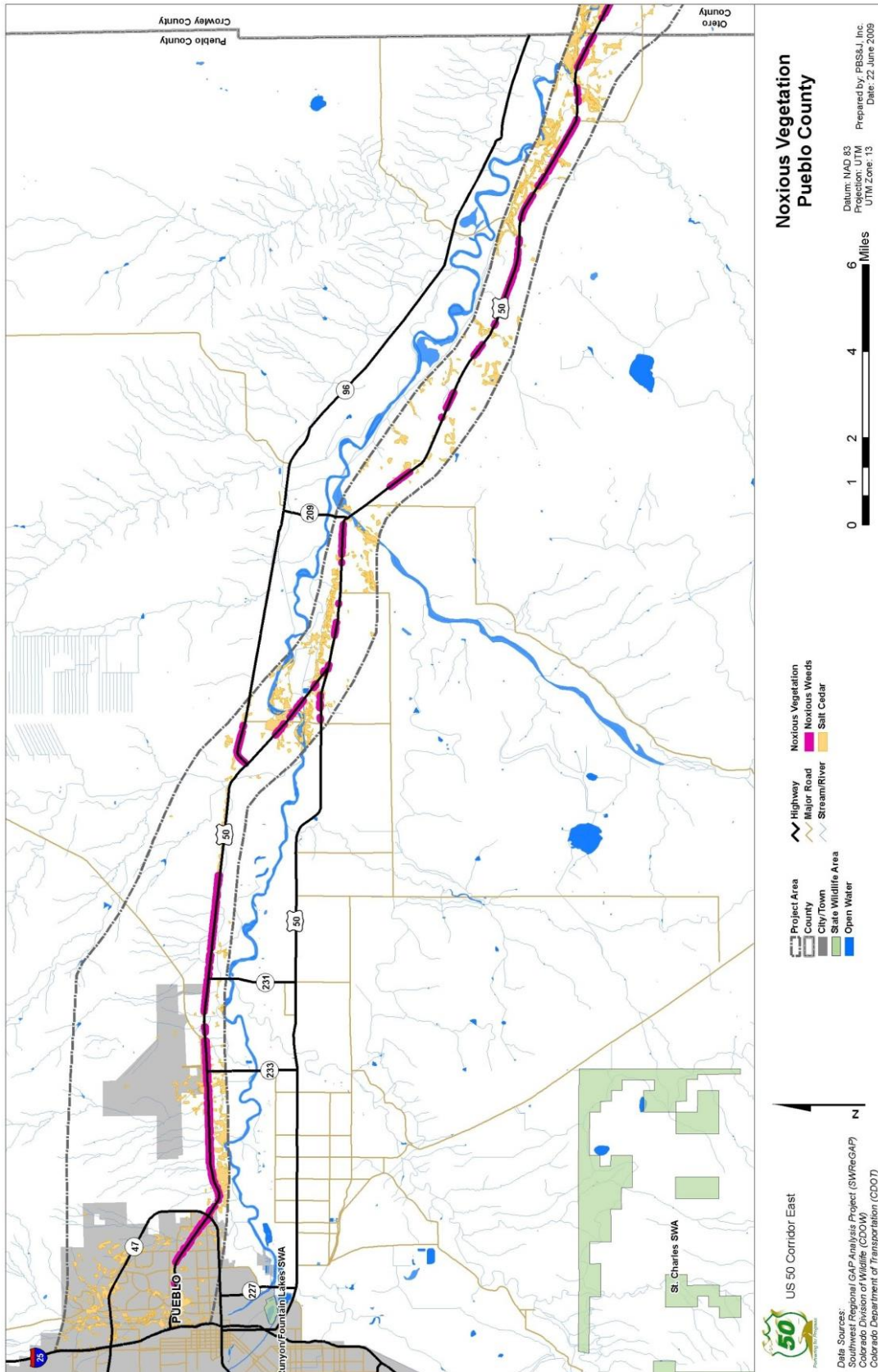


Figure J-6. Noxious Vegetation—Otero County

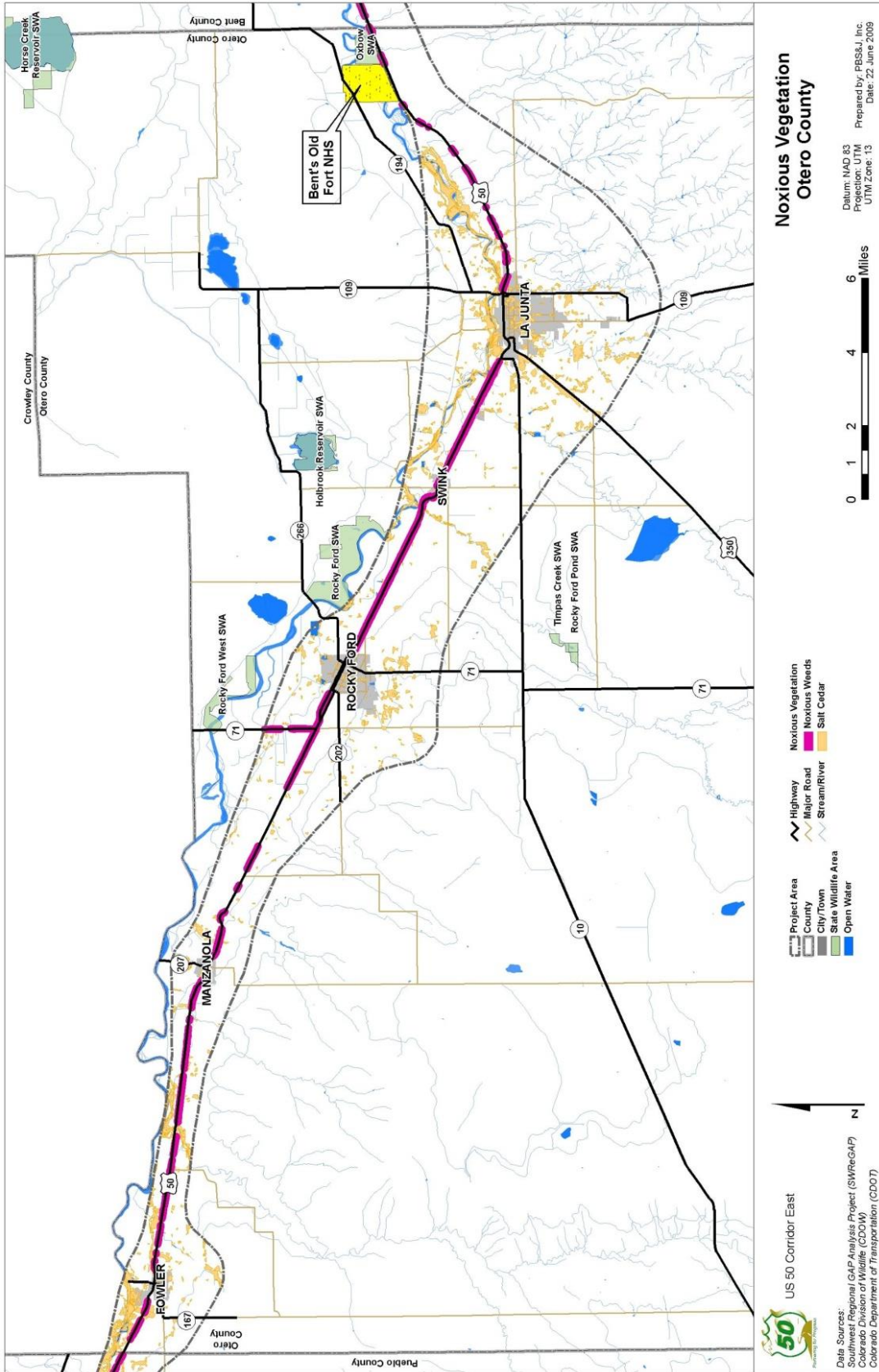


Figure J-7. Noxious Vegetation—Bent County

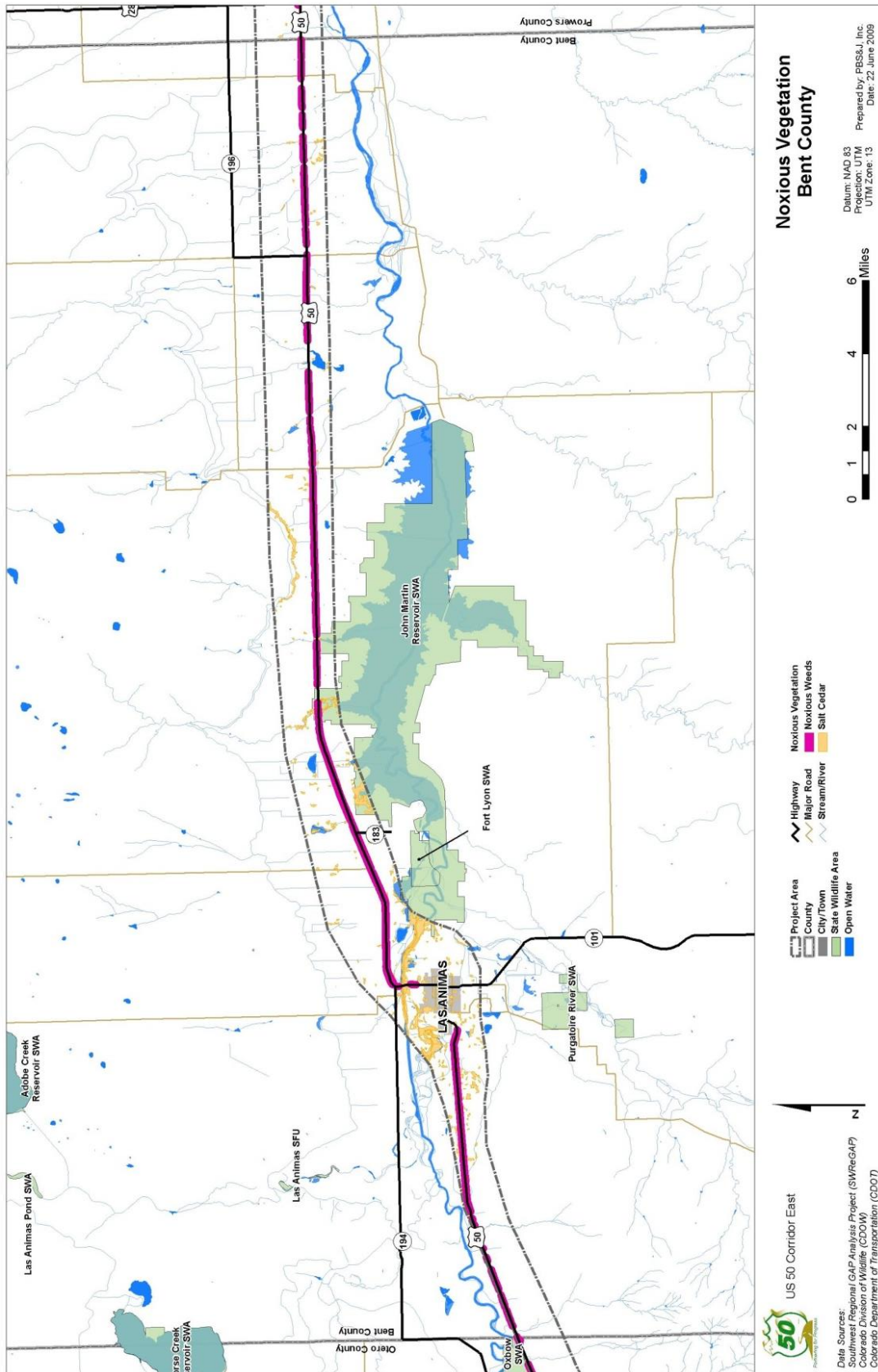


Figure J-8. Noxious Vegetation—Prowers County

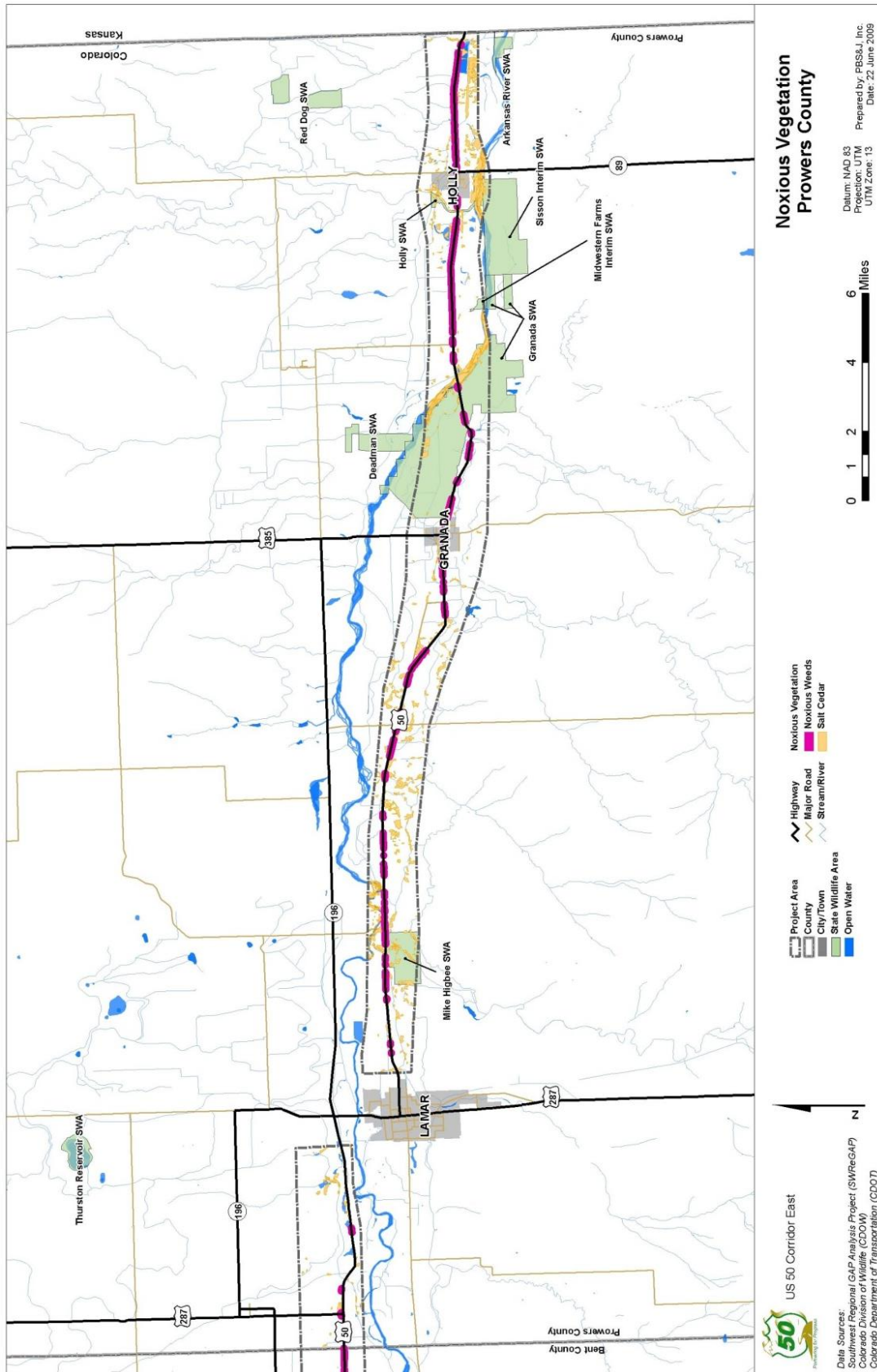


Figure J-9. Black-tailed Prairie Dog Activities—Pueblo County

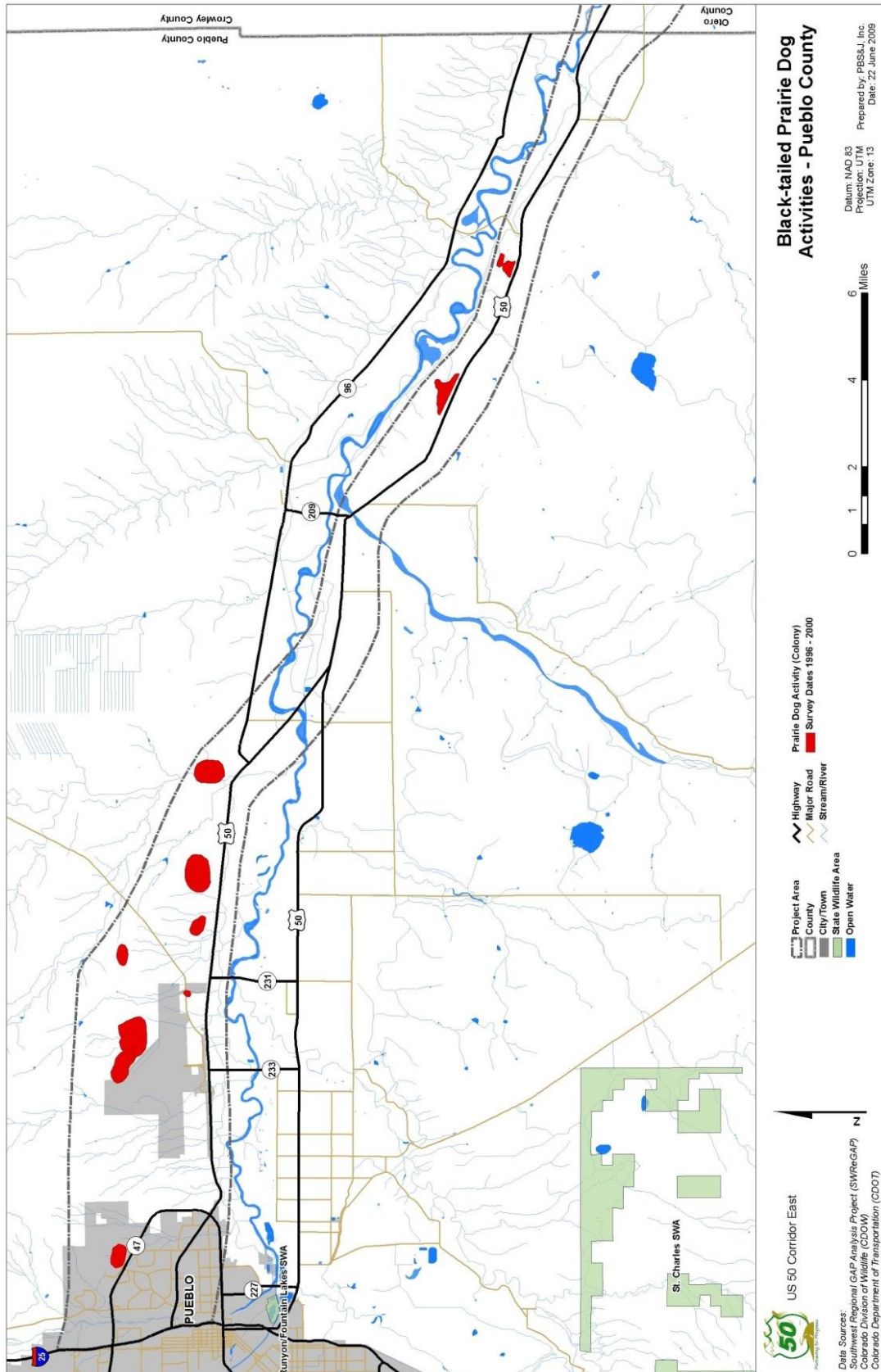


Figure J-10. Black-tailed Prairie Dog Activities—Otero County

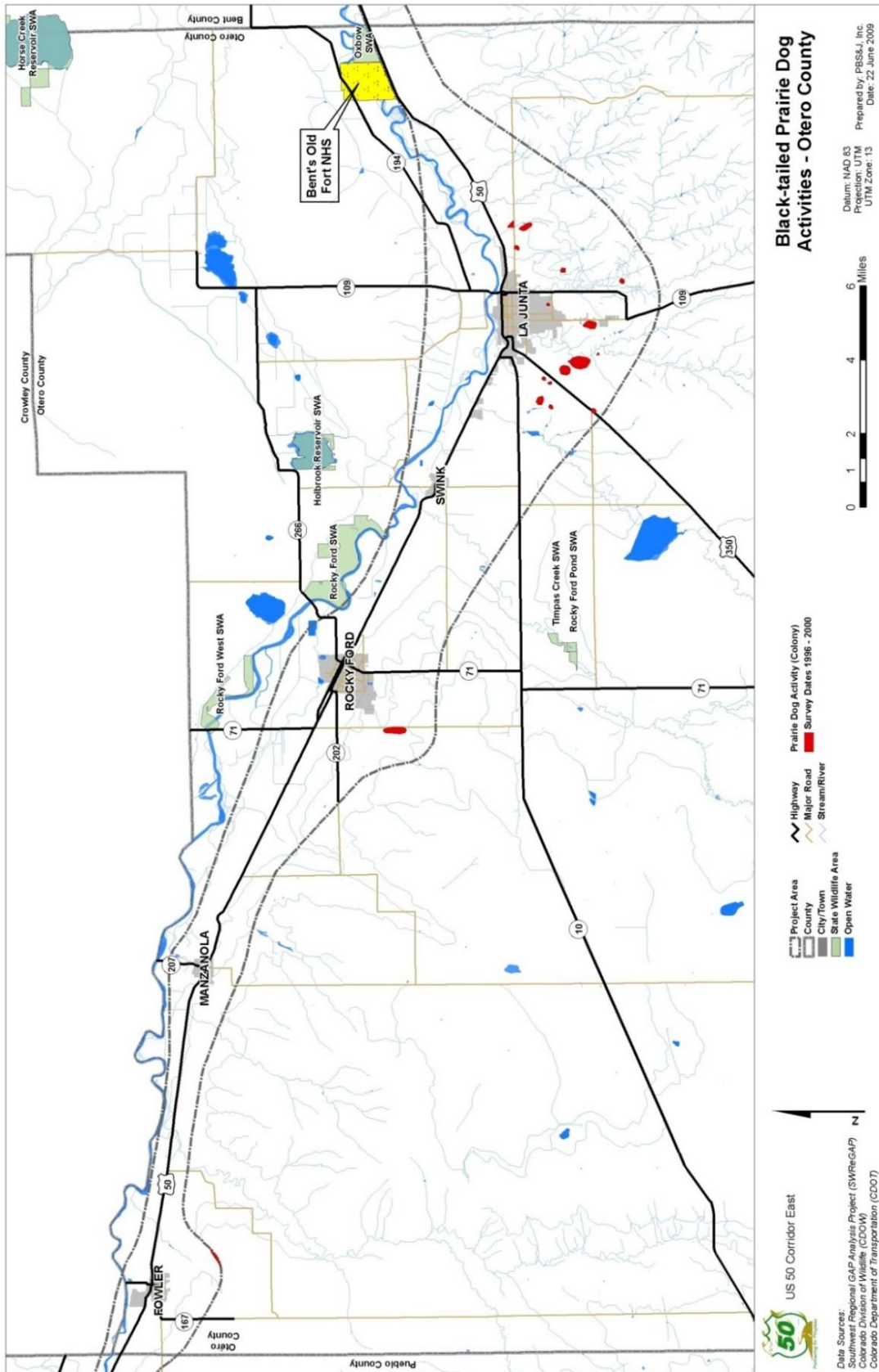


Figure J-11. Black-tailed Prairie Dog Activities—Bent County

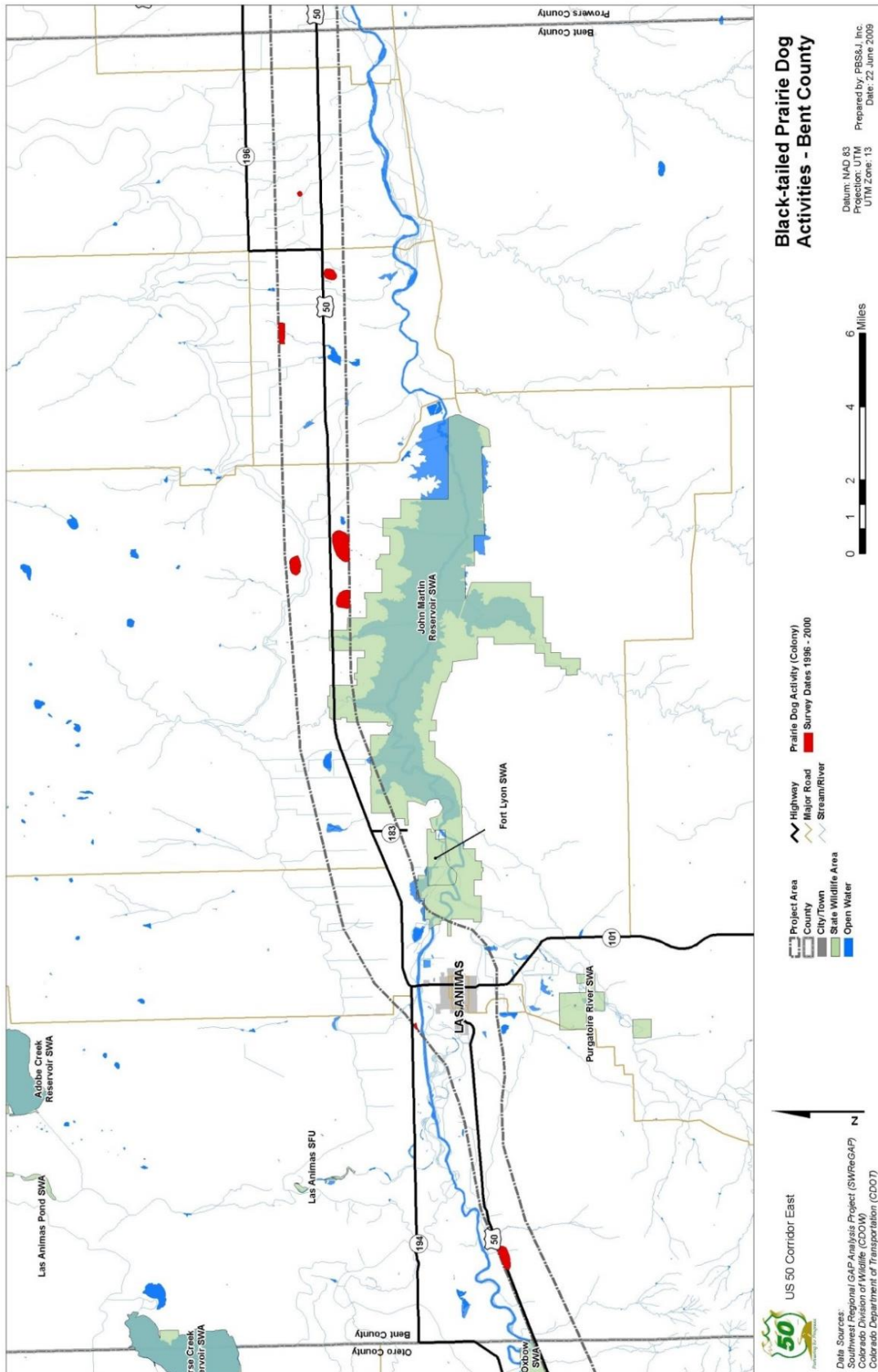


Figure J-12. Black-tailed Prairie Dog Activities—Prowers County

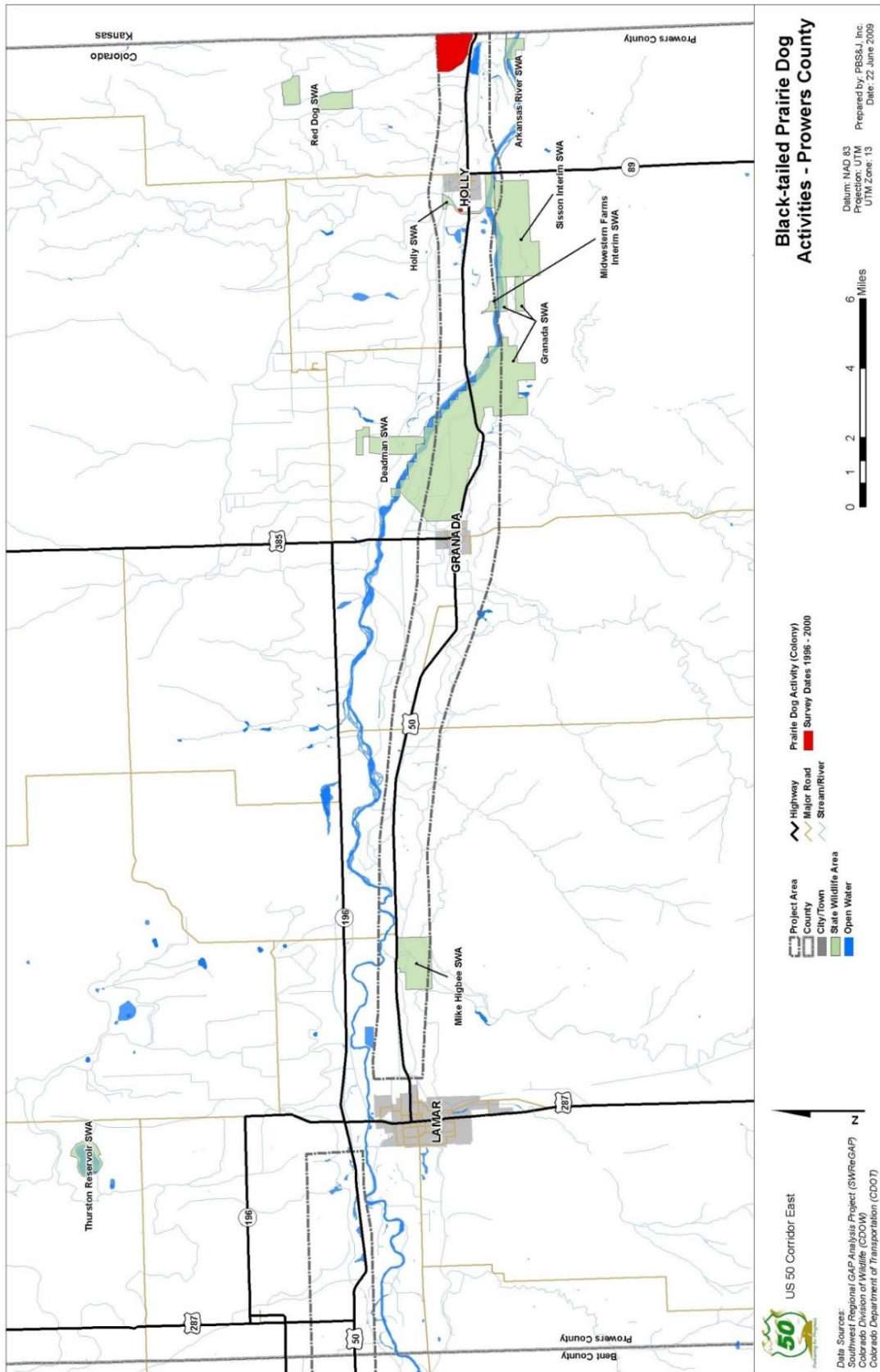


Figure J-13. Wildlife Crossings Relative Priority—Pueblo County

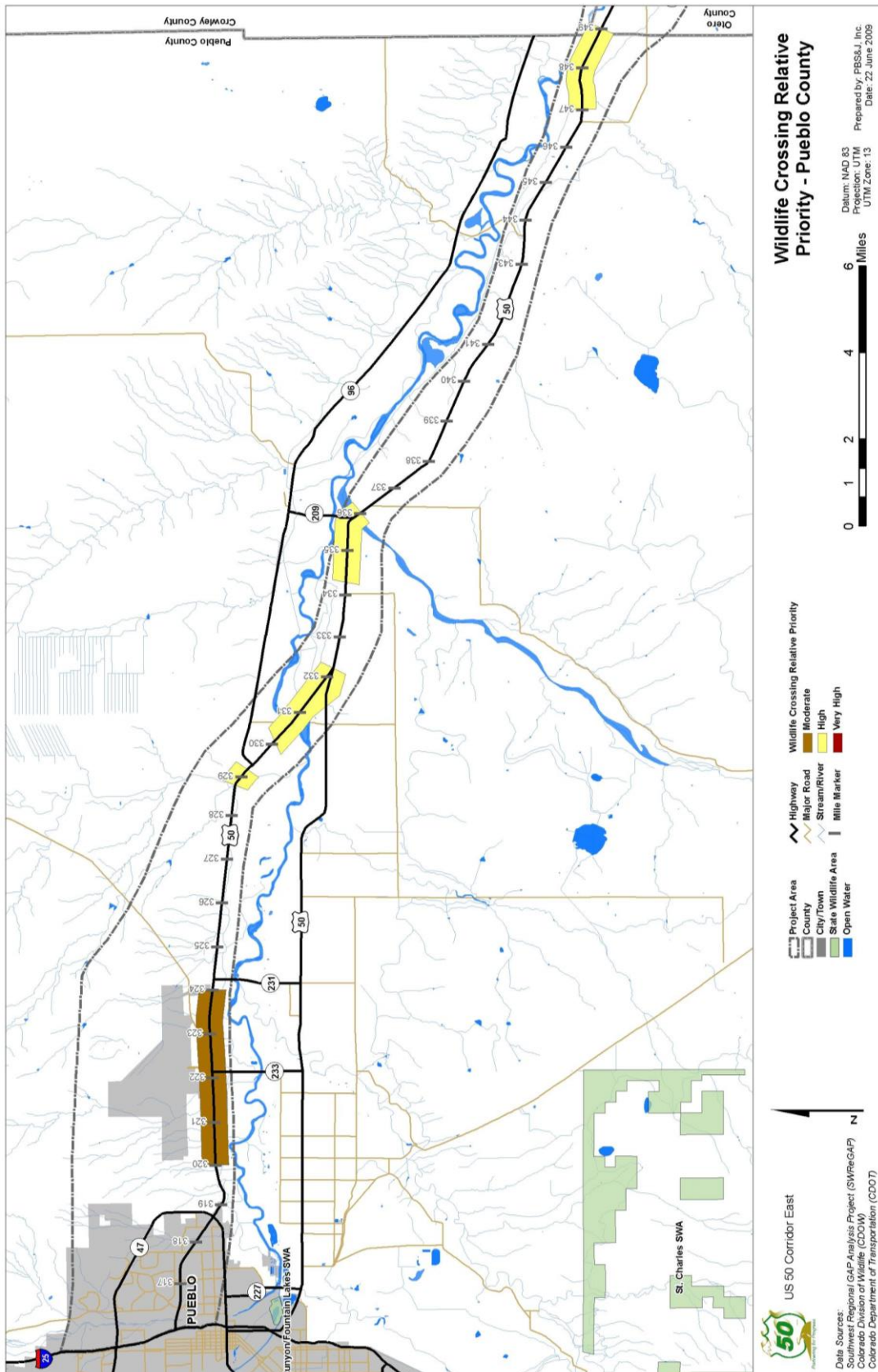


Figure J-14. Wildlife Crossings Relative Priority—Otero County

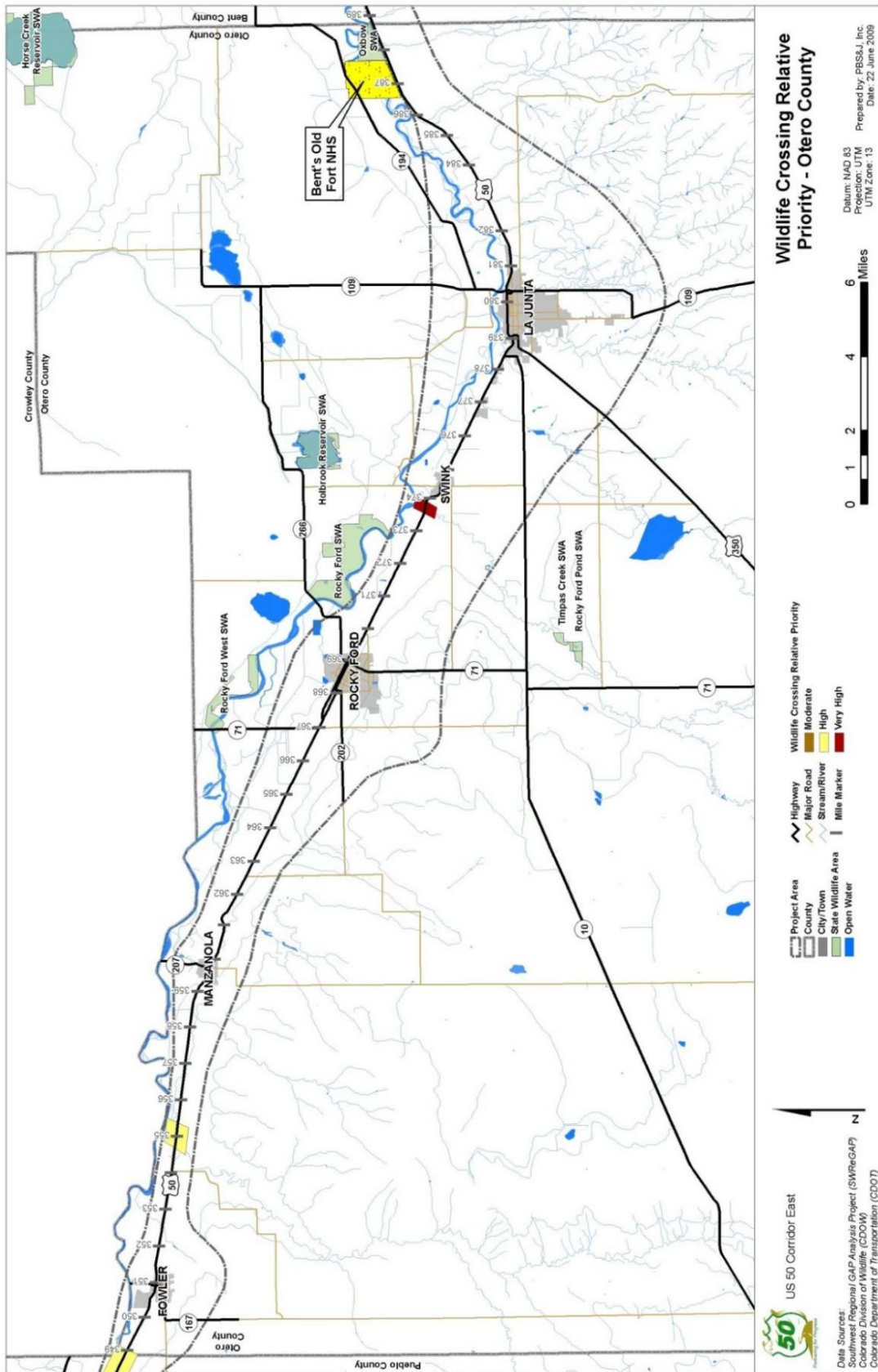


Figure J-15. Wildlife Crossings Relative Priority—Bent County

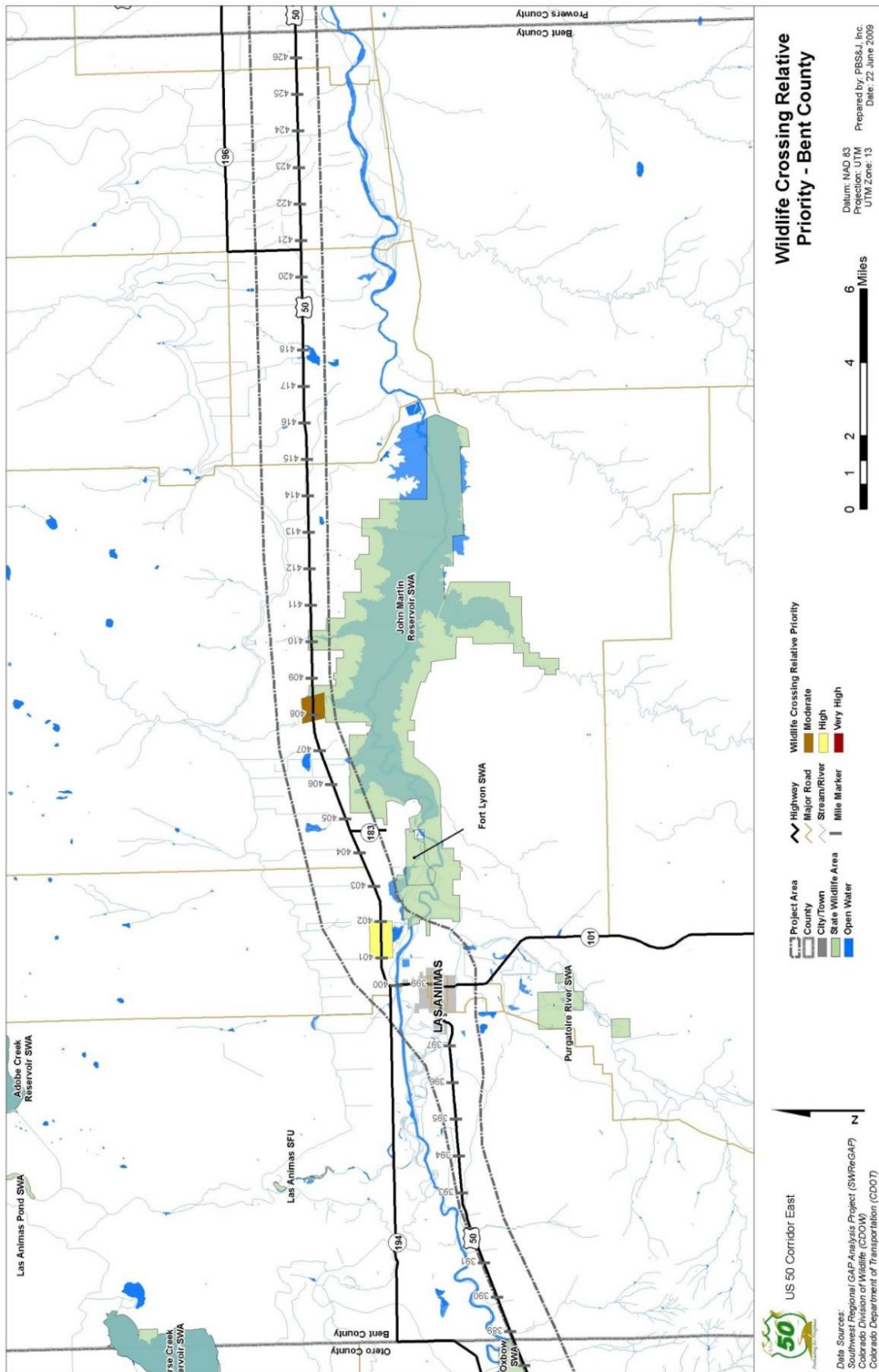


Figure J-16. Wildlife Crossings Relative Priority—Prowers County

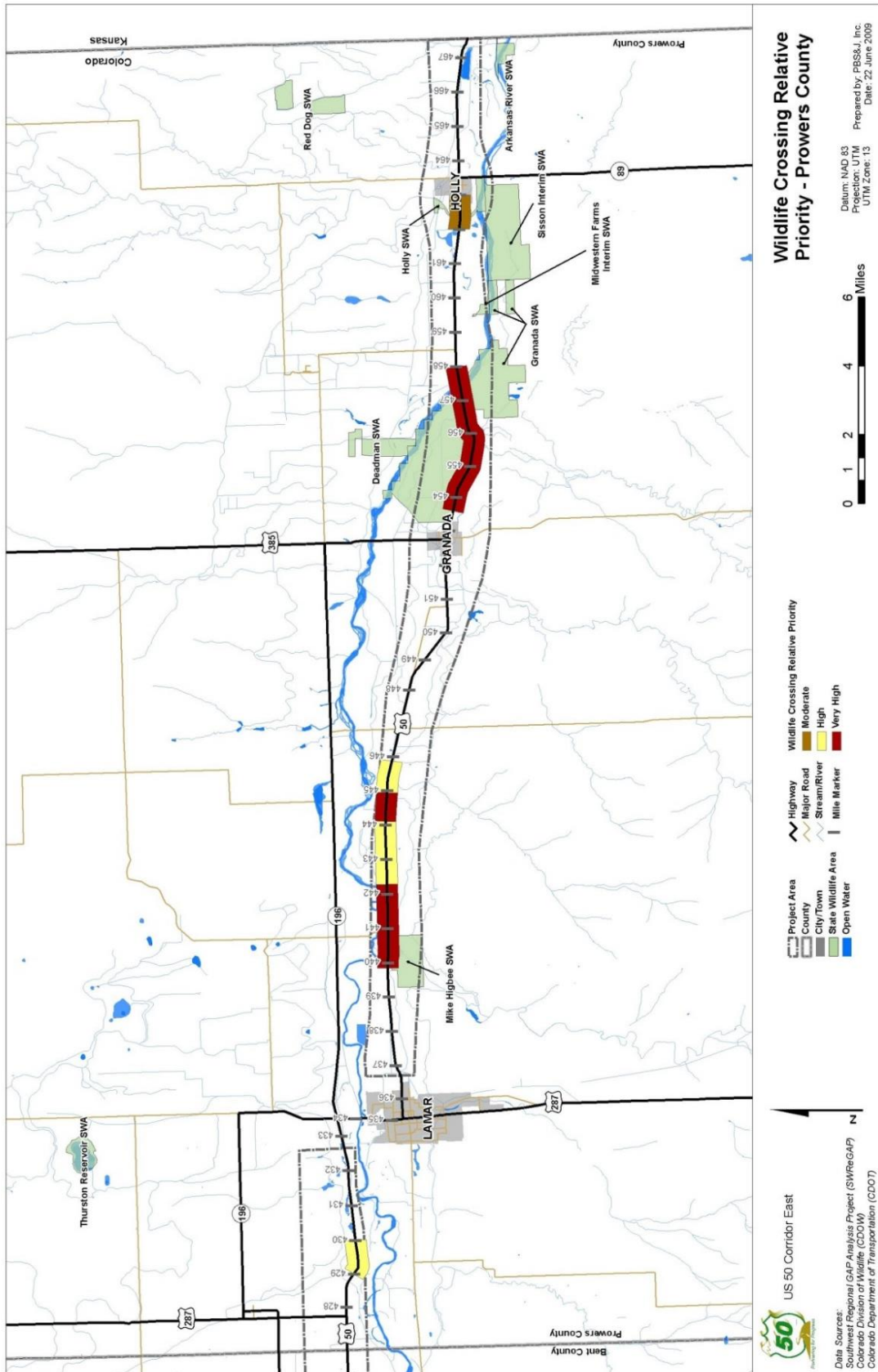


Figure J-17. Land Use and Land Cover Effects—Pueblo

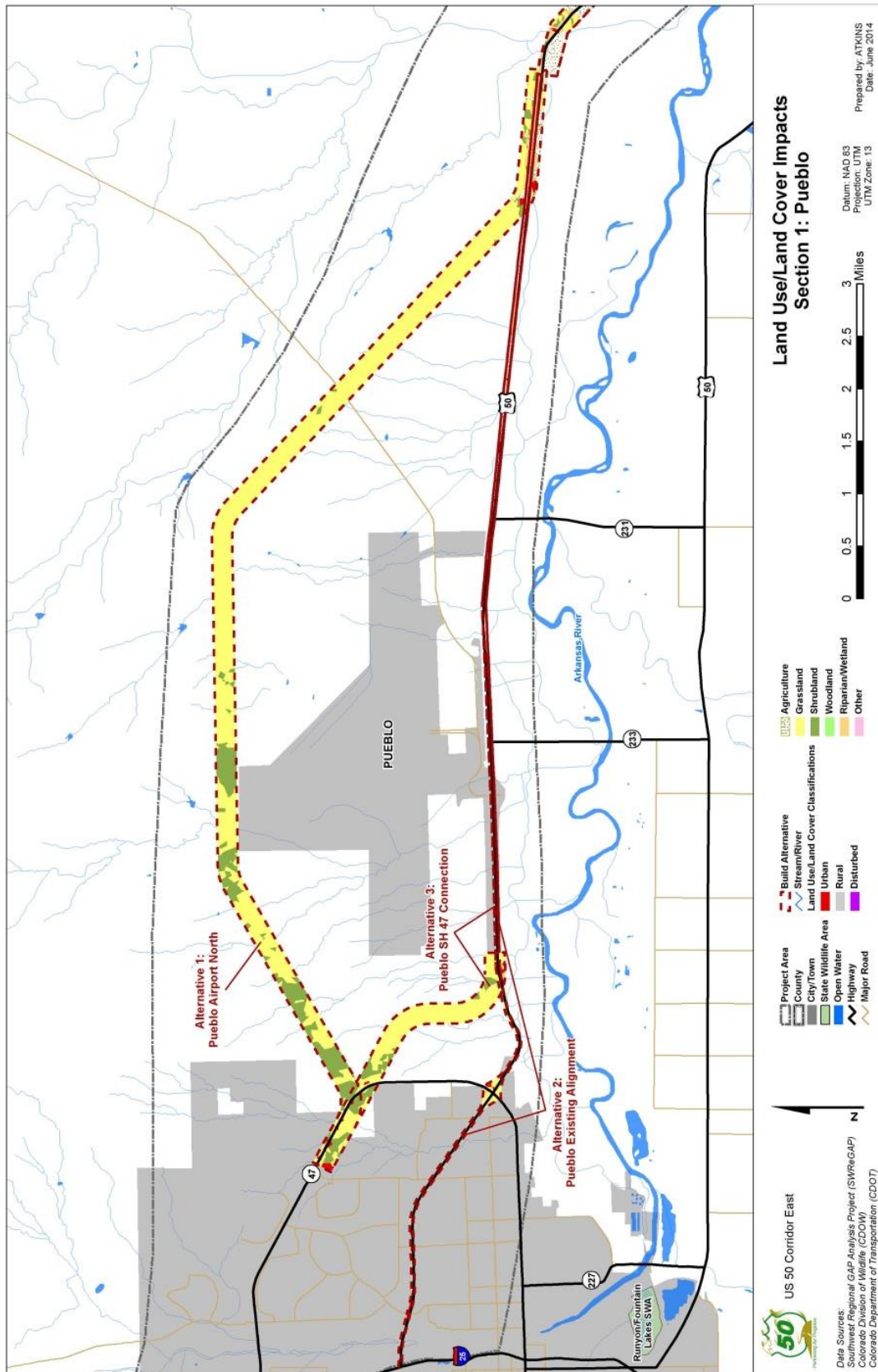


Figure J-18. Land Use and Land Cover Impacts—Pueblo to Fowler (west)

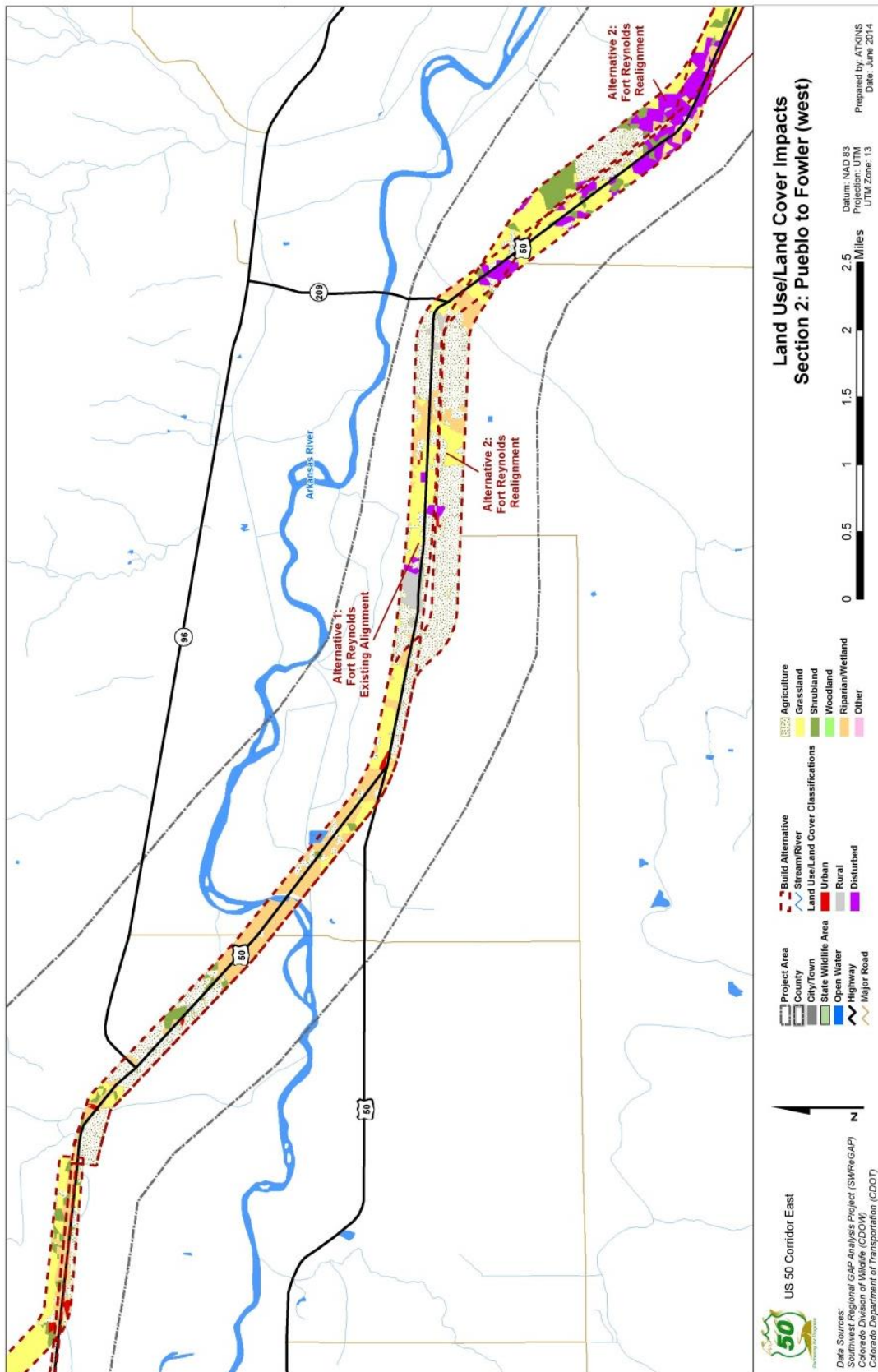


Figure J-19. Land Use and Land Cover Impacts—Fowler North Option and Fowler South Option

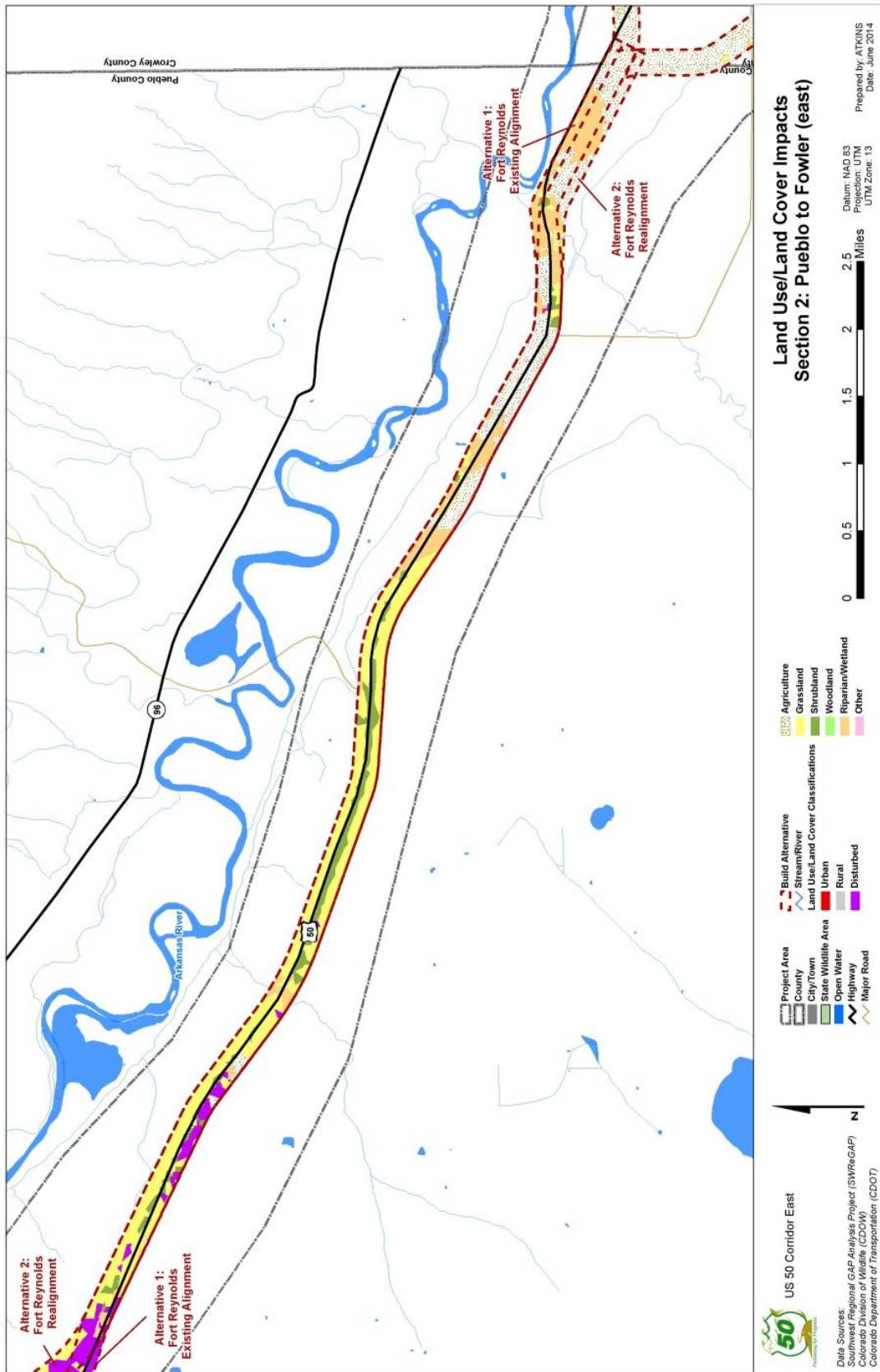


Figure J-20. Land Use and Land Cover Impacts—Fowler North Alternative and Fowler South Alternative

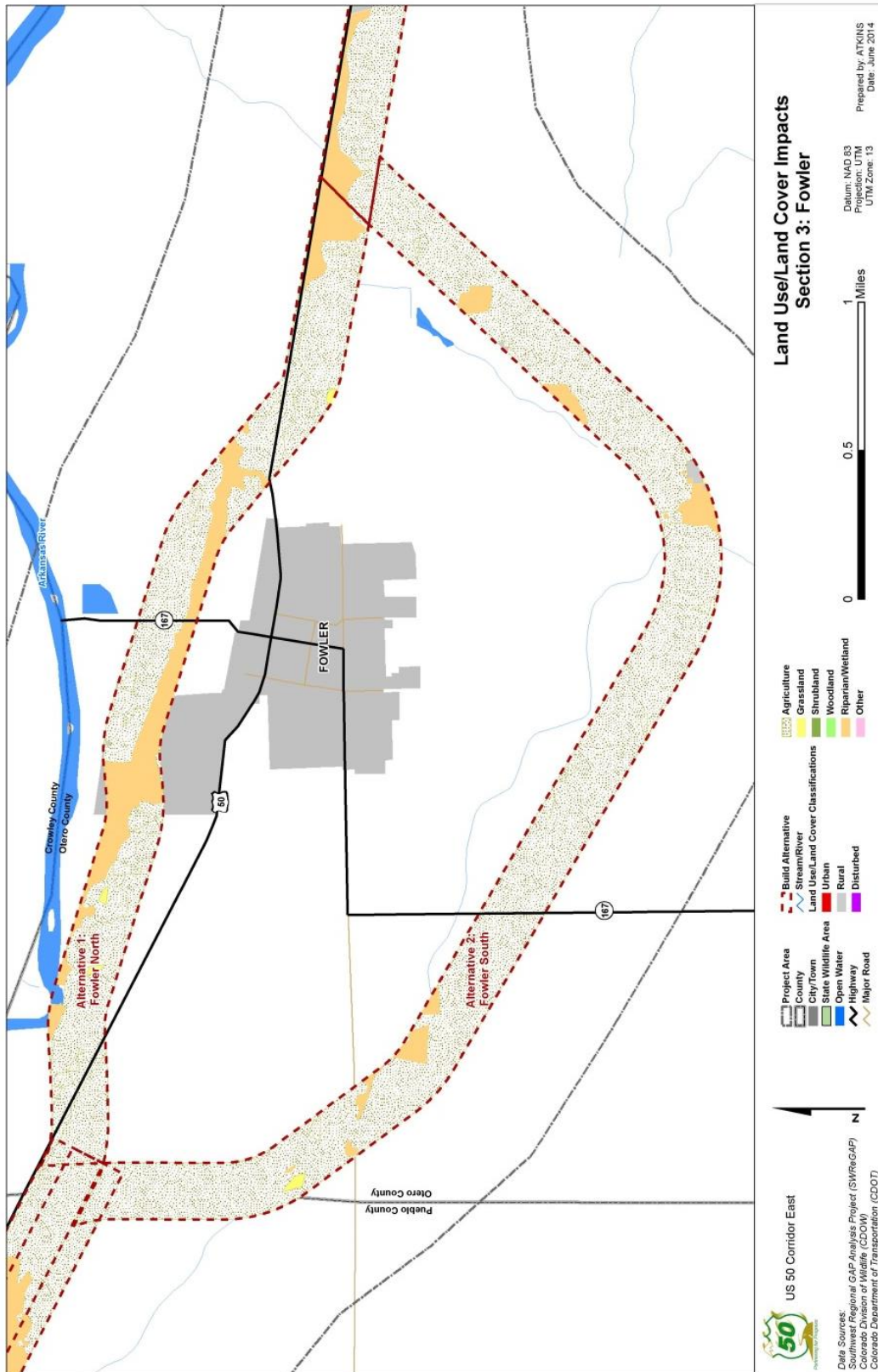


Figure J-21. Land Use and Land Cover Impacts—Fowler to Manzanola

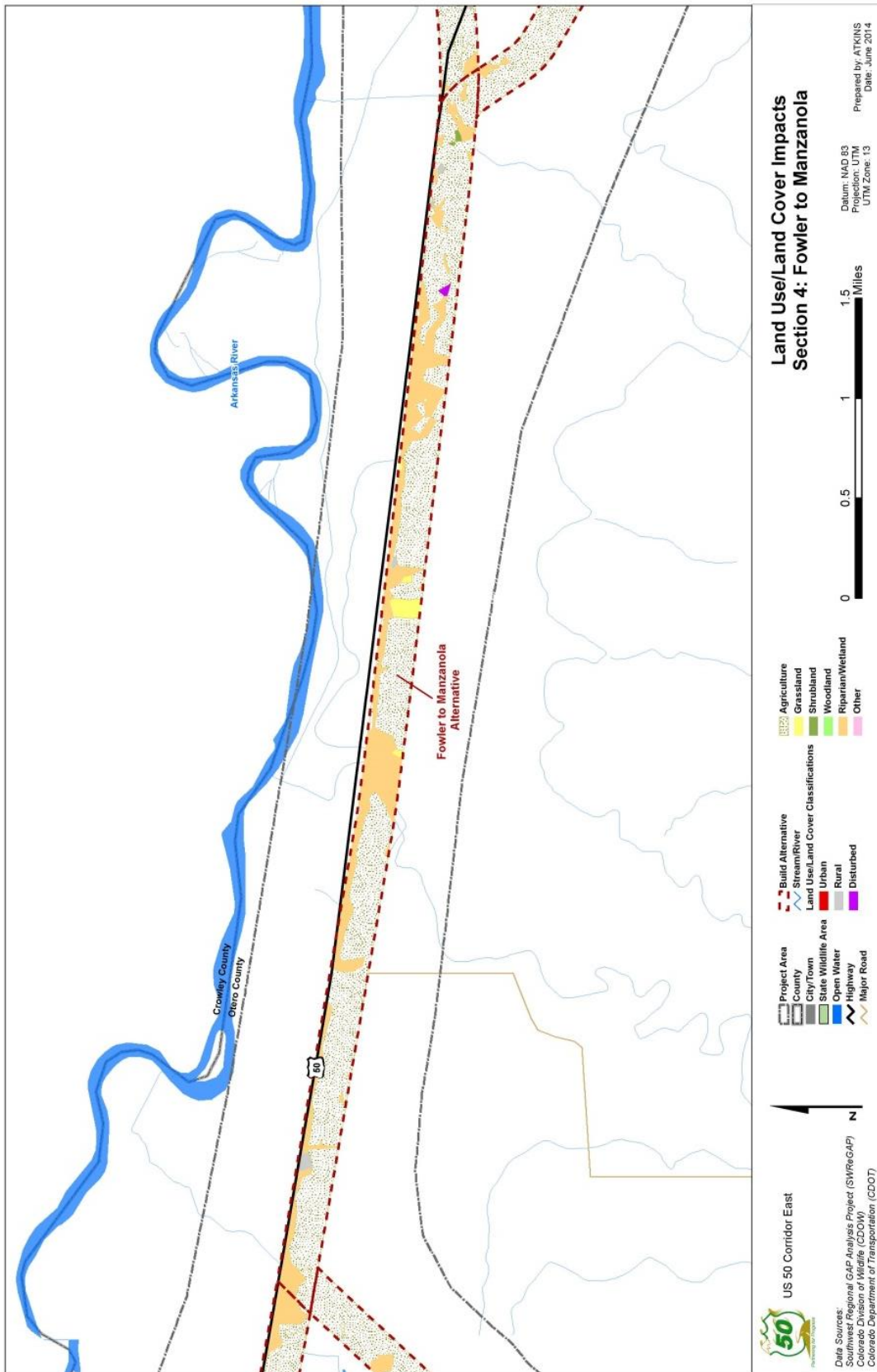


Figure J-22. Land Use and Land Cover Impacts—Manzanola

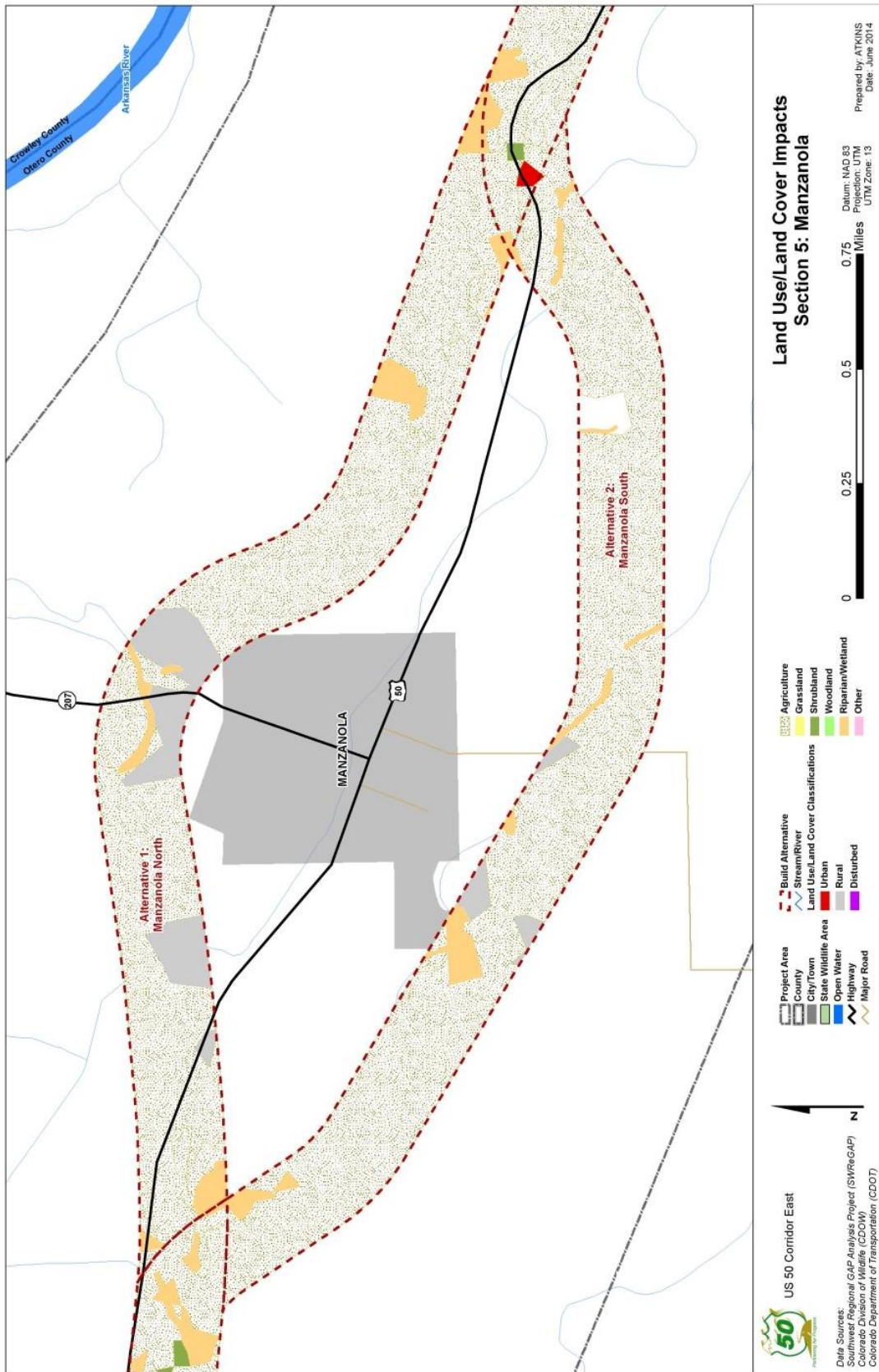


Figure J-23. Land Use and Land Cover Impacts—Manzanola to Rocky Ford

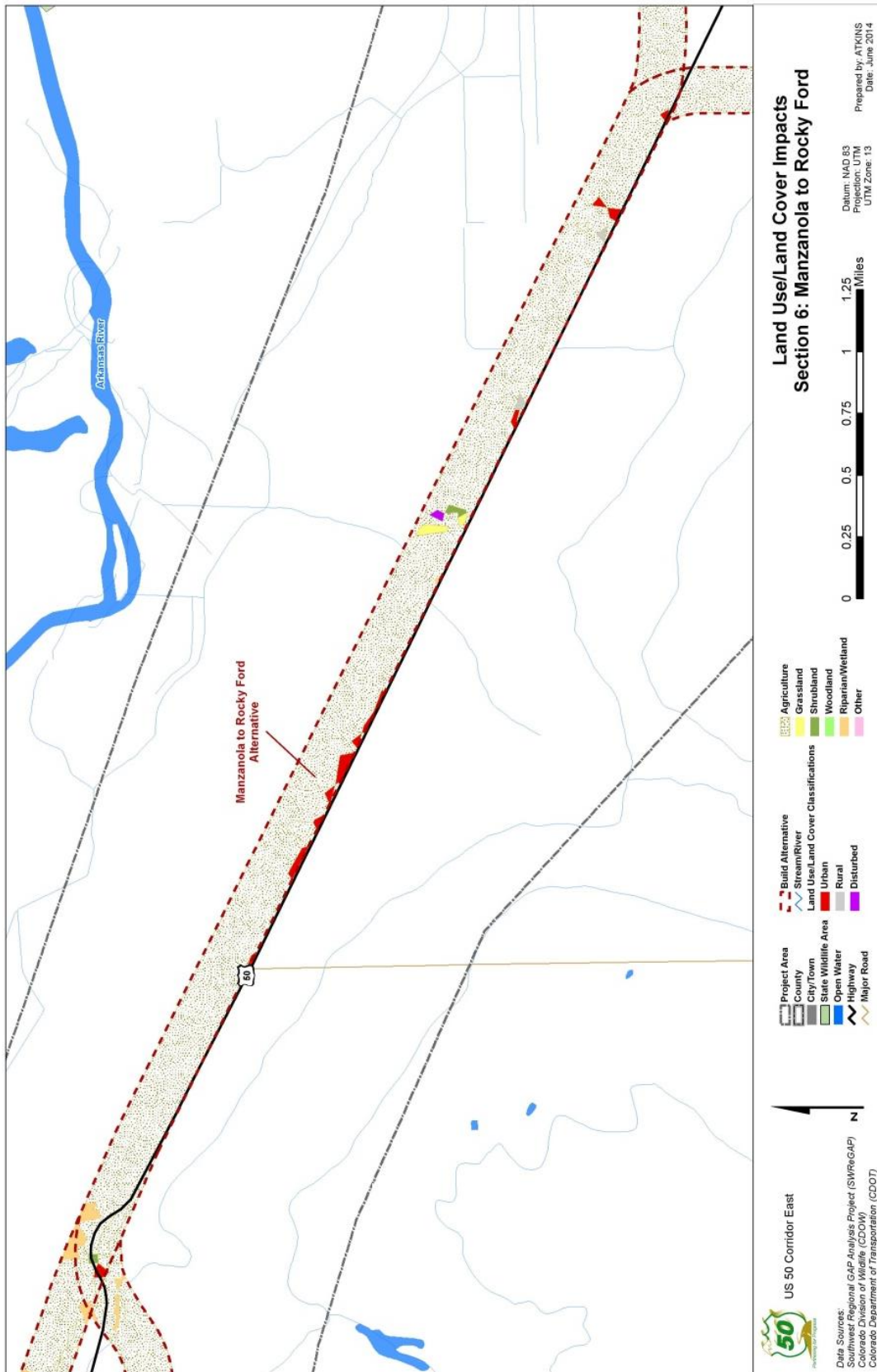


Figure J-24. Land Use and Land Cover Impacts—Rocky Ford

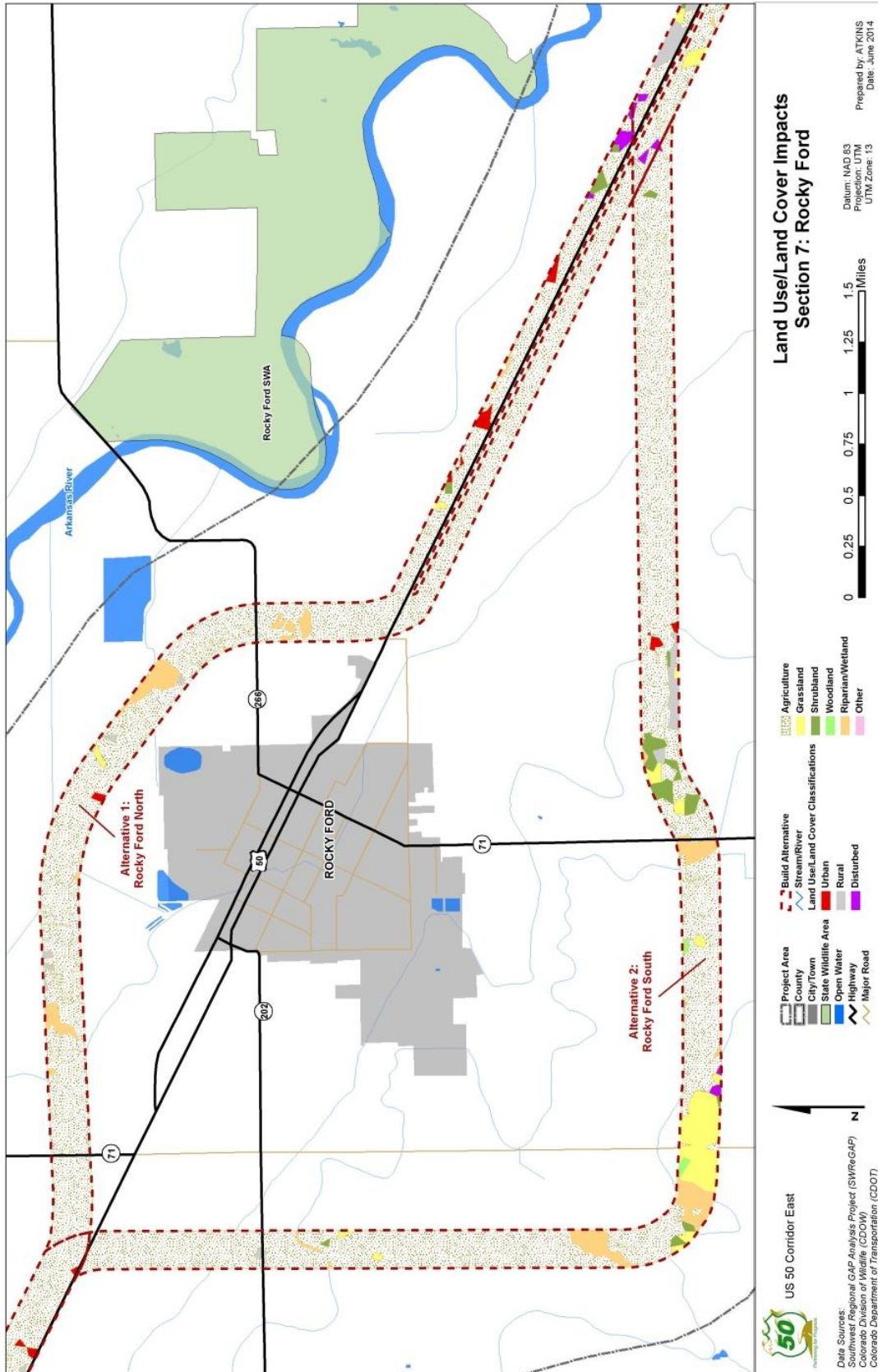


Figure J-25. Land Use and Land Cover Impacts—Rocky Ford to Swink, Swink North Alternative and Swink South Alternative

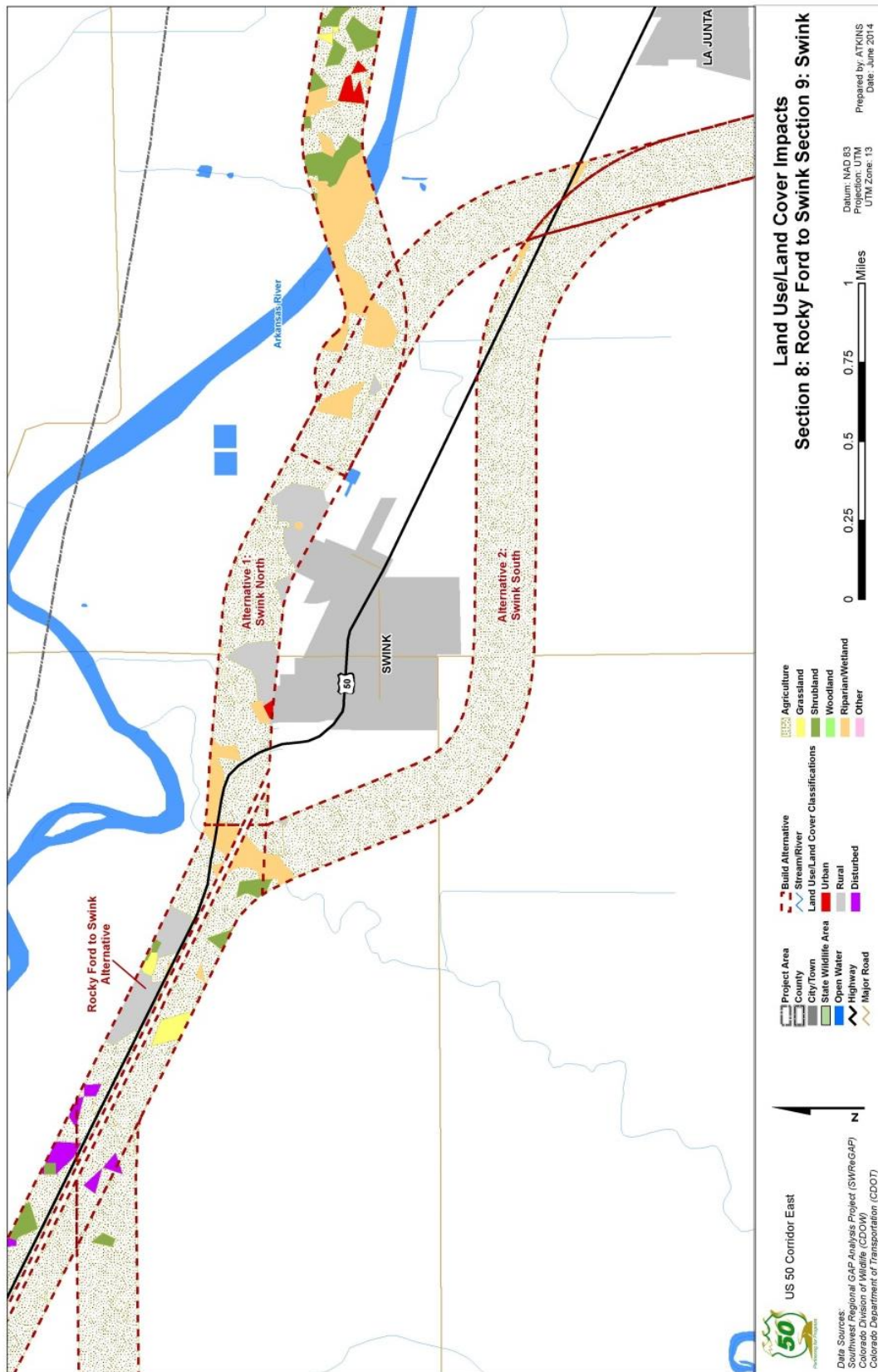


Figure J-26. Land Use and Land Cover Impacts—La Junta South 1 Alternative and La Junta South 2 Alternative

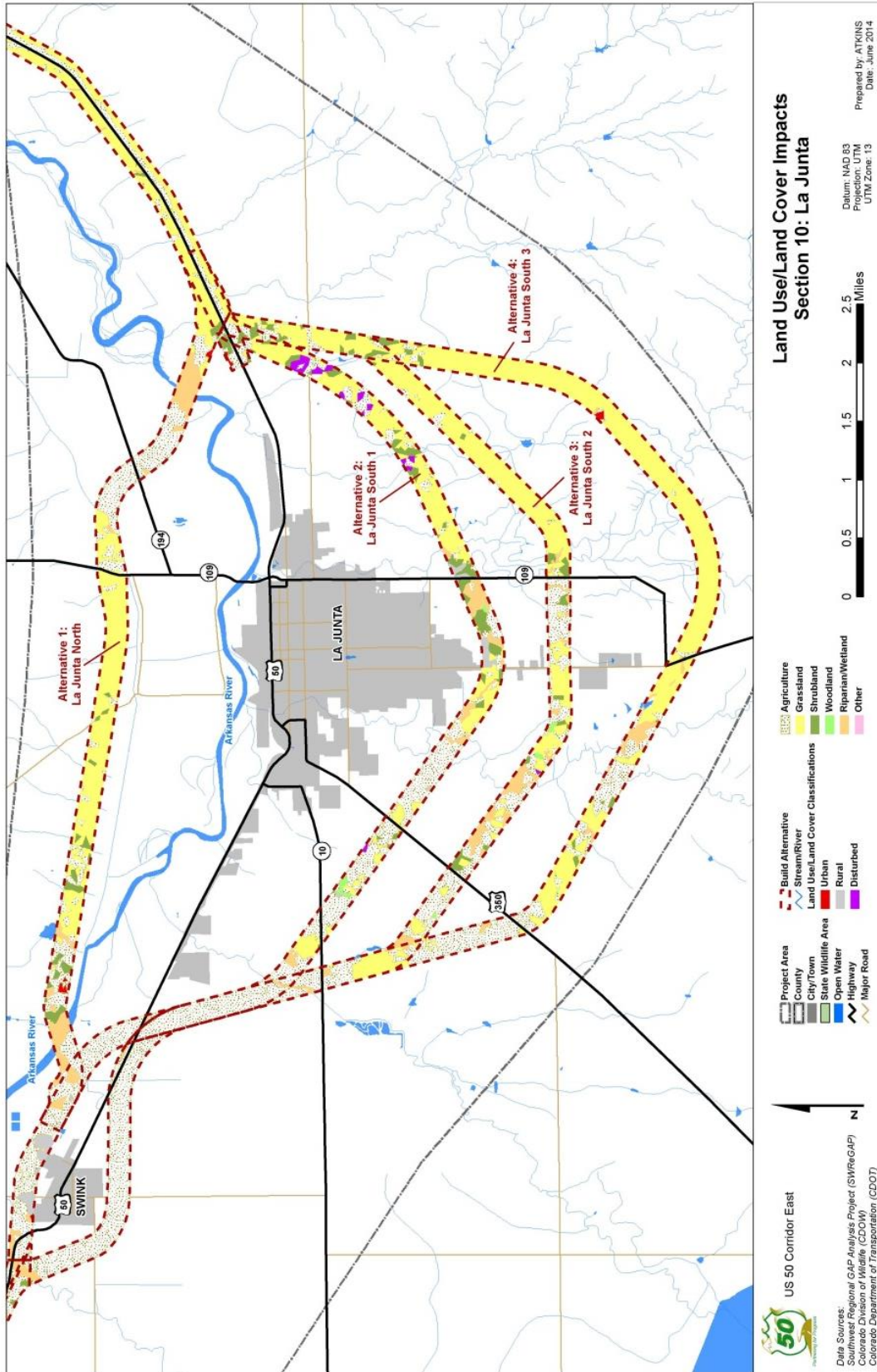


Figure J-27. Land Use and Land Cover Impacts—La Junta to Las Animas

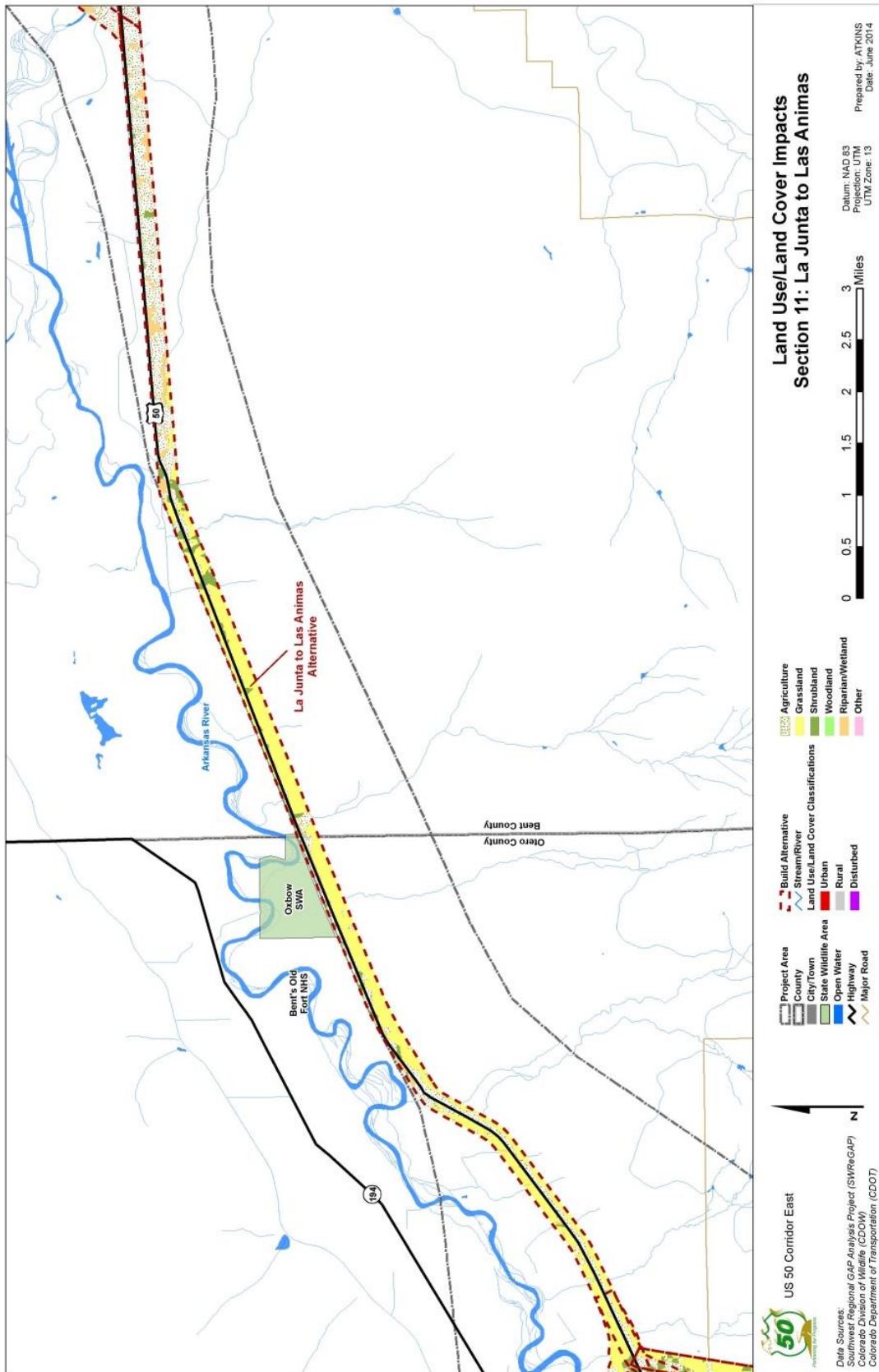


Figure J-28. Land Use and Land Cover Impacts—Las Animas

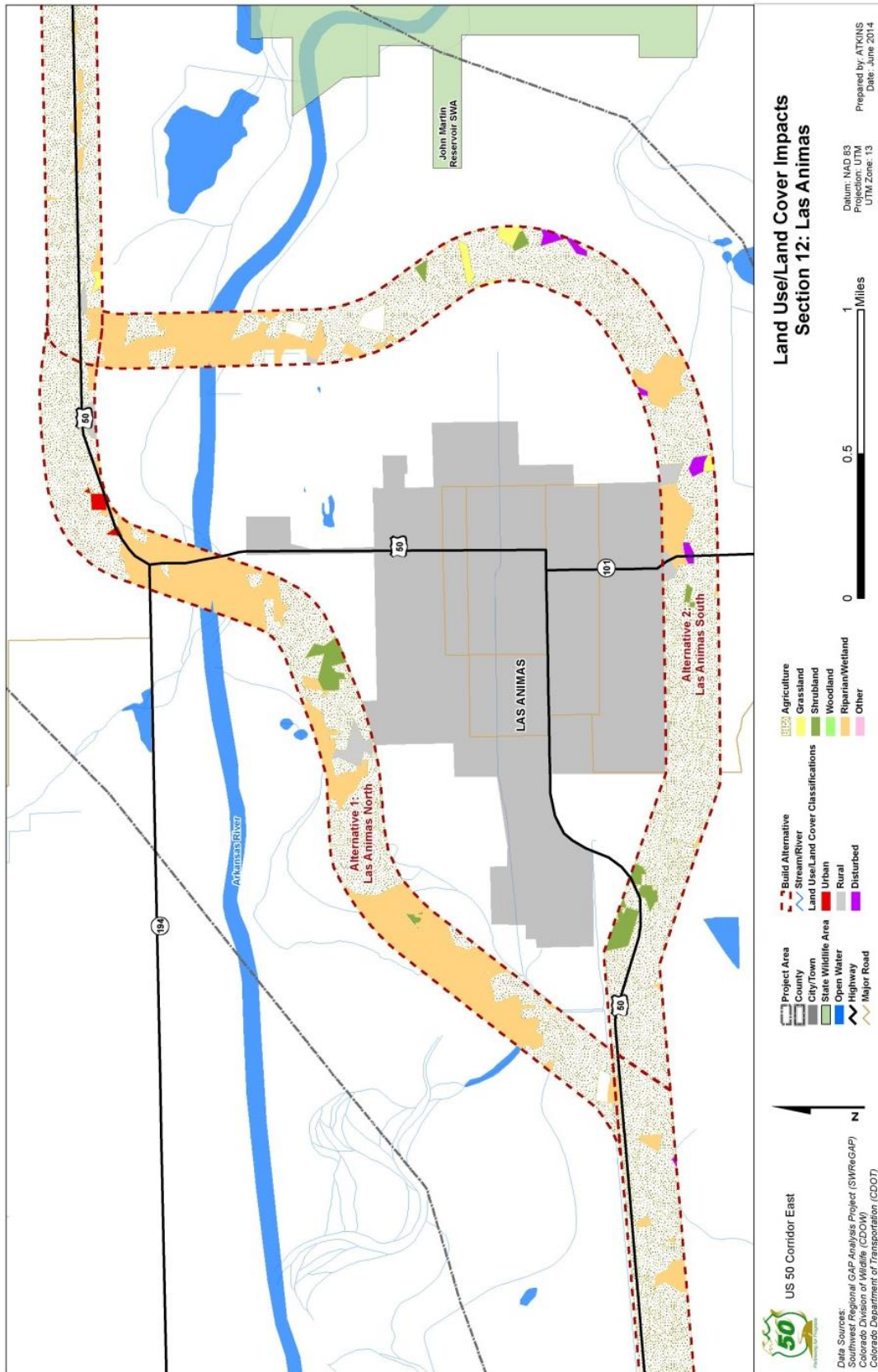


Figure J-29. Land Use and Land Cover Impacts—Las Animas to Lamar (west)

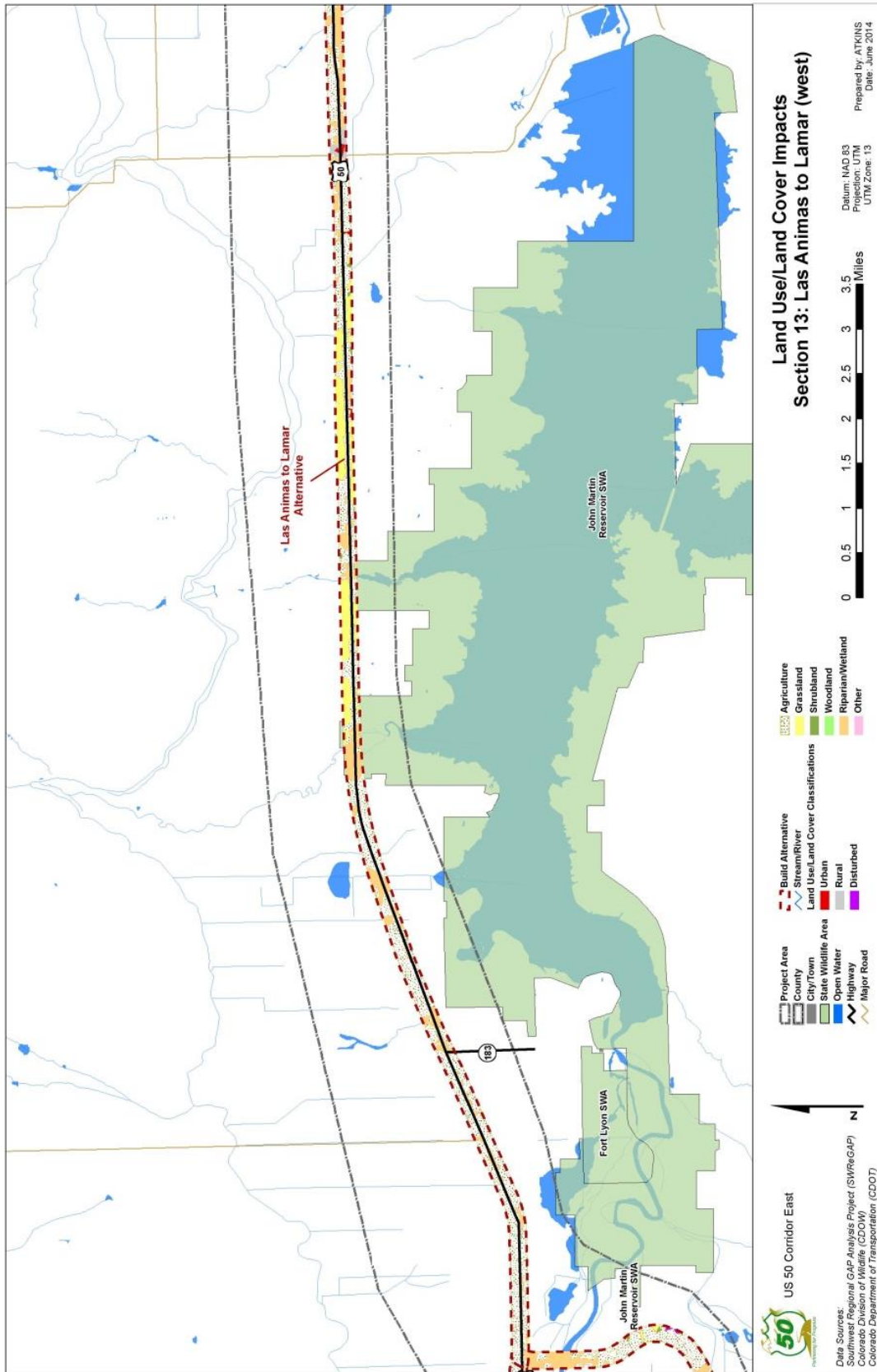


Figure J-30. Land Use and Land Cover Impacts—Las Animas to Lamar (east)

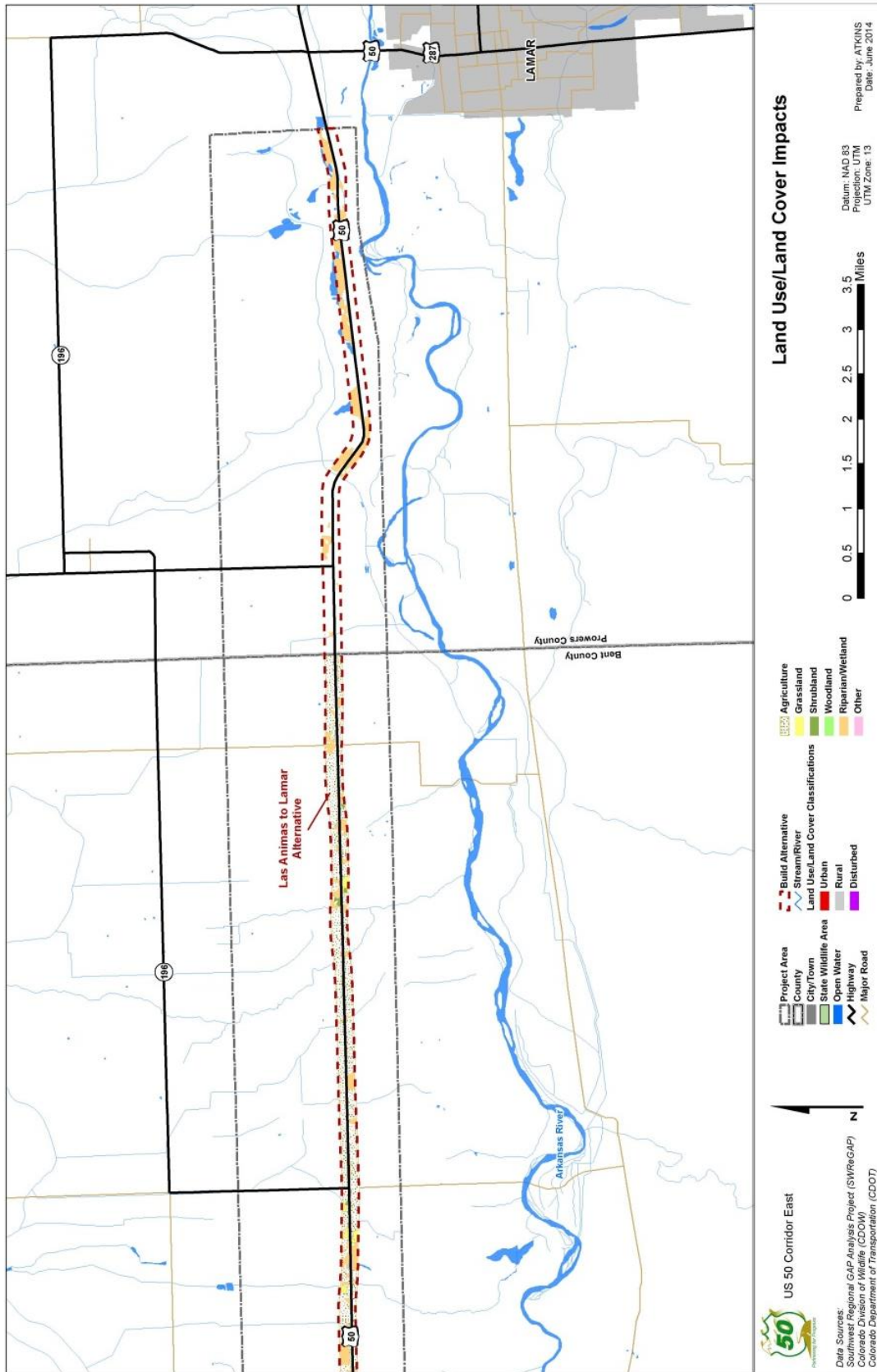


Figure J-31. Bald Eagle Habitat Impacts—Las Animas to Lamar (east)

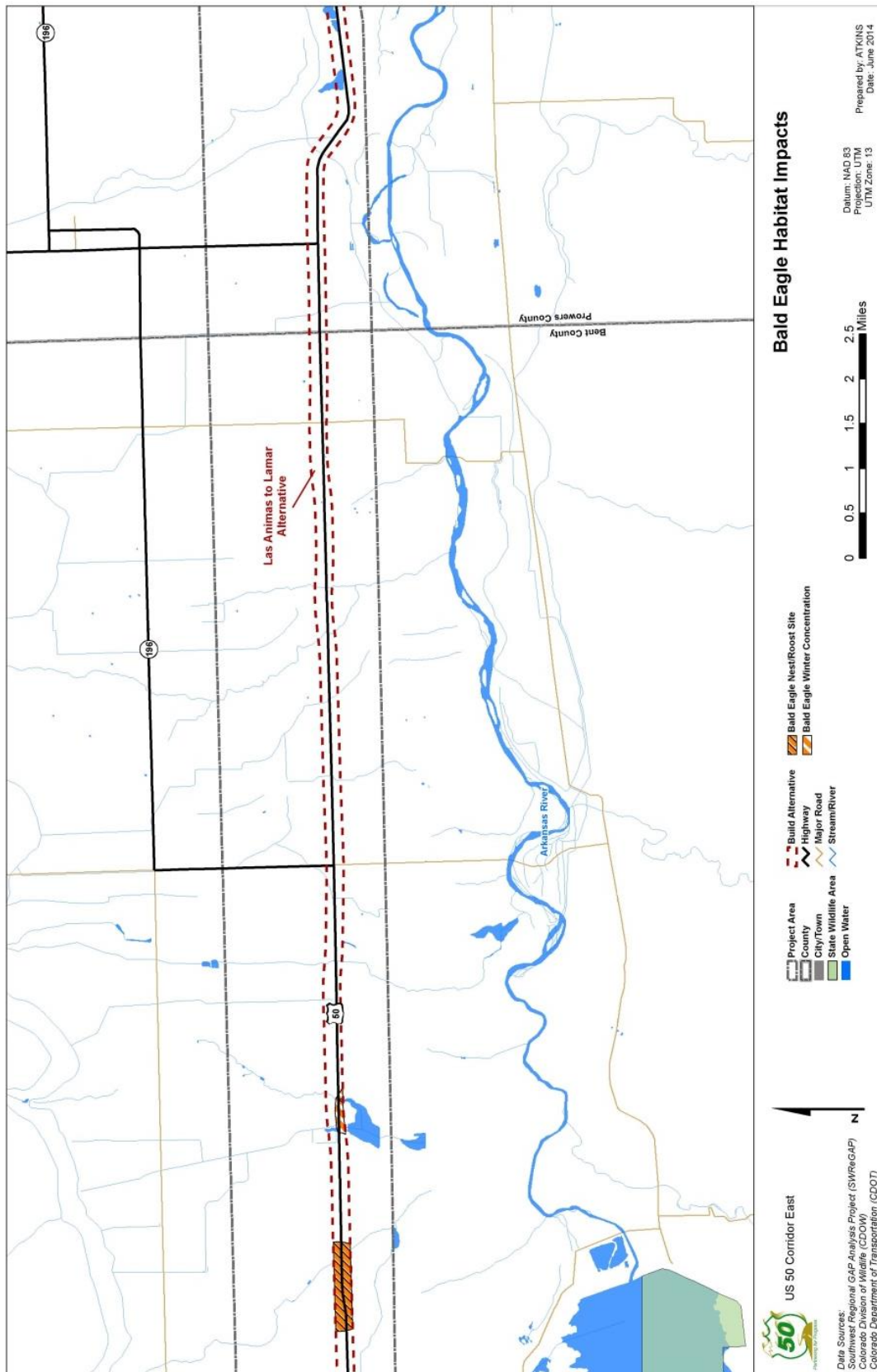


Figure J-32. Land Use and Land Cover Impacts—Lamar to Granada

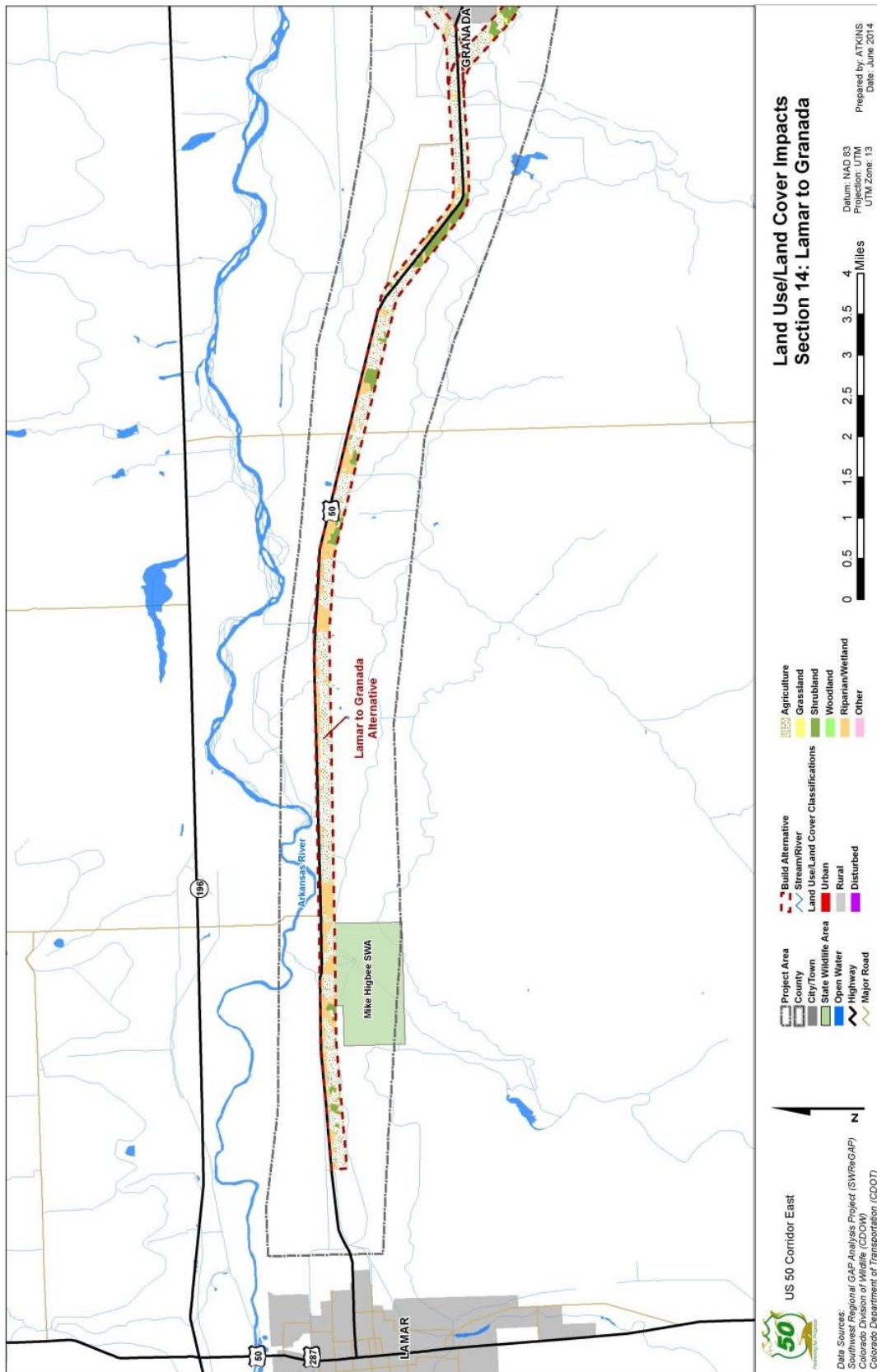


Figure J-33. Bald Eagle Habitat Impacts—Lamar to Granada

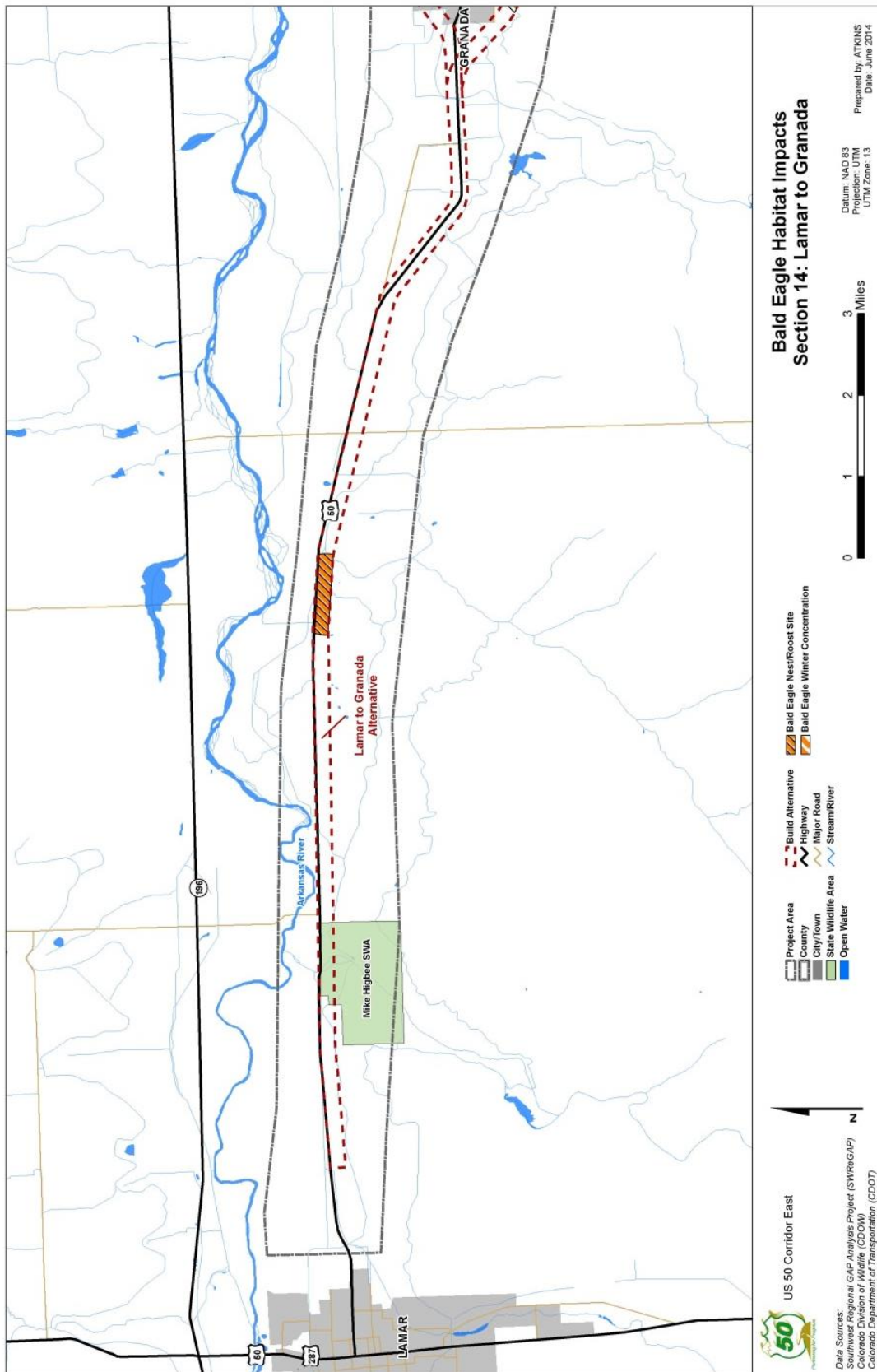


Figure J-34. Land Use and Land Cover Impacts—Granada

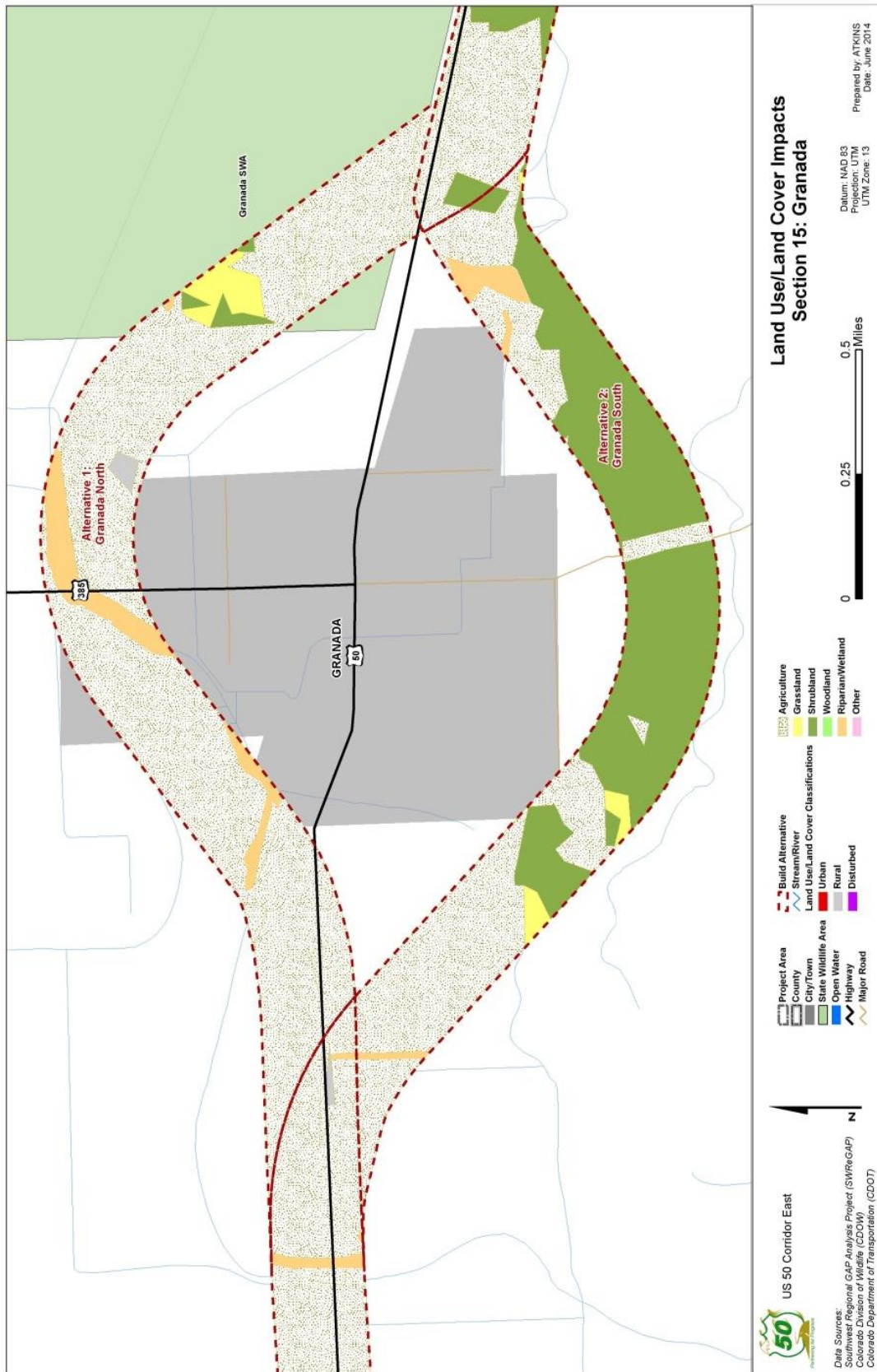


Figure J-35. Lesser Prairie Chicken Habitat Impacts—Granada

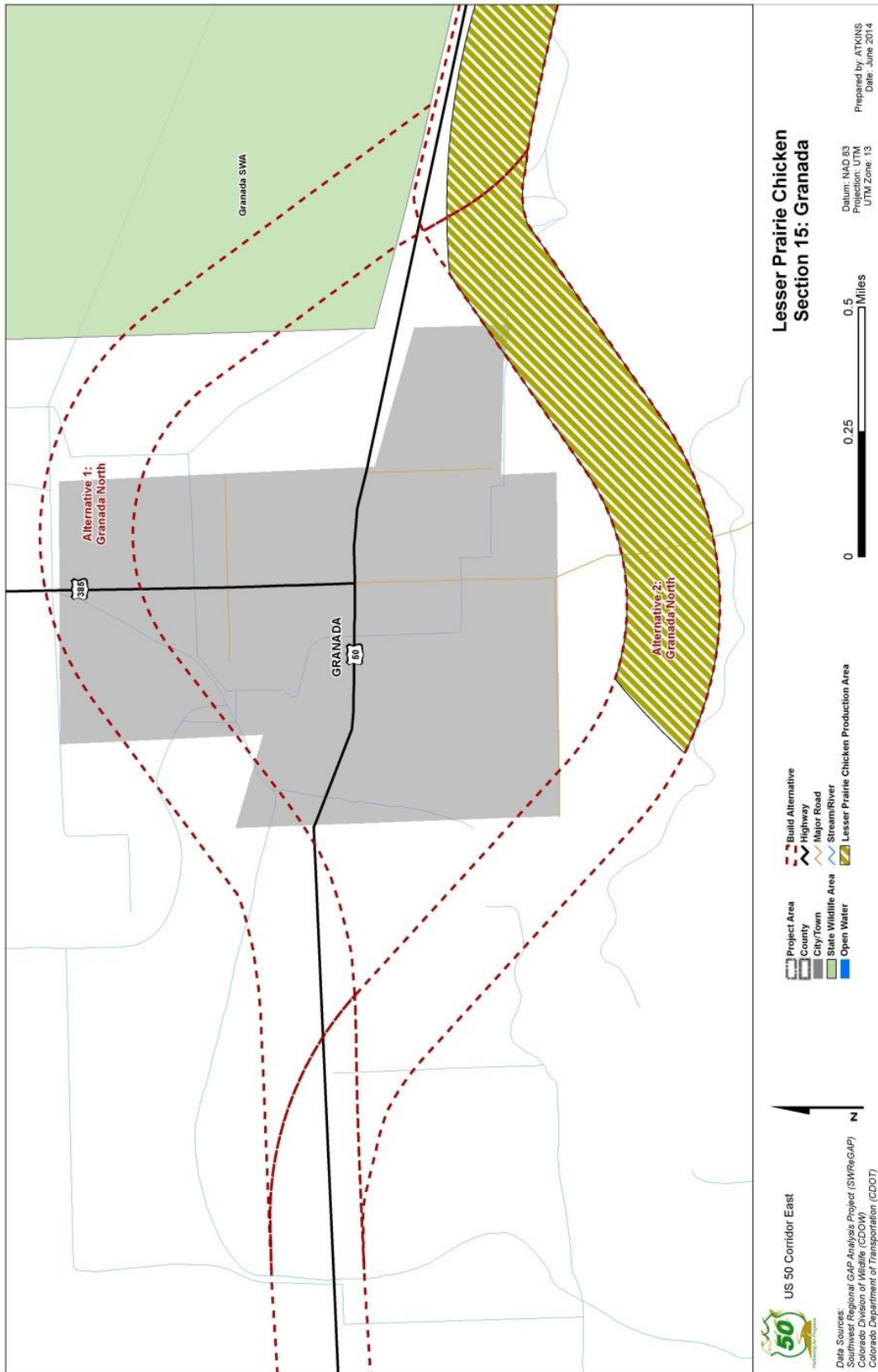


Figure J-36. Land Use and Land Cover Impacts—Granada to Holly

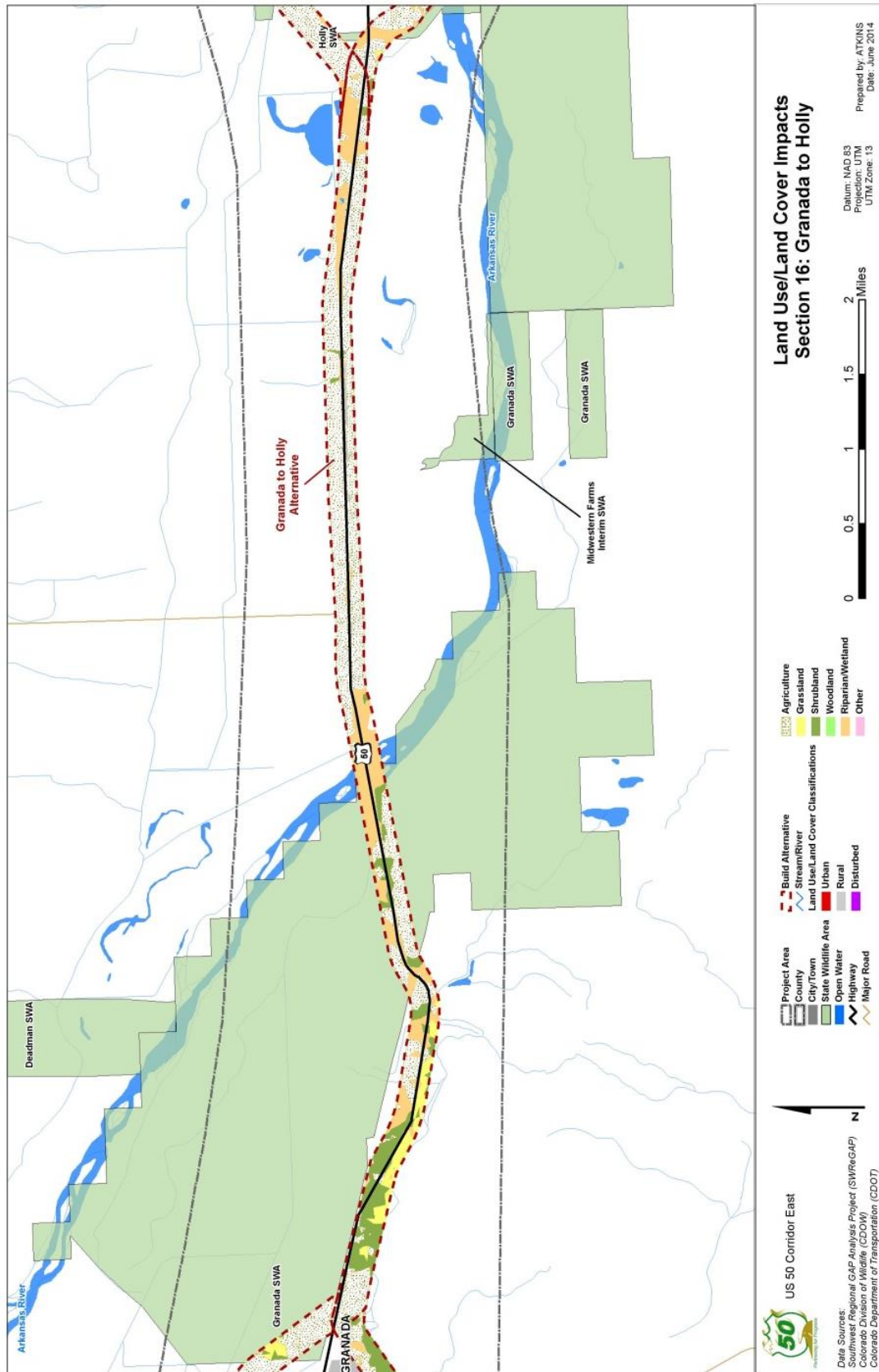


Figure J-37. Lesser Prairie Chicken Habitat Impacts—Granada to Holly

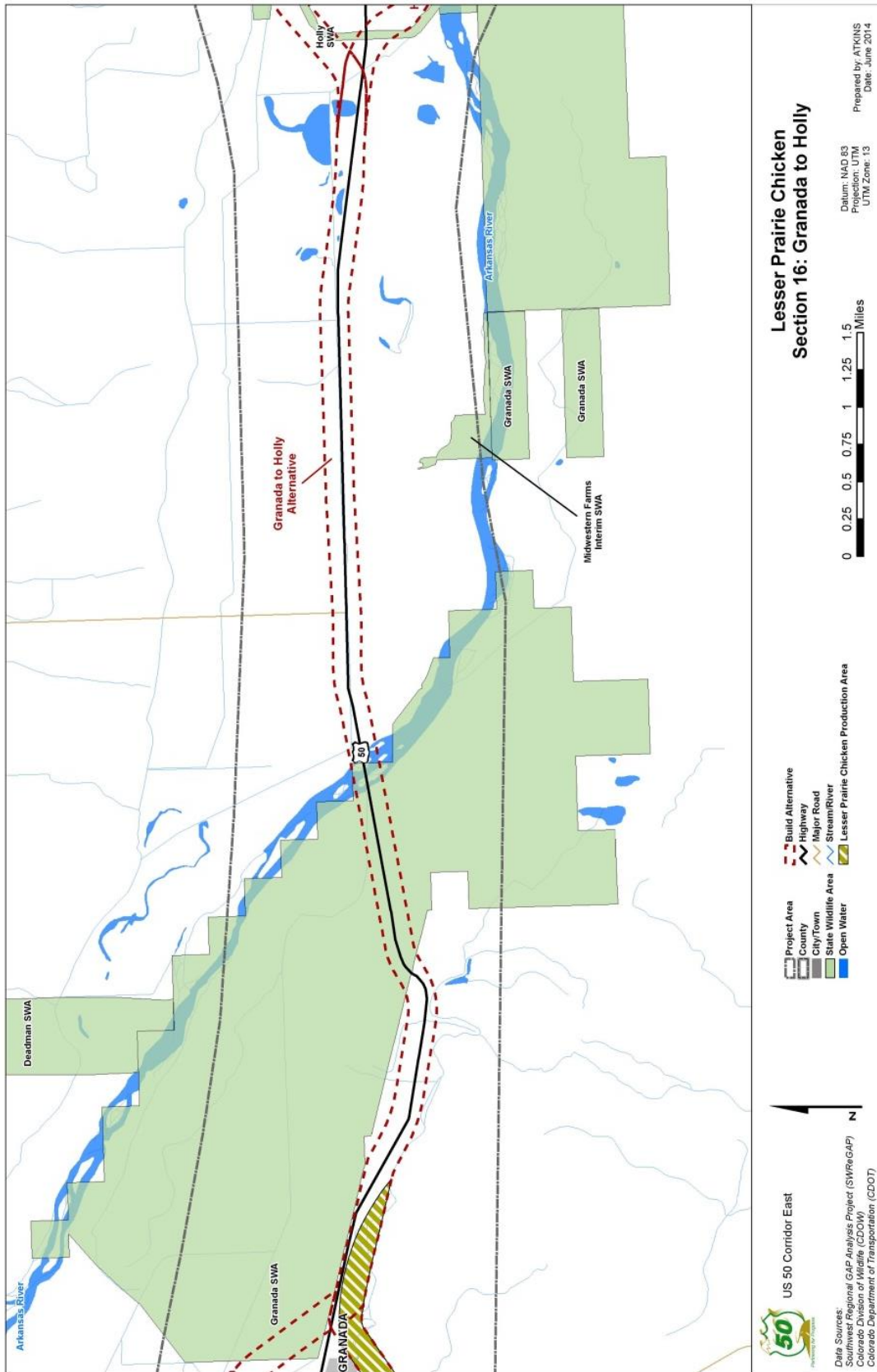


Figure J-38. Land Use and Land Cover Impacts—Holly

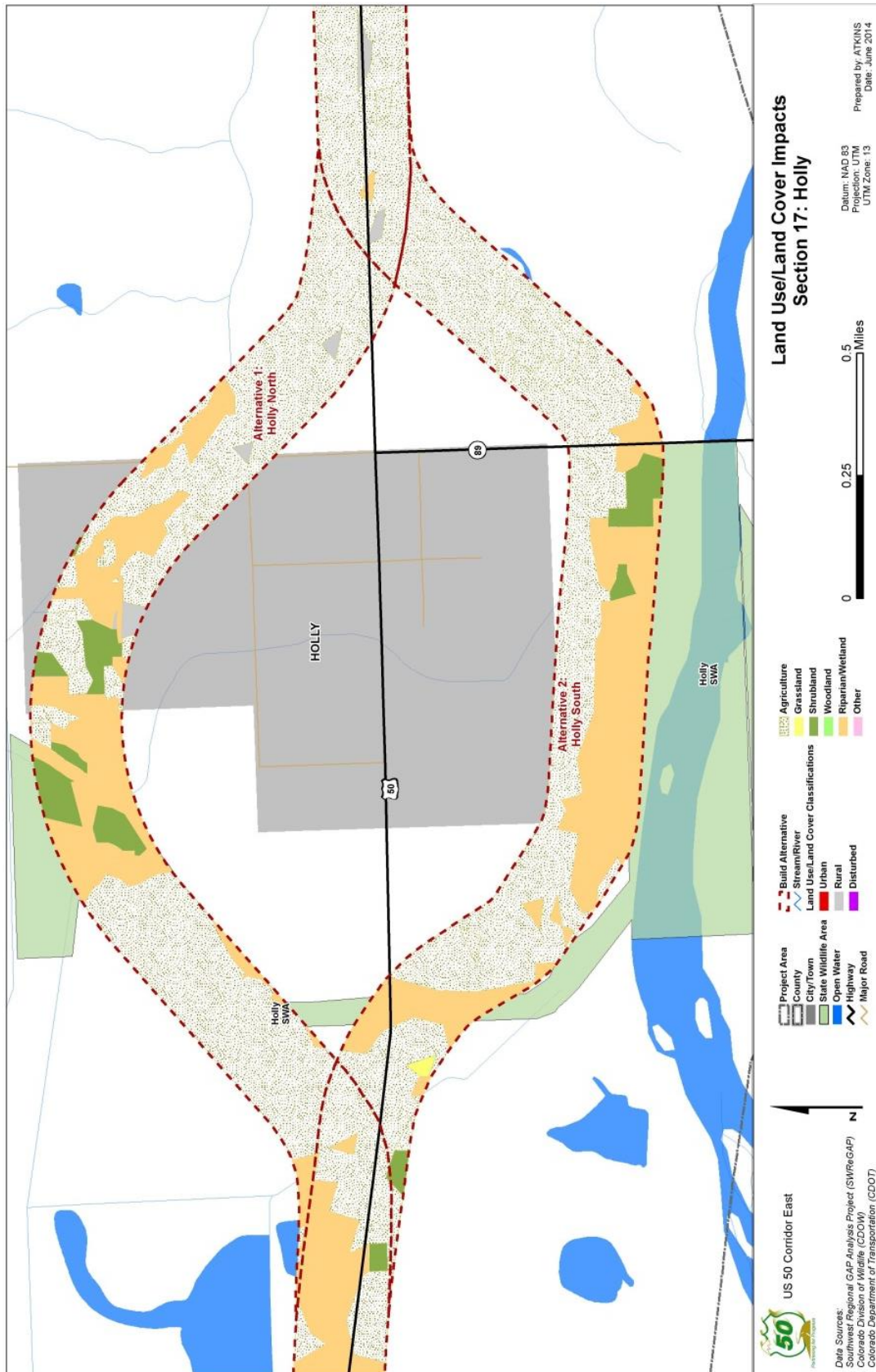
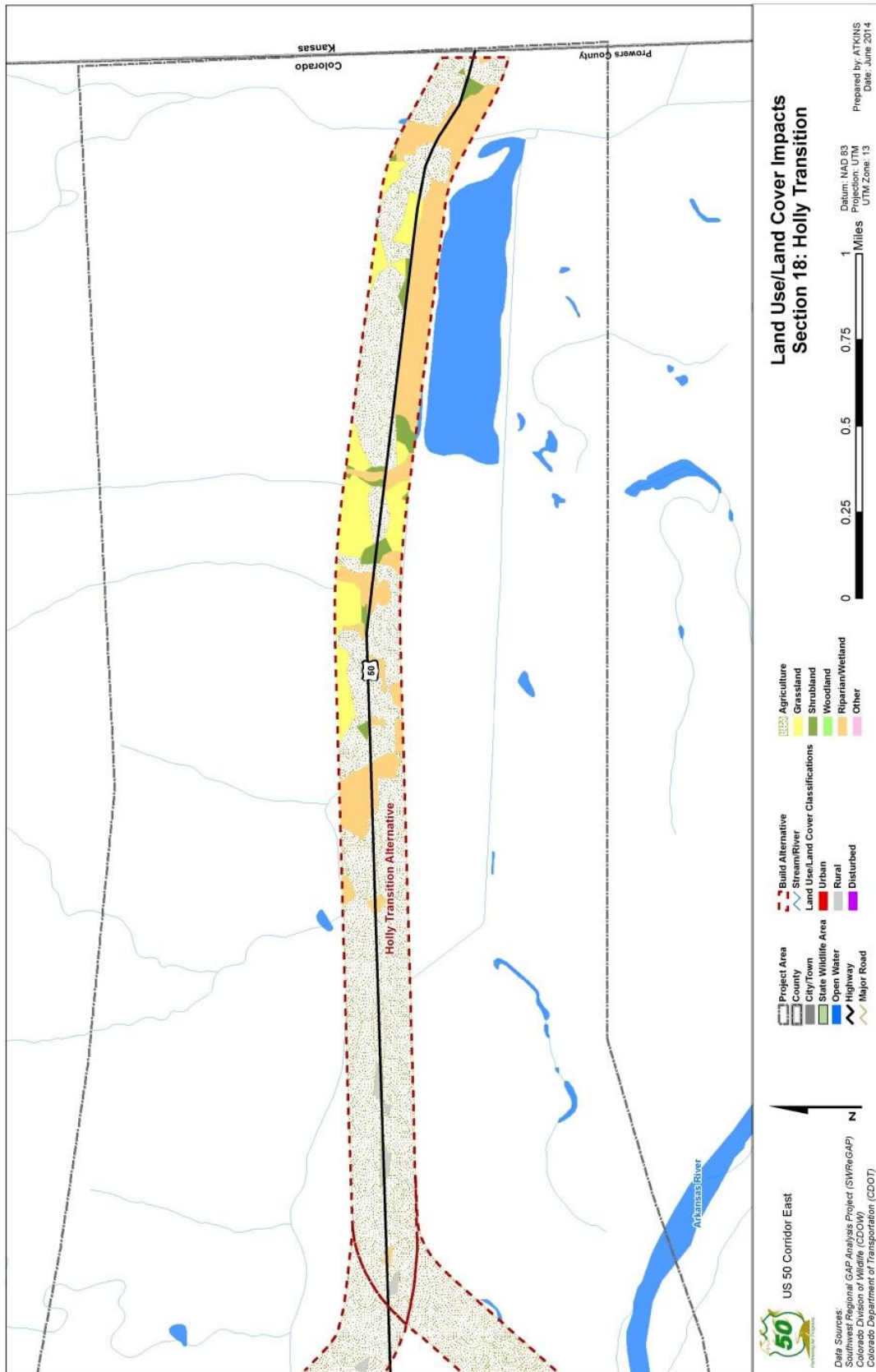


Figure J-39. Land Use and Land Cover Impacts—Holly Transition



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